The Relational Ship between Rice Market Liberalization and Food security in Iran

S. N. Mousavi

**Poster paper prepared for presentation at the
International Association of Agricultural Economists Conference,
Gold Coast, Australia, August 12-18, 2006**

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S. N. Mousavi

Marvdasht Islamic Azad University, Marvdasht, Iran

Email: mousavi_sn@yahoo.com

Tel: +989171129500

Abstract

In an effort to alleviate rice shortages, the Iranian government is attempting to encourage the private sector to become more involved in the rice market and trade of Iran. To this end, the multi rate foreign exchange system, which was adopted for several years mainly to support consumers, is being substituted by a single rate, with which the consumer price of rice is expected to decline, and the producer price to increase towards the world price. In this study, the links between change in rice price on the one hand, and poverty and food insecurity (measured by calorie intake) on the other, are calculated by applying Foster-Greer-Thorbecke (1984) measures to data from a sample of 540 Iranian households. Because of the increase in the real income of consumers following lower prices for a staple food, the poverty rate is calculated to fall from 0.24 to 0.16. The measures of poverty gap and poverty severity are also expected to fall, by 0.07 and 0.26 respectively. However, food insecurity, in terms of daily calorie intake, was found expected to be more severe after market liberalization, particularly among the poorest in Iranian society.

Keywords: rice market, liberalization, food insecurity, poverty, Iran

1. The rice market in Iran

Rice is a major food staple in Iran, particularly in the northern areas where the majority of this crop is produced. Per capita consumption of rice rose from 18.6 kg in 1961 to around 34 kg in 1999, indicating an average growth of 1.6% per annum (FAO database). As shown in Figure 1, although the production of rice has been increased in

recent years, the gap between domestic production and consumption of rice fluctuated over this period, and a substantial share of consumption, e.g. a little over 20% in 1995, is imported into Iran each year.

Figure 1. Production and Consumption of rice in Iran
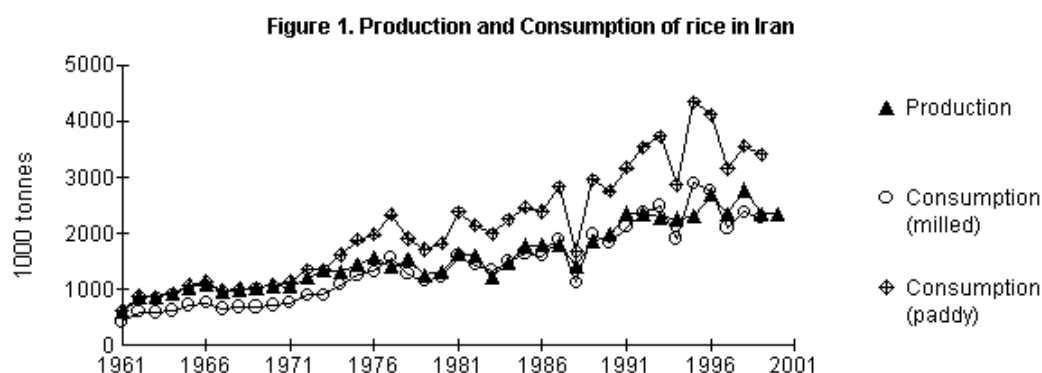
Rice production in Iran uses traditional agronomic systems and is concentrated in the northern areas, where the climate is suitable although output has been limited in recent years due to successive droughts. The farmers cannot easily adopt a new cropping pattern from which rice is excluded and are not familiar with other crops. Furthermore, there is a steady demand for at least some types of high-quality domestic rice such as *Taromi*.

2. Rice market intervention in Iran

The Iranian government intervenes in the rice market by controlling imports (which exceed 1 Mt per year, about half domestic production) to prevent rises in the price of rice in the country. The government manages only part of domestic rice consumption, namely subsidized rice, and encourages the private sector to supply the rest at a target price close to the (higher) world level. Rice importers can only earn foreign exchange, at a rate between the official rate and that in the gray market, if they agree to import rice at a predetermined price close to that of domestic rice. This policy is naturally not popular with traders. As a result, a shortage of the product exists each year, and thus the government imports rice by spending foreign currency reserves at the official exchange rate, so that the imported rice is apparently cheaper than the domestic rice. However, when the prices are evaluated at the exchange rate in the black market, the imported rice is more expensive than domestic rice.

Among the factors affecting the increasing gap between production and consumption of rice, both the direct and indirect policies of government intervention are important. These policies include farm input subsidies and credit programs, guaranteed prices, food coupon distribution, and importing rice using foreign exchange evaluated at a special rate restricted for food purchases. Najafi (1999) has suggested that most of these programs have been inefficient, and have in fact widened the supply-demand gap. With the aim of rice market liberalization, the Iranian government is currently relaxing the multiple exchange rate system so that the private sector can be more involved in the trade. According to the Iranian Trade Minister (Hamshahri, 3 Sept. 2002), the government is abandoning its exclusive imports of rice and wheat. This is likely to increase the domestic supply of rice and cause a significant reduction in price. Therefore, consumers are likely to increase their demand for rice and to substitute this product for wheat products, potatoes, etc. These changes in consumption patterns can influence their daily calorie intakes or equivalently the severity of food insecurity.

Shapouri and Trueblood (2002) have showed that global trade liberalization has so far led to only a slight improvement in the food security of low-income food-deficit countries. Also, although agricultural market liberalization and privatization may seem justified in terms of social welfare and treasury costs (e.g. Bakhshoodeh and Akbari, 2002), the policy is not fully desirable when its side-effects on poverty are taken to account. For instance, Bernabe (2002) states that "it is clear that in a world made more precarious by uncertainties in food supply and unpredictable movements in foreign exchange valuations, the only safeguard available to developing countries like the Philippines against food insecurity is to develop our nation's capacity to feed itself. And this can only be done if we reinvest in the rice industry and secure our local farmers from full-scale rice liberalization."

This paper investigates the expected impacts of future Iranian rice policy on poverty and food insecurity in Iran. The rest of the paper is structured as follows: the methods and theoretical basis are given in Section 2, followed by a short description of data and

variables. Then, the findings are discussed, and some policy implications are discussed at the end.

3. Methodology

Following Minot and Goleti (2000) and Hoddinott (1999), the class of poverty indexes defined by Foster, Greer and Thorbecke (FGT, 1984) is used to measure the poverty and food insecurity effects of rice market liberalization in Iran. Following Datt (1998), the FGT measures are defined as:

$$P_a = \int_0^z \left[\frac{z-x}{z} \right]^a f(x) dx \qquad\qquad a \geq 0 \qquad\qquad (1)$$

where x is household consumption expenditure, f(x) is its distribution density function, z is the poverty line, and α denotes a parameter whose magnitude represents the sensitivity of the poverty measure to inequality amongst the poor.

Expression (1) can be re-stated as:

$$P_\alpha = (1/N) \sum_i [(z-x_i)/z]^\alpha \qquad\qquad (2)$$

where N is total population (households), x_i is the income of household i, and the summation is limited to poor households. This expression is used by Hoddinott (1999) to measure the severity of food insecurity, expressed in terms of caloric requirement.

The usual values for α are 0, 1 or 2. Then, P_0 denotes the simple head-count or rate of poverty, i.e. the proportion of households below the poverty line, and P_1 is the poverty gap index, i.e. the product of P_0 and the gap between the poverty line and the average income among the poor. Finally, P_2 is an index of the severity of poverty, in which the proportion and the average income of the poor as well as the variance of income among them is considered. According to Hoddinott (1999), $\alpha = 0$ implies no weight to the severity of food insecurity, and $\alpha = 1$ and $\alpha > 1$ (usually $\alpha = 2$) imply equal and more weight to this severity, respectively. According to Mahmoudi (2001), the indices are not very sensitive to differences in the depth of poverty, i.e. to the income distribution among the poor.

4. Data

A sample of 540 households was interviewed in Shiraz (a city in south Iran) in 2001/02, and the collected data included monthly income, the consumption of rice, wheat products (basically bread) and potatoes, and householder-expected changes in consumption following a fall in the price of rice. The basic statistics of the sample are summarized in Tables 1 and 2. As can be seen, more than three quarters of the sample households have an income between 1000 to 2500 thousand Rials (about $120-300) and a quarter below 1500 thousand Rials, which is close to the poverty line in urban areas.

	Number (and %) of households		Income			
			Min	Max	Mean	Std. Dev.
100 and lower	31	(5.7%)	50.00	100.00	80.34	17.56
101-150	113	(20.9%)	110.00	150.00	132.21	13.44
151-250	307	(56.9%)	153.00	250.00	184.13	25.17
251-350	37	(6.9%)	252.00	350.00	302.62	28.66
350 and higher	52	(9.6%)	375.00	460.00	428.50	26.37
Total	540	(100%)	50.00	460.00	195.23	90.90

Table 1. Distribution of sample households by monthly income (10000 Rials)

10000 Rials/month	Rice		Wheat		Potatoes	
	Before	After	Before	After	Before	After
100 and lower	25.16	30.33	161.29	154.13	39.60	32.26
101-150	26.38	34.04	162.30	151.83	40.73	31.83
151-250	26.75	34.96	162.20	149.60	39.90	31.74
251-350	32.32	40.69	163.33	149.95	40.14	31.91
350 and higher	40.27	45.31	163.62	149.78	40.13	32.61
Total	28.26	35.89	162.38	150.39	40.09	31.88

Table 2. Distribution of households by mean per capita consumption of rice, wheat products and potatoes before and after rice price change (kg/yr)

Table 2 reveals that while the per capita consumption of rice increases markedly with income level among the families, those of wheat and its products and of potatoes remain almost constant. If the price of rice decreases after liberalization, the per capita consumption of rice is expected to increase from 28 kg to 36 kg on average. The corresponding figures for wheat and potatoes imply that households will substitute rice for these two products.

5. Poverty effects

There are wide income differences in Iran between urban and rural households, as well as between the lowest and highest income quartiles. According to Assadzadeh and Paul (2001), almost 47 percent of the rural population and 24 percent of the urban population lived in poverty in 1993. Based on the 1989 prices, the poverty line was found to be 157 and 247 thousand Rials in rural and urban areas respectively. With regard to this study, the head-count poverty rate measure was estimated to be 0.464 and 0.338 in rural and urban areas respectively, compared to 0.371 in 1994.

From other estimates, mainly unofficial, the poverty line is put at between 1000 and 3500 thousand Rials. Between 10 to 30 percent of Iranian households fall below this line. The poverty line in urban areas was calculated by adjusting the figures in previous studies (Mahmoudi, 2001; Assadzadeh and Paul, 2001). Based on the latter findings, the poverty line for urban areas was calculated to be 1008 thousand Rials per month at 1989 prices, or around 1410 thousand Rials at current (2001) prices. Bakhshoodeh and Soltani (2002) showed that the mean income of 36.1 percent of households in urban areas falls below this poverty line, and that the poverty rate has increased in rural areas but not significantly in urban areas.

Based on this study, poverty in urban areas may decline significantly following the expected decrease in the consumer price of rice. As shown in Table 3, the poverty rate P_0 falls from 23% to 16%. With regard to P_1, which takes account of the average income of households as well as its variance, liberalization of the rice market is expected to lessen the gap between the poverty line and average income among urban households. Finally, poverty severity is expected to be lower, as indicated by P_2.
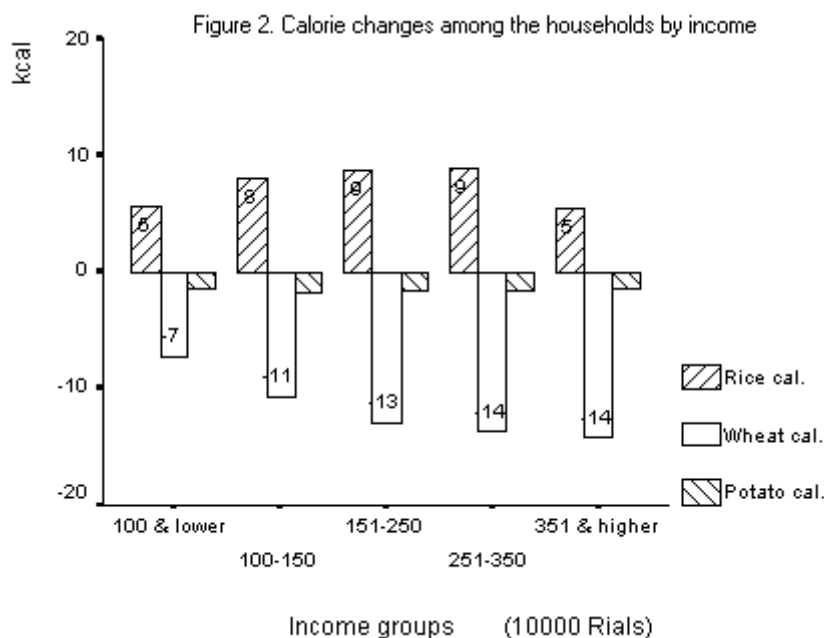
	Before	After
Poverty rate (P_0)	0.235	0.156
Poverty gap (P_1)	0.040	0.033
Poverty severity (P_2)	0.853	0.597

Table 3. Poverty rate, poverty gap and poverty severity measures amongst rice consumers in Iran, before and after rice market liberalization

6. Food insecurity effects

Based on FAO reports (Bienvenido, 2002), the approximate calorie content per 100g of rice, wheat and potatoes is 384, 374 and 70 kcal, respectively. Thus, based on the consumption levels in the sample, the average total calorie availability of these products in Iran is estimated to be more than 2000 kcal per day.

In contrast with the poverty impacts of rice market liberalization, food insecurity is found to widen among the sample households as a result of changes in their consumption patterns. As shown in Figure 2, as the rice price falls, the average-income households expect to substitute rice for wheat and potatoes, and all families to lessen their consumption of wheat, thus reducing total calorie intake. In general, food insecurity appears higher after market liberalization. The calculated indices of food insecurity among five income groups of households are shown in Table 4, and exhibit the extent by which food insecurity occurs for different groups of the sample households.

Figure 2. Calorie changes among the households by income

kcal

20

10

0

-10

-20

100 & lower   151-250   351 & higher
      100-150   251-350

Income groups   (10000 Rials)

Rice cal.
Wheat cal.
Potato cal.

| 10000 | P_0 | | P_1 | | P_2 | |
Rials/month	Before	After	Before	After	Before	After
100 and lower	0.516	0.741	0.028	0.042	0.024	0.055
101-150	0.434	0.664	0.022	0.034	0.055	0.131
151-250	0.453	0.700	0.025	0.043	0.192	0.568
251-350	0.297	0.540	0.018	0.028	0.012	0.029
350 and higher	0.115	0.365	0.006	0.021	0.002	0.023
Total	0.409	0.652	0.020	0.038	0.269	0.774

Table 4. Food insecurity indices before and after rice market liberalization in Iran

The poverty rate measure P_0 indicates that around 40% of sample households are classified as food-insecure in terms of calorie intake from rice, wheat and potatoes. This figure is expected to reach 65% after liberalization. The food insecurity gap increases from 0.02 to nearly 0.04, and finally, as indicated by P_2, food insecurity becomes much more severe amongst the most food-insecure households after liberalization.

7. Summary and conclusions

In the context of public interest in Iran toward establishing a market-oriented agricultural sector, and the recent policy of moving towards a single exchange rate, this study was conducted to evaluate the effects of rice market liberalization on poverty and food insecurity in the country. Liberalization seems to have little direct effect on the level of poverty among consumers, but might widen the rate and severity of poverty. Thus, although the establishment of a freer rice market may have economic justification in terms of overall social gains, other aspects of the policy such as its effect on food insecurity point to a different conclusion. To achieve the long-run target of a market-oriented economy in Iran by means of privatization and liberalization, the private sector needs to be encouraged in order to improve the rice market situation in the country. However, as the results of this study indicate, implementing such a policy may have some distributional effects, which are negative. Therefore, the policy should be implemented only after ensuring that its possible adverse side-effects do not offset net welfare effects. Conducting a general equilibrium analysis with multiple household sectors might be useful in assessing these effects from a more general point of view.

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