Pursuing International Competitiveness in Iranian Wheat Policy

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Abstract

After the war with Iraq which ended in 1988, Iran implemented several agricultural support policies based on Five-Year National Development Plans. The main objective of these plans in the agriculture sector was to make the agricultural economy more market-oriented and to encourage sustainable agriculture. This paper investigates the extent to which Iran's government has been able to achieve this objective in the case of wheat. For this purpose, Producer Support Estimate (PSE) and Consumer Support Estimate (CSE) indicators for Iranian wheat are calculated and discussed. Generally, producers' and consumers' support is achieved chiefly by distorting market prices. As will be shown, from 1989 to 2006, the PSE increased about 20 times (in real prices), while the level of production increased 1.69 times. However, the PSE had no significant causal relationship with either wheat yield or its area under cultivation. With respect to consumers' support, this was found to be positive for Iranian wheat, a result that is uncommon for most developed and developing countries. Recent agricultural policies in Iran do not appear to encourage international competitiveness for wheat and are making the wheat economy more dependent on support prices. We suggest that policy makers reconsider the method of subsidization and the pricing system, at least in the case of wheat. JEL: Q18

Keywords: Producer Support Estimate (PSE), Budgetary Payments, Consumer Support Estimate, Causality relationship, Competitiveness, Wheat, Iran.
INTRODUCTION

Support policies are the most important economic policies in agriculture of developing and developed countries (Hosseini and Spriggs, 1998). Without supporting agriculture, most low-income farmers are faced with serious problems, especially when governments try to lower food prices by importing or interfering in market prices to support consumers.

Generally, supporting agricultural production and consumers’ income stabilization are two vital roles of support policies in countries whose agriculture is a primary sector. Different countries use different policy instruments to fulfill these requirements. For example, the member countries of the Organization for Economic Co-operation and Development (OECD) in 2004 allocated US$279,527 million to support agriculture production using different policies such as market price supports, payments based on output, payments based on input use, payments based on overall farming income, etc. (OECD, 2005).

In Iran, agricultural support policies have been implemented on the basis of Five-Year National Development Plans (FYNDPs). These policies were initiated in 1961 and approved as the Law of Guaranteed Purchase of Main Crops in 1989. The first, second, and third FYNDPs emphasized the subsidization of seed and fertilizer while the fourth FYNDP focused on food security through encouraging domestic production to achieve self-sufficiency of staple food, increasing incomes of farmers and rural people through price supports, and creating a fund for farmers’ income stabilization (Agricultural Planning and Economic Institute, 2005b).

Generally, Iranian wheat policy can be divided into two parts: before the introduction of FYNDPs and after. Until the introduction of the first FYNDP, Iranian wheat policy was based on low consumer prices and guaranteed purchase prices below import parity. This policy sought to encourage industrial development at the expense of the agriculture sector. However, with the introduction of the first FYNDP, the government’s attitude shifted in the direction of economic liberalization in 1989 (Hosseini and Spriggs, 1998).

The major goal of these new plans was to make the agricultural economy more market-oriented or competitive in international markets (Hosseini and Spriggs, 1998). The question is: to what extent has the goal of greater market-orientation been achieved by the various FYNDPs which have involved considerable government intervention in pursuit of production self-sufficiency (Amid, 2007) and consumer subsidy (Amid, 2007; Hosseini and Spriggs, 1998). That is the purpose of this paper.

In addressing this purpose, the paper employs an economic welfare framework similar to that used in previous research, such as Hosseini and Spriggs (1998), Gardner (1988), Alston and Hurd (1990), Alston et al., (1999), and Longworth and Knopke (1982). While the economic welfare framework is limited to a short period of time, we propose to analyze the supports in an eighteen-year period of FYNDPs.

In this paper, the amount and type of support in Iran’s wheat production and consumption were analyzed and compared with those of OECD member countries. The criteria include amounts, trends, and diversity of supports in Iranian agriculture, and the ability of support policies to make Iranian wheat production more internationally competitive through greater market-orientation and less dependent on distorted prices. In other words, less dependency on support policies, especially of input and output prices, is assumed to be an index of competitiveness. In addition, to examine the government’s success in effective encouragement of wheat production, we examined the causal relationship of the Producer Support Estimate (PSE) with wheat yield and its area under cultivation.

PSE and Consumer Support Estimate (CSE) are widely-used indicators for evaluating the amount of support in the agricultural production and consumption sectors. For our purpose, these indicators were calculated for 1989-2006. Many studies have applied these indicators to analyze support policies in agriculture. In particular, the OECD, in its annual reports, monitors the agricultural policies of its member countries through the use of such indicators (OECD, 2005). Data on the PSE and CSE of individual crops in each
member country are provided annually along with data on related indicators of support such as General Services Support Estimate, Total Support Estimate, and some subordinate indicators such as % PSE and % CSE.

Some studies also have been carried out in non-OECD countries. For instance, the International Food Policy Research Institute (IFPRI) published a report which included indicators of support for some crops in China, India, Vietnam, and Indonesia (Orden, et al., 2004). Cakmak (2003) used the PSE, CSE, General Services Support Estimate (GSSE), and Total Support Estimate (TSE) indicators to evaluate past and future agricultural policies in Turkey. He investigated whether these policies were capable of achieving sustainability.

In Iran, some studies with restrictive assumptions have also been carried out. For instance, Permeh and Seiedi (2003) calculated the level of support in Iran’s agricultural sector using the Total Aggregate Measurement of Support (TAMS) indicator in 1989-2001. Hosseini, Darvishani, and Gharib Reza (2003) calculated the PSE, CSE, and GSSE for Iran’s entire agricultural sector in 1975-2000. However, as in Permeh and Seiedi (2003), the study by Hosseini et al (2003) was unable to separate out the amounts of support given to different crops and hence did not calculate the supports for each crop separately.

The present study addresses the deficiency of previous studies in Iran. The methodology used is that developed by Portugal (2002) for OECD countries. Also, the methodology extended for non-OECD countries by Melyukhina (2002) was used for some adjustments.

**Conceptual Framework**

The analysis to be conducted in this paper is of two types. The first concerns an examination of trends in the measures of support for the Iranian wheat industry since the beginning of the First FYNDP in 1989. These trends will help to illuminate how successful the FYNDPs have been in reaching their objective of international competitiveness for one of the most important agricultural industries in Iran. The second type of analysis concerns a test of the relationship between the measures of support for wheat farmers and wheat production. A stated goal of the support measures for wheat production has been to encourage expanded production leading towards self-sufficiency. In Section 2.1 below is a discussion of the measures of support developed for both types of analysis discussed above. In Section 2.2 is a discussion of the tests developed for the second type of analysis discussed above.

**Measures of Support for the Iranian Wheat Industry**

The PSE is based on a small country assumption (price taker) and existing world prices. According to Mullen et al., (2004), “A product-specific PSE can be expressed in monetary value per unit of output, as an aggregate monetary value for total national production of the given commodity, or on a percentage basis, usually reported as a percentage of the value of production plus budgetary support provided to that commodity”.

The PSE can be categorized into eight subcategories. The first is Market Price Support (MPS), The seven other subcategories of support, called Budgetary Payments (BP), are various types of budgetary outlays and payments by which governments support farmers (Mullen et al., 2004). Definitions and procedures of MPS, BP, and PSE measurement follow.

**Market Price Support (MPS):** According to Mullen et al., (2004), assuming competitive markets, ex post price certainty, and a small country case, the domestic farm-gate price of a commodity, Pd, is compared to an adjusted reference price, Par. According to Melyukhina (2002), this may be obtained for an imported commodity as in equation (1):

\[
P_{ar} = P_r + (C_p + T_{d1}) - (T_{d2} + M) - Q_{adj}
\]

where, \(P_r\) is the reference price at the border, \(C_p\) is the port charges, \(T_{d1}\) is the transportation, handling, and marketing costs from port to internal wholesale market, \(T_{d2}\) is the transportation and handling costs from farm to wholesale market, \(M\) is the marketing and processing costs.
costs from farm to wholesale market, and $Q_{\text{adj}}$ is the quality adjustment factor. $P_r$ is the world market c.i.f. price for an imported commodity, expressed in the domestic currency. The adjustments in equation (1) make the reference price, $P_r$, comparable with the domestic farm-gate price in a specific level of market that here is the wholesale market level. The researcher may adjust both $P_r$ and $P_d$ in any level of a market in which the international and domestic commodities can be made “like with like” by the quality adjustment factor, $Q_{\text{adj}}$ (Portugal, 2002).

**Budgetary Payments:** Budgetary payments usually are supposed to be divided into seven subcategories: those based on 1) output; 2) area planted/animal numbers; 3) historical entitlements; 4) input use; 5) input constraints; 6) overall farming income; and 7) miscellaneous payments (OECD, 2003).

In Iran, the only items in use are payments based on input use and Crop Insurance Policy which is included in area planted/animal numbers. In Iran, we also have Subsidized Bank Credits for the Agriculture Sector as a kind of miscellaneous payment.

Payments based on input use are associated with policy measures based on the use of a specific input or a specific group of inputs or factors of production (Portugal, 2002 p. 3). These payments are calculated by:

$$\sum_{i=1}^{n} (P_{Di} - P_{Wi}) Q_i$$  \hspace{1cm} (2)

where, $Q_i$ is amount of tradable input $i$ in wheat production, $P_{Di}$ is domestic (subsidized) price of input $i$, $P_{Wi}$ is adjusted reference price for input $i$; and $i=1,...,n$ is the number of subsidized tradable inputs in wheat production. As described in the previous section, in the case of an importable input, adjusting $P_{Wi}$ is similar to adjusting $P_{ar}$.

In developing countries, like Iran, the researcher must try to include all explicit and implicit types of budgetary assistance, even if they are not paid to farmers directly. According to Melyukhina (2002), “Preferential prices for inputs such as electricity, fertilizer, irrigation, and transportation also may be more important in developing than in developed countries”. Therefore, in this study, fuel subsidies and transportation costs have been taken into account as budgetary payments.

**Producer Support Estimate (PSE):** Support policies which have been implemented in Iran’s agriculture production sector may be categorized into five types: (1) Guaranteed Purchase Policy, (2) Crop Insurance Policy, (3) Subsidized Bank Credits (4) Payments based on input use, and (5) Mechanization Development and Production Inputs Supply Policy. The first four policies are directly related to the PSE and affect it.

With respect to these support policies used in Iran’s agricultural production sector, the PSE on wheat is specified as the sum of the MPS for wheat, payments based on input use, crop insurance payments, and subsidized bank credits where:

1. The MPS for wheat is calculated as total wheat production multiplied by the difference between domestic and world price of wheat (after accounting for transportation costs);
2. Payments based on input use is calculated as in equation (2) using the amount of subsidized inputs used in wheat production, and the difference between their domestic and world price (after accounting for transportation costs);
3. Crop insurance payments are for using area planted/animal numbers;
4. Subsidized bank credits are calculated by multiplying the difference between the bank interest rate for the agricultural sector and other sectors of economy by the amount of subsidized credit in the agriculture sector;

**Percent PSE:** Percentage PSE is more appropriate than PSE for comparing the support between countries. According to Portugal (2002) “percentage PSE is the share of gross farm receipts derived from policies” and may be expressed as

$$\%\text{PSE} = \left( \frac{MPS + BP}{VP + BP} \right) \times 100$$  \hspace{1cm} (3)

where $VP$ is the value of production at producer prices (not including output payments).

**Consumer Support Estimate (CSE):**
includes the following explicit and implicit consumer transfers associated with the MPS (Portugal, 2002). In this study, they were measured at the wholesale level. These transfers include:

1. (Negative) transfers to producers from consumers, which has a negative value if the consumer price is below the world price, as in Iran. Here, the ceiling price of bread for consumers is lower than both the world price and the producer price for wheat.

2. Other (negative) transfers from consumers. According to Portugal (2002, p.5), other transfers from consumers can be represented as the “transfer to the budget or to importers, or both, on the share of consumption that is imported”. When this item has a negative value, it means that the country is a net importer and there is a payment from the budget to import the wheat.

3. Transfers to consumers from taxpayers, which is the amount of subsidy that the government pays to consumers for bread consumption.

4. Excess feed cost, which arises when the government sells a crop (as an input) at a lower price than the world price for feeding.

A negative CSE indicates an implicit tax from consumers associated with agricultural policies (Portugal, 2002 p.5).

Testing the Effects of Government Support for Wheat Production

A simplified acreage response function from Salassi (1995) can be represented by

\[ A = f(P, X) \]

where \( A \) is the planted acreage of the crop, \( P \) is the price of the crop, and \( X \) is a vector of variables representing supply shifters. According to Mahmood et al., (2007) and Salassi (1995) supply shifters include variables such as government support, lagged planted acreage of the commodity, and lagged price of crop. Some studies, such as Krause et al., (1995), also emphasized on the necessity of a vector of prices for substitute crops. Therefore, Hsiao’s Granger Causality Test (Hsiao, 1981) was used in conjunction with equation (4) below to examine the relationship between PSE and area under cultivation of wheat. In this equation,

\[ Area = a_0 + a_1TOT + a_2RPSE + \varepsilon \quad (4) \]

Where, \( Area \) is the ratio of area under cultivation of wheat to area under cultivation of seven major food crops (barley, corn, rice, sugar beet, soya, cotton, and wheat), \( TOT \) is terms of trade of wheat to seven major food crops, \( RPSE \) is the ratio of wheat PSE to total PSE of seven major food crops, \( \varepsilon \) is error term, and \( a_0, a_1, a_2 \) are parameters to be estimated.

Thus, cultivated wheat area (as a proportion of total cultivated area under the major crops) is expressed in equation (4) as a function of relative prices (the TOT) and relative producer supports. An accomplishment of this paper to literature is that in addition to relative prices, vectors of PSEs and area under cultivations for substitute crops are taken into account.

Hsiao’s Granger Causality Test (Hsiao, 1981) was also used to examine the relationship between PSE and wheat yield. In the estimating equation (5) below, wheat yield is expressed as a function of wheat PSE as well as other variables that are thought to have an important influence on yield; notably technological improvements and the presence of spring rain. Thus: (5)

\[ Yield = a_0 + a_1Trend + a_2PSE + a_3Rain + \varepsilon \]

Where, \( Yield \) is wheat yield per hectare, \( Trend \) is index of technology improvement, \( PSE \) represents wheat PSE, \( Rain \) is the amount of spring rain in millimeters, \( \varepsilon \) is error term, and \( a_0, a_1, a_2 \) are parameters to be estimated.

According to Hsiao (1981) all variables in the above-mentioned models have to be stationary. We used the difference form of Difference Stationary Process (DSP) variables and the detrended form of Trend Stationary Process (TSP) variables to make them stationary.

RESULTS AND DISCUSSIONS

Measures of Support

The data and calculations of annual estimates of wheat support are presented in Tables 1 and 2 below. Table 1 contains the data and calculations for MPS and CSE, while Table 2 contains the data and calculations for PSE. MPS in both nominal and real prices was calculated to be negative from 1989 to 2000, shifting to positive in 2001. That is, until 2000 the domestic price
of wheat was less than its adjusted reference price and thus during this period, wheat producers paid an implicit tax to consumers.

Since there was a steadily increasing trend in domestic prices (producer and consumer) from 1989 to 2005, we can deduce that MPS fluctuations were mostly affected by the exchange rate and world price fluctuations. After the Exchange Rate Equalization Policy in 2002, the MPS in both current and real terms has had fewer fluctuations. In 2001, the MPS switched from negative to positive, and thereafter its trend has been upwards, rising from a 2001 figure of 857 billion Rials in current prices (US$107 million) to 12,250 billion current Rials (US$1328 million) in 2006; that is a fourteen-fold increase in just five years. Even in real prices, it increased 759 per cent over the same period (from 455 billion Rials in 2001 to 3460 billion Rials in 2006). Such increasing market price supports not only impose a burden on the treasury, but also distort domestic prices severely and keep the wheat economy far from international competitiveness.

The increasing trend of MPS is directly related to the wheat pricing system. In Iran, the wheat pricing mechanism facing farmers is based on a production cost method, which probably was not problematic when the domestic producer price of wheat was less than world parity. However, owing to the high inflation rate in recent years, production costs have increased and hence the domestic producer price of wheat has exceeded its world price equivalent.

Rising prices decrease the competitive power of Iranian wheat in world markets. Thus, continuing with this pricing mechanism no longer seems to make sense. The Law of the Fourth FYNDP also has emphasized the need to revise the pricing system of agricultural products (Agricultural Planning and Economic Institute, 2005a). Other pricing methods such as the border price equivalent method or the terms of trade method might now be more appropriate for Iranian wheat producers.

Note: * MPS was deflated using the PPI (base year: 1997).
 ** CSE was deflated using the CPI (base year: 2004).

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<th>Table 1: Iran’s Wheat MPS and CSE</th>
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<td>1. Percentage CSE</td>
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<td>2. CSE in real prices**</td>
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</table>
III. Producer Support Estimate (PSE)

II. Value of production (at farm-gate)

I. Level of production

V. Percentage PSE

IV. PSE (in real prices)

Note: PSE was deflated using PPI (base year: 2004).

Referring now to Table 2, BP has been the dominant component of PSE, in both current and real prices, during the years since 2001 (when MPS switched from negative to positive). It increased in current prices between 1989 and 2006 by about 85 percent annually (from 772 billion Rials in 1989 to 12,569 billion Rials in 2006); however, in real prices, it decreased to 7011 billion Rials in the same period. In the 1999-2006 period, the PSE increased about 19 times (in real prices), while the level of production increased just 1.69 times (Table 1).

Tests of the Effects of Government Support

A key objective of the various FYNDPs has been to increase production of staple foods such as wheat and hence move the country towards self-sufficiency. In this Section we discuss the results of tests of a significant relationship between government support for producers (as measured by PSE) and the components of wheat production (area and yield). Yield of wheat, its area under cultivation and imports in 1989-2006 are used (Yield and area under cultivation: Ministry of Jihad-e Agriculture Import: FAO/FAOSTAT-Agriculture/TradeSTAT).

As proposed in Section 2.2, Hsiao’s Granger Causality Test was used to carry out these tests and the results are summarized in Tables 3 and 4 below. In neither case was a significant relationship found between PSE and the corresponding component of production. In Table 3, the insignificant T-Ratio on the RPSE coefficient suggests a lack of relationship between PSE and area under cultivation. In Table 4, the insignificant T-Ratio on the PSE coefficient suggests a lack of relationship between PSE and yield.

Azari (2008) applied the same test to examine the relationship between AMS and production
growth of some agricultural commodities, including wheat, in Iran. He also found no Granger causality between the AMS of wheat and its production growth.

This suggests Iranian wheat support policy has been unsuccessful in encouraging domestic production and attaining self-sufficiency. It is true, imports have declined in recent years (see FAO/FAOSTAT-Agriculture/TradeSTAT, years 2004 to 2006). However, this appears to be an aberration because by 2008, imports had climbed back up to 5.9 million tons and for 2009, the Government has passed a by-law allowing the Government Trading Corporation (GTC) of Iran to import more than 7 million tons wheat (Islamic Republic News Agency, 2009).

This failure to improve the yield or to encourage the area under cultivation might be due to the lack of targeting in the support provided to the Iranian wheat industry. For example, one of the most important forms of support is the fuel subsidy, but this is generally available and not just for farmers. In addition, the MPS measures are based on an inappropriate pricing system which is, after all, severely affected by inflation but insensitive to world prices and the internal terms of trade of crops (and hence their substitution possibilities). Support policies for Iranian agriculture generally are minimally distorting as they apply to all producers regardless of their yield and hence tend not to be significantly production enhancing.

In many ways this has merit because, while the Government may wish to support low-income farmers, this should not be done at the expense of making the wheat industry more market-oriented and competitive. Otherwise agriculture will always remain an infant industry. As shown in Table 6, the wheat PSE for OECD did not exceed US$19 billion during 1986-2004.

Looking now at the consumer subsidies, CSE is comprised of two important components: budgetary transfers and market transfers. In this study, budgetary transfers consist of a bread subsidy and a wheat import subsidy while market transfers are indicated by the extent to which the domestic price is set below the reference price. According to Table 1 and Figure 1, the CSE for wheat in current prices has an upward trend while in real prices the trend is downward. However, in either real or current terms, its fluctuations closely follow reference price variations.

During the period under review, the bread subsidy rose steadily, and hence fluctuations of market transfers (owing to reference price variations) are the main source of CSE changes. It is interesting to note that for Iran the CSE is positive (see Table 1 and Figure 1). This is unlike the situation for most developed countries and some developing countries where the CSE

| Table 3: Hsiao’s Granger Causality Test for wheat PSE and area under cultivation |
|-------------------------------|-----------------|-------|
| Independent Variables | Estimated Coefficient | T-Ratio |
| RPSE (Difference form) | -0.036 | -0.94  |
| TOT (Difference form)  | 0.622** | 10.23  |
| Constant | -0.00075 | -0.0555 |

Dependent Variable: Area (Difference form)  
DW=2.01  R²=88%  
Note: Since RPSE was not significant, we did not continue the Hsiao’s process to find the optimum lag  
** Significant in 1% level

| Table 4: Hsiao’s Granger Causality Test for wheat PSE and yield |
|-------------------------------|-----------------|-------|
| Independent Variables | Estimated Coefficient | T-Ratio |
| PSE (Detrended form)  | -0.0006 | -0.0337 |
| Rain | 2.7482* | 2.205  |
| Trend | 75.450** | 9.902  |
| Constant | 1496.7** | 12.27  |

Dependent Variable: Yield (Detrended form)  
DW=1.88  R²=90%  
Note: Since PSE was not significant, we did not continue the Hsiao’s process to find the optimum lag  
* Significant in 5% level  
** Significant in 1% level

Figure 1. CSE and reference price trends during 1989-2006
tends to be negative (see, for example the data for OECD member countries in Table 5). The positive CSE for Iranian wheat is indicative of the relative political strength of urban consumers compared to rural producers. It suggests, although transfers from consumers to producers has been positive in recent years (see IX.1 in table 1), there still is an implicit tax on wheat producers in Iran, and continuing this trend will continue to affect them negatively.

CONCLUSIONS

During the period under consideration, the Iranian government has intervened heavily in the wheat industry in an attempt both to influence production and consumption. On the production side, it has attempted to both encourage international competitiveness in production and to move the wheat industry towards self-sufficiency. However, it appears to have achieved neither. It has attempted to encourage production by means of market interference through methods such as severely distorting the input and output prices. However, this has failed to have the desired effect probably because of poor targeting of the support through an inappropriate pricing mechanism. However, these same price distorting support measures have also meant that the Iranian wheat industry is no closer to being internationally competitive. Such interventions involve enormous Government outlays to both consumers and producers, which look likely to continue into the future, as well as large market transfers from producers to consumers.

Such policies place a huge burden on the Treasury and reinforce neither international competitiveness nor long-term self-sufficiency for three reasons:

1. the high support price of wheat which has a tendency to be above the world price;
2. low input prices which are below the world prices of inputs;
3. an inability to improve the yield.

With regard to the consumer subsidy this appears to be a political issue which will need to be resolved, if at all, in the political arena.

In conclusion, Iranian policy makers need to reconsider the methods of intervention in the wheat industry. Iranian wheat needs a well-targeted policy regime to support efficient production and consumption. Implementing a wider range of support policies, which are designed with respect to special characteristics of different crops and regions, could minimize the price distortions and thereby support policies would perform more efficiently. Also, we suggest that agricultural policies in Iran shift from being effectively transfer mechanisms (where farmers receive payments irrespective of yield) and toward mechanisms that encourage more efficient production, make agriculture more market-oriented, enhance international competitiveness and reduce excess pressure on the Treasury. That is, the Government should consider targeting support for increased productivity to only the more efficient producers while targeting income support to only low-income farmers. The nature of targeted support for increased productivity might include investments in seed breeding, research into new methods of cultivation and increasing efficiency of irrigation.

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