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Extraction of Demand Functions from Inputs of Wheat to Produce Whit Use Profit Function (A Case Study in Yazd Province during the Year 2010-2011)

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ABSTRACT

The aim of this study was to estimate the profit function and estimate crop production inputs such as fertilizer and labor demand is at work.And then forming factors of the demand function (fertilizer prices, wage rates, the amount of water used per hectare, investment in agricultural machinery and nominal protection rate). And finally calculate its elasticity and cross-price demand factors of production. Information required by simple random sampling method and interview farmers face crop areas prone Yazd is collected. The results of this study showed that all of the variables used in the model is consistent with the study hypothesis. As well as elasticity of own price elasticity of demand inputs represent the elasticity of demand for it is its price. Cross-elasticity of demand indicates a weak relationship between inputs are complementary. In addition, the price elasticity of supply with respect to the price of wheat was positive and greater than one. This means that farmers in the production are very sensitive to price changes.

KEYWORDS: Wheat, production inputs, demand, elasticity, Khatam.

INTRODUCTION

Wheat as a main food of the people of Iran policy, agricultural producers and consumers of wheat market studies, many researchers are interested. It would be the world's largest wheat cultivation in America, Kazakhstan, Australia, Canada, Pakistan and Turkey respectively. But the country's most widely used around the world in consumption of wheat and bread. Average per capita consumption in India is 6 times the per capita consumption and the highest per capita consumption of the world. Since one of the most important cereal crop that is used in an attempt to increase the production and supply of these products is of great importance, this study examines the demand functions for inputs in wheat production in Yazd deals. It is the reason that despite the shortage of water resources has led to 28 percent of economic area Yazd is no productivity. And wheat farming as one of the main products of the province that has quality is very good. Khatam city, with about 8,500 acres of wheat acreage, average yield of 4 tons per ha and an annual production of more than 34 tons first is the most important producers of wheat Yazd.The present study examined the wheat input demand function is not in Yazd province. In addition, according to project subsidies in recent years and the increasing relative cost of agricultural production and the difficult situation in the province, the province of the product is important.

Stable condition with all the taste consumer income and consumer price-related and ... The demand for a commodity at a time when the price of goods varies inversely related.So the demand is a function of the inverse relationship between price and quantity of goods to indicate the remaining factors constant.

Also, many researchers, including Zulfiqar and Chishti (2010), Alwan and EL-Habbab (2002), Hilmer and Holt (1999), Sidhu and Banant (1981), Arifullah (2007), Lu and Kerten (2006), Ashfaq and et al (2001), Lin (1997), Alderman (1988) and ... Demand for agricultural products were studied.

MATERIALS AND METHODS

To achieve the crop input demand functions in this model has been used Sidhu and Banant 1981. According to this model, the profit function is as follows (Equation 1):

$$\pi = AP_l^{\alpha_1} P_f^{\alpha_2} P_s^{\alpha_3} SR^{\alpha_4} AC^{\alpha_5} WC^{\alpha_6} K^{\alpha_7} \quad (1)$$

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Where:
π :Normal Profit

P_l : The normalized price of labor (labor cost divided by the price of wheat)

P_f : The normalized price of fertilizer (fertilizer price divided by the price of wheat)

P_s : The normalized price of improved seeds (seeds of improved price divided by the price of wheat)

SR :Rate of nominal protection

AC : Cultivated area (ha)

WC :Crop water (m)

K : Investment Investment in machinery Agricultural Machinery

However, for simplicity of the logarithmic profit function And the equation (2) are Reached.

$$Ln\pi = A + \alpha_1 LnP_L + \alpha_2 LnP_F + \alpha_3 LnNSR + \alpha_4 LnWAC + \alpha_5 LnK \quad (2)$$

The estimated parameters of equation (2), the share price of labor and fertilizer inputs variable costs than benefits, according to equation (1) to describe the relationships (3) is obtained.

$$S_L = -\frac{P_L X_L}{\pi} = \frac{-\partial Ln\pi}{\partial LnP_L} = \alpha_1 \quad (3)$$

$$S_F = -\frac{P_F X_F}{\pi} = \frac{-\partial Ln\pi}{\partial LnP_F} = \alpha_2$$

And then estimate the parameters of equation (3), the demand for inputs based on the relationship to relationship (4) is extracted.

$$X_L = \frac{\pi}{P_L}\left[\frac{-\partial Ln\pi}{\partial LnP_L}\right] = \frac{\pi}{P_L}\alpha_1 \quad (4)$$

$$X_F = \frac{\pi}{P_F}\left[\frac{-\partial Ln\pi}{\partial LnP_F}\right] = \frac{\pi}{P_F}\alpha_2$$

Elasticity of demand

First, the relations (4), the logarithm of the equation, then the resulting price elasticity of their labor wage rates and prices of fertilizer inputs to the relationship (5) is obtained.

$$w_{LL} = \frac{\partial LnX_l}{\partial LnP_l} = \frac{\partial Ln\pi}{\partial LnP_l} - 1 + \frac{\partial Ln}{\partial LnP_l}\left[\frac{-\partial Ln\pi}{\partial LnP_l}\right] \quad (5)$$

$$w_{FF} = \frac{\partial LnX_F}{\partial LnP_F} = \frac{\partial Ln\pi}{\partial LnP_F} - 1 + \frac{\partial Ln}{\partial LnP_F}\left[\frac{-\partial Ln\pi}{\partial LnP_F}\right]$$

So can be cross-elasticity demand inputs into relationships (6) to obtain.

$$w_{LF} = \frac{\partial LnX_L}{\partial LnP_F} = \frac{\partial Ln\pi}{\partial LnP_F} + \frac{\partial Ln}{\partial LnP_F}\left[\frac{\partial Ln\pi}{\partial LnP_L}\right] \quad (6)$$

And the elasticity of demand at any given price of wheat include:

$$\omega_{LW} = \frac{\partial LnX_L}{\partial LnP_W} = \frac{\partial Ln\pi}{\partial LnP_W} - \frac{\partial LnP_L}{\partial LnP_W} + \frac{\partial Ln}{\partial LnP_W}\left[\frac{-\partial Ln\pi}{\partial LnP_L}\right]$$

$$\omega_{FW} = \frac{\partial LnX_F}{\partial LnP_W} = \frac{\partial Ln\pi}{\partial LnP_W} - \frac{\partial LnP_F}{\partial LnP_W} + \frac{\partial Ln}{\partial LnP_W}\left[\frac{-\partial Ln\pi}{\partial LnP_F}\right] \quad (7)$$

The method Sidhu and Banant (1981) without the use of production inputs demand functions directly from the production function profit function is obtained. It is noteworthy that in this study the

profit function parameters based on ordinary least squares regression (OLS) was estimated using Eviews software. For this test, ANOVA and linear anisotropy was performed. Anisotropy of variance was used to test White test. The result is based on the assumption of homogeneity of variance was rejected, not to zero. Also the linearity test was performed using SPSS software. The results show a linear relationship between the independent variables is relatively strong. The ratio of the two methods varied among the variables used. For the farmers of simple random sampling was used. Data sample questionnaire to 100 farmers in the wheat growing areas prone Yazd collection is 2010-2011.

RESULTS

Wheat profit estimate results in Table (1) and equation (8) is shown. The results presented in the above table shows that the variable wage rate factor (-0.36), fertilizer prices index (-0.079), the rate of nominal protection coefficient (4.22) and the rate of investment (0.26) is significant at the 1% level. The only variable is the amount of water used per hectare, not significant. Our results also indicate that there is an inverse relationship between wage rates and grain increments. This study confirms the first hypothesis of the variable. Inverse relationship between the price of fertilizer and wheat profit there. Because fertilizer prices as the cost is included in the model, and has a negative sign and has an adverse effect on profitability. This relationship is consistent with economic theory and the study's second hypothesis is confirmed. As the nominal protection rate results in Table (1) shows, supportive government policies have a positive impact on the profitability of wheat. This hypothesis is consistent with the behavior of these variables. Variable amounts of water per hectare, is not significant. Because it is the city seal of adequate water resources and water resources are limited. The variable amount of water affect the profitability of wheat production in the crop year is not. Thus increasing the water will not affect profitability. And this is the concept of access to adequate water supplies in the area are wheat plant. It also varies based on the results of investment in farm machinery, wheat has had a positive impact on profitability.

Table 1) Wheat profit function regression results

Variable	Coefficient	Standard error	t statistic	**percent error**
Intercept	0.55	7.26	0.07	0.3
Wage rate	-0.36	0.14	-2.57	0.01
Fertilizer prices	-0.079	0.29	-2.26*	0.00
Nominal protection rate	4.22	1.45	2.91*	0.00
Water per hectare	0.31	0.37	0.82	0.42
Investment	0.26	008	3.23*	0.00
R^2		0.62		
F		6.63*		
Prob-F		0.00		
SE		0.28		

***: Significant at 1% level.**

$$\pi = 1.7268\ P_l^{-0.36}\ P_f^{-0.079}\ SR^{4.22} WAC^{0.31} K^{0.26} \quad (8)$$

As can be seen in wheat production factor demand functions, demand functions for inputs in production has an adverse effect on input values.

Based on the demand, the price of input demand functions for inputs of fertilizer prices and labor wage rates are quite reasonable and expected. It also supports variable rate is a nominal effect on input demand functions(Equations 10 and 11).

$$X_L = 1.217\, P_l^{-1.36}\ P_f^{-0.079} SR^{4.22} WAC^{0.31} K^{0.26} \quad (9)$$

$$X_F = 0.1364\ P_l^{-0.36}\ P_f^{-1.079} SR^{4.22} WAC^{0.31} K^{0.26} \quad (10)$$

The effect of varying amounts of investment demand for production inputs is positive. In other words, the increase in investment in agriculture is increasing demand for inputs such as fertilizer. The research hypothesis is confirmed.
According to the results of Table (2), the price elasticity of their labor and fertilizer inputs are the -1.36 and -1.079. Their absolute price elasticity of inputs is greater than one. This represents the price elasticity of demand for inputs to them. Negative cross-elasticity of demand for all inputs and the absolute values are less than unity. This suggests a complementary relationship between inputs is relatively weak.

Table 2) Demand, Cross-elasticity of &Own price elasticity

	Fertilizer prices	labor prices	wheat prices
Labor demand	-1.36	-0.079	0.79
Fertilizer demand	-0.079	-1.079	0.79

Source: Calculations research

Input demand elasticities for wheat price equal to 0.79 is obtained. The elasticity of demand with respect to changes in input demand some influence on wheat prices show.

Suggestions

The results support the rates on the profitability of wheat and had a positive impact on input demand functions, which suggests farmers respond positively to government decisions. It is noteworthy in the context of government policies, the formulation of these policies should be based on scientific principles and undergraduate studies done.

The increased investment in agricultural machinery and increase profitability is to increase the supply of wheat. But on arrival, use of machines as well as on the compatibility of this technology with our terms of applied research to be done. And the technologies that fit our requirements is placed at the disposal of farmers.

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