Governmental Intervention in Risk Minimization for Prices of Principal Commodities: The Egyptian Case

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Abstract: The study revealed the negative impact of international prices' fluctuation and increasing trends upon domestic plans to secure needs of price-subsidized bread in Egypt. Uncertainty with respect to international prices' changes call for neutralizing their influence on domestic prices. In this respect, the study suggested a contract agreement between the local authority and producers to deliver specific quotas of wheat and maize at prices determined in advance on bases of production costs and expected profitability of competitive crops, specifically clover, cotton and rice. The risk may still hold with respect to expected prices of competitive crops, rice in particular, as influenced by international price levels. However, such risk may be minimized if firmly activate regulations of irrigation water use, exerting limits upon rice's total acreage.

Key words: Risk and uncertainty • Price fluctuation • Floor guaranteed price • Delivered quotas • Producers' response functions

INTRODUCTION

Global changes have taken place during the last two decades, reflecting on the domestic economic conditions of most countries, each according to the strength of its international links. The most drastic changes may be featured by both the global financial and food crises. While the first was caused by various both financial and economic emerging problems, the second was principally resulted by climatic disturbance mostly due to the global warming syndrome [1]. Moreover, the recent tendency toward partially replacing petrol by bio-fuels [2] produced from certain crops has become an additional influential factor. In effect, dramatic international prices' fluctuations took place. Accordingly, many countries relying to a great extent on imports of their major food needs were strongly affected, Egypt included. As measures of price forecasting are poorly managed, the impact became overwhelming. Such impact hit hard domestic production and imports of major staple crops, especially wheat and corn. In view of these respects, the study tends to propose proper measures that should be governmentally undertaken in Egypt such as to confront the risks caused by international prices fluctuations of major commodities, especially of food nature. Emphasis set upon wheat and corn as raw materials for price-subsidized bread.

Problem: Although the Egyptian government announces a guaranteed floor farm-gate price for wheat and maize every season prior to production, such prices have become subject to late changes as affected by unaccounted for fluctuation in international prices. Negative impacts have occurred on producers' production decisions, which fired back on grain deliveries for manufacture of price-subsidized bread. In turn, dramatic increases in imports occurred, enlarging as such the already tremendous deficit of the balance of trade.

Objectives: The main objective is to suggest proper methods for determination of the governmental price offers away from the uncontrolled international price fluctuations, such as to ensure deliveries of domestically produced wheat and maize, at least covering the needs of price-subsidized bread manufacture.

Methodology: Mathematical models for price determination are formulated, based upon factors found determining producers' decisions with respect to areas devoted to production of either wheat or maize and likely influencing their specific supplies to bread industry. Identification of such factors is realized through regression analysis. Estimation of Spearman's correlation coefficients may be used to judge validity of variant estimates. Data sources are principally secondary with respect to volumes of production and imports as well as domestic and international prices.

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RESULTS

Recent Trends for Wheat and Maize Economics in Egypt:
As Egypt depends on wheat imports for no less than half its needs, import prices are strongly influential. For example, the unit price of imported wheat rose in 1995 by nearly 34% from the price of one year earlier (1994) while dropping in 1999 to almost 54% of the price of 1998 [3]. Reaching the level of about $167/metric ton in 2006 it dropped in only two years (2008) to nearly 62% and then sprang again the very next year (2009) to about 180%. The average price for import price for the first quarter of 2010 has reached $325/metric ton [4], representing almost three folds the average level of 2008. Likewise, the average corn international price which was about $145/metric ton in average for the 1990s dropped to nearly $128/metric ton for period (2000-06) but sprang again to almost $240/metric ton (2009-10). In effect, the volume of wheat imports smoothly increased from 4.9 million metric tons in the beginning of the millennium to 5.9 million metric tons in 2007 then sprang to 11.5 million the very next year due to price drops caused mostly by the global financial crisis and is expected to maintain its high level during the few following years. On the other hand, corn's imports which were at level of about 1.5 million metric tons (1990-94) rose to double during (1994-95) and then to almost 4.2 million metric tons (2000-06) [3]. Such recent upward trend for both imports and prices enlarges the import bill and the balance of trade's deficit up to intolerable levels.

Extended Impact of International Prices' Fluctuations upon Domestic Economics of Wheat and Corn:
The most recent volumes of domestic production for both wheat and maize have strongly suffered the unexpected changes in international prices. Since the government apparently failed to anticipate the increase in prices after the drop of 2008, which reflected on domestic prices, producers were discouraged to maintain the areas devoted to production for both crops. Accordingly, grain deliveries for bread production dropped severely in 2008 and 2009 to less than half and one-fifth of the planned for quotas of wheat and maize, respectively [5]. Primary estimates of total acreages for wheat and corn show drastic fall for 2010 which shall be met by a wide increase of imports imposing an enormous burden on imports bill, considering the mentioned above wide leap in international prices. It is worth mentioning that another factor impedes fulfillment of required deliveries, which is shortage of storage facilities. That is since only 10% of the planned-for expansion for storage facilities in 2000 was actually established. However, fluctuation of international prices seems to be the most crucial factor causing such dilemma.

Farm-Gate Price Determination in Favor of Delivery Promotion: In view of the conditions stated above, the Egyptian government should target a certain self-sufficiency ratio, at least covering the needs for subsidized price bread. Such amounts nearly reach 9 million and 2 million metric tons of wheat and maize, respectively [5]. Accordingly, the price determined would be best derived from producers' response functions, away from international prices. Such functions should reflect the effect of influential factors, principally production costs and expected prices of competitive crops. The general mathematical form is derived as following [6]:

\[ TPR_{w.m} = AR_{w.m} \times Y_{w.m} \]  (1)

\[ Ar_{w.m} = a + b_1 (P_{w.m}) - B_1 (Ps) \]  (2)

\[ P_{w.m} = \{AR_{w.m} - a + B_1 (Ps)\} / b_1 \]  (3)

or

\[ Ar_{w.m} = a + b_1 (P_{w.m} - C_{w.m}) - B_1 (Ps - Cs) \]  (4)

\[ P_{w.m} = \{AR_{w.m} - a + B_1 (Ps - Cs)\} / b_1 + C_{w.m} \]  (5)

Where:
- \( TPR_{w.m} \) = total production of wheat or maize for delivery
- \( Ar_{w.m} \) = total wheat or maize area for delivered production
- \( Y_{w.m} \) = expected average yield of wheat or maize
- \( P_{w.m} \) = determined announced price for delivered wheat or maize
- \( Ps \) = vector of expected farm-gate prices for major competitive crops
- \( C_{w.m} \) = average production per unit cost of wheat or maize
- \( Cs \) = vector of average production per unit costs for major competitive crops

Note that \( B_1, B_2 \) are vectors of regression coefficients. Also, equations (2-5) may not be linear according to the best fit, both economically and statistically wise.

In general, the major competitive crops for wheat are clover, onions, broad beans and cotton, while rice and cotton are the most competitive to maize [7,8]. Price expectations for such competitive crops are based on their recent trends and so are the costs of production for crops involved. Differences of both production costs and expected prices of competitive crops among variant regions should lead to different announced prices for deliveries in each region. However, slight differences are expected in general. In this respect, econometricians can
provide best estimates for the former mathematical equations with monotonic updating according to any changes in cost items or inclusion (or exclusion) of competitive crops. It is also preferable to make specific estimations for each of different regions in order to avoid econometric problems of aggregation which occur for estimations at the national level.

**Validity Test for Determined Price:** To chose among possible different estimates, use of the Spearman rank correlation coefficient analysis tool may be most proper for a short time series [9] selected for testing the effectiveness of each estimate.

**Estimate:** Spearman Cor (Pw.m-Pa), (Q*-Qa).

Where:
- Pw.m = determined announced price for delivered wheat or maize
- Pa = Actual delivery price
- Q* = volume of delivered grain required for bread production
- Qa = Actual volume of delivered grain

It would be applied for different estimates of determined prices according to variant suggested models for the last period of 4-5 years. The estimate with the highest positive correlation coefficient is chosen.

As example, the Spearman coefficient was applied on data of period (2003-08) for price determined on basis of a supply response function estimated by Abdou et al. [10], where the most competitive crops were clover and cotton. The estimated correlation coefficient was nearly 0.63. Higher estimates are hardly obtained considering influence of other factors upon delivered bulks, especially bureaucratic complexities in both receipt of grains and payment of the delivered to producers. That is in addition to producers’ response to higher price bids by the private sector middlemen.

It is worth mentioned that exclusion of international prices appears necessary for crops such as wheat and maize which have a distinctive position in Egypt, as early mentioned. However, despite the intention to insulate the farm-gate determined price from the international prices' fluctuation, impact of the last occurs for domestic prices of some of the competitive crops considered in price determination. Such condition applies for both cotton and rice as exportable commodities. While, cotton's price fluctuation is of negligible magnitude, the opposite occurs for rice. Although producers are discouraged by the unexpected drops in rice prices, their level is still in favor of its production on expense of maize. The remedy lies in activation of the official regulations exerting limits on rice acreage under the policy of irrigation water use rationalization.

**Confrontation of Delivery Failure's Risk:**

Full commitment of the government, or the relevant authority, to the announced price should be officially guaranteed. On the other hand, the authority must face the risk of producers’ failure to fulfill their part of the deal. For if the international prices at harvest time turn up considerably higher than the announced price, middlemen would be lured to offer higher than the announced price in order to procure the produce for uses other than price subsidized bread manufacture, especially considering the better quality of the domestic produced wheat. The producers in turn would respond to the higher price and refrain to deliver their produce to the authority. To deal with such problem, the authority should have legal contracts with producers before season, such as to ensure delivery of certain quotas of the produce at the set price. To encourage farmers to submit to such deal the authority should offer a down payment of the produce's value, covering some of the production costs and mediating to some extent the impact of a crucial problem facing most of the Egyptian producers, which is tight budget. According to levels of costs for both production requisites and labor within the most recent period (2008-09) [3], down payment of nearly one-third of the total sale value would adequately cover most of the production costs. Needless to say that violation of such contracts should be seriously and firmly dealt with.

**Benefits of the Contract Deal Execution:** The suggested above contract deal between the nominated authority and wheat or maize producers would be most beneficial to producers in two ways. It covers at least a fair portion of the production costs which represent their major production problem and forces them to apply less than proper amounts of production requisites, especially seeds and agrochemicals. Moreover, it allows them to perform their production procedures free from price risks and uncertainty. As for the government, or its representative authority, disturbing plans would be minimized with
respect to volume of production, import needs, subsidies budgets, handling capacities especially milling and storing and budgets required for all relevant areas. As for the state in general, national security is sensitive to issues such as securing a sufficient undisturbed bulk of subsidized bread, a matter that may be indirectly fairly sustained by the suggested actions.

CONCLUSIONS

The study revealed the prevailing negative impact of uncertainty with respect to farm-gate prices, as influenced by uncontrolled and hard to forecast international prices. It seems to be the basic problem disturbing the government plans concerned with determining guaranteed floor prices and ensuring receipts of the required bulk of grains. This situation fully reflects upon producers’ responses, as they would regard production of wheat or maize as risky economic activities compared to competitive crops. Considering the ongoing global environmental conditions and energy growing needs, the upward trend in international prices is expected to continue. Accordingly, the suggested sort of governmental intervention becomes a necessity. Such kind of intervention is far from contradicting the prevailing liberal economy system. That is since it relies upon a voluntary agreement between the government and producers and where the suggested plan is only an attempt to better determine the present guaranteed floor farm-gate prices.

REFERENCES

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