

Study of Relation Wheat Price Variation, Wheat Insurance and Subsidies Paid to Wheat in Iran Agriculture

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Abstract

In this paper, on basis of vector autoregressive model (VAR), three variables of subsidies for wheat, wheat prices and wheat insurance was modeling for agricultural section in Iran in 1993-2008. The results of the model show that even if a shock as big as one standard deviation incur in wheat price, subsidies for wheat receive big variation, that this variety come with positive sign and wheat insurance will have low varieties. Although if shock incur in wheat subsidies, wheat insurance and wheat price will have small varieties, also of other results in this paper can point that, how much differentiation in variations is due to variable itself and how much is due to other variables. Variations in wheat insurance are due to of its variable, while variations in wheat price are due to wheat insurance and wheat price. And variations in subsidies are due to of three variables.

Keywords: impulse response function, subsidies paid to wheat, variance decomposition, vector autoregressive model, wheat insurance, wheat price,

Introduction

Study of agricultural section in Iran shows that, it's a important economical section in Iran and specify more than one third of value added and occupation. We can rank government financial and monetary policies in agricultural section in Iran in this order: pricing and agricultural product purchase, agricultural product insurance and paid the insurance damage to providers and give cheap facilities to compare with other section and subsidies to secure of agricultural institutions (Mojtahed and Sharifi, 2004). First we introduce variables and economical position in Iran.

Wheat insurance

Activities in agricultural section that due to excessive rely to nature and dependence to atmosphere factors and situation is consider risky activity (Horowitz and Lichtenberg, 1993). So for prevention of possible damage, usage of agricultural product insurance for providers in this section is necessary. Agricultural product insurance on theory is partnership mechanism in acceptance in risk but in practice its an expense tool in risk transmission of farmers and providers to insurers. Thereby government for supporting of providers in agricultural section and ranching and restitution of damage and disadvantages while natural events occurs. Outlined agricultural insurance box for farmers and for surety of applying new ways and development of cultivation as tool for agricultural progress. Because by use of this, not only can, with the low saving that large proportion farmers pay for insurance right, cause restitution for parts of damage. But with that can provide more security for farmers. That is clear that "agricultural product insurance" has vital role, especially in period of transmission of traditional agriculture to modern agriculture.

Efficiency scope of agricultural insurance section in Iran can be studied in three subsections:

- 1- Farming and cultivation insurance: include wheat, beet, cotton, rice, soy, potato, corn, onion.
- 2- animal, aquatic and birds insurance: include cow and calf, sheep, goat, bee, horse, aquatic, and support all birds

3- forest, pasture

in the following figure, insurance variation was observed in 1993-2008. Numbers are base of thousand hectare.

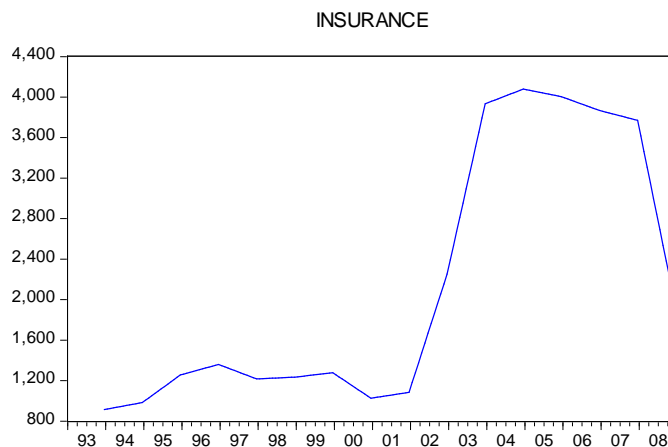


Figure 1. wheat insurance in 1993-2008 in Iran

Wheat subsidies

Support in agricultural section and unique tool to subsidies in production and business in this section is the Important Debate in the world, there for today subsidies is a big obstacle in the way of business agreement in international levels and developed countries deal with decreasing of this subsidies, because experts express that increasing of alimentary product in industrial countries in previous decade, become two vital factors:

Policies supporting of agriculture and productiveness development. In Iran is also as section of economical development in agriculture, supporting is through subsidies that as an example can named subsidies to wheat production institution. In Iran subsidies pay off to agricultural institution are for two purpose:

- 1- Agricultural section improvement and production abilities in country for increasing of production quantities, competence development and product quality improvement in this section.
- 2- Support providers through decreasing production costs and at last lowering production price in this part of consuming market.

The following figure reveals subsidies position for wheat in 1993-2008, that is increasing. Numbers are on base of milliard RIALS.

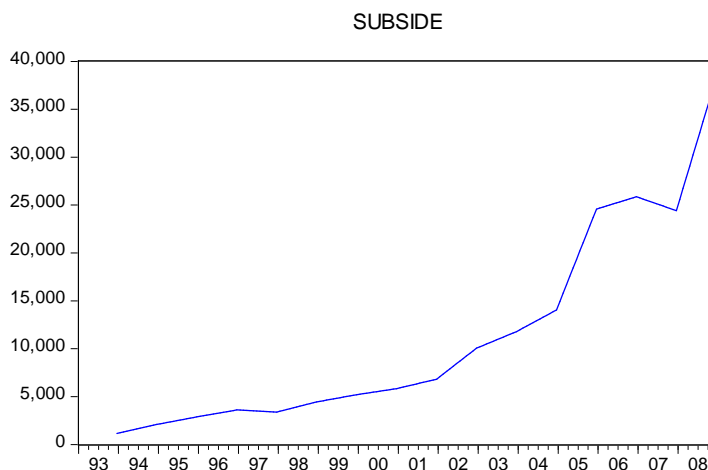


Figure 2. subsidies paid for wheat in 1993-2008 in Iran

Wheat price

Wheat is one of products that due to its importance, has got economical management attention. This strategic product, in addition to be common food for people of country, consider main income source that cant substitute with traditional farmers and providers in some parts of rural areas.

So you cannot take into account it as economical products, but has main living and valuable aspects. Although pricing this sensitive and strategic product is so important. In the following figure, wheat price was studied in different period and numbers are on base of RIALS.

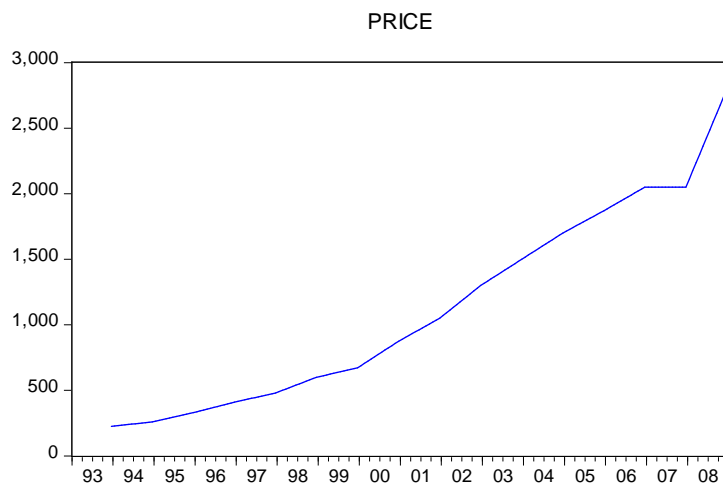


Figure 3. wheat price in 1993-2008 in Iran

After recognition of variables model, in second part we have brief look on literature review and in third part, with the use of vector autoregressive model(VAR), we modeling this variables and results are analyzed.

Also in this research with the usage of impulse response function, other Reaction against reciprocal reactions are shown. Also variance Decomposition is done in this paper that identify how much variable differentiation is due to variable itself or due to other variables.

Literature review

Ahmadian (2005) was studied warranty wheat price effect on pure surplus variation in consumers and providers and also disadvantage in production and consumption was studied. Sharif (2004) in his research, studied wheat price effects on wheat production in Iran in 1997-2001. The way he uses in this research is seemingly unrelated regression model. research results reveals that, price has trivial effect on wheat production and all the cases about institution. In Vandever and Young(2001) research about effect of agricultural product insurance in federal government and in wheat field, we gained the results that agricultural product subsidies have effects on decisions. In Smith and Baquet(1996) research, about investigation of request for agricultural product from farmers in Montana, discover that variables such as, agricultural education level, background of encountering with danger, debt level in Credential institution and banks and product fluctuation levels and also insurance right in agricultural partnership in wheat insurance is effective. Mahjouri and et.al(2010) with use of time series data and modeling multiple balance model, simulate five different tools for wheat. From the results of this research, express that government should follow increasing price of wheat to avoid damages due to decreasing of harvest level and wheat production. Najafi (2001) identify the effect of wheat pricing on substitute product and product static price which express that wheat supporting expense is negative. Yavari(2001) which use of time series data from 1971-1998 and estimation of selling supply and demand function for wheat, evaluate effect of product pricing in producers and consumer.

Methods and results

Sims (1980) with investigation of multi equation of models and economical theories shows that each variables that appear to the right of the equation set, should enter to the right of all the other equation. In Sims opinion, if there is a simultaneous model between set of variables, should consider this simultaneous equal in all the variables and prediction about which one is in endogenous or exogenous is not corrected. Sims Conclude that model results with big value consider like summarizing figures in all the variables. So, he introduce new framework as a vector autoregressive model(VAR). When the aim is investigation of multi behavior in time series, should pay attention to the relation between this variables.

Performing this model, need to take several test, such as determination of optimal lag, variance decomposition test and impulse response function test. For estimation VAR model, first step is to identifying optimum lag, that this optimum lag is on base of Akaike, Schwarz information criterion. To be lower in this criterion is as a better model. In the following table criterion results are with different lags.

Table1. Criterion results with different lags

lag	akaike	schwarz
1	30.7	30.92
2	25.74	26.12
3	25.85	26.39
4	25.96	26.66
5	26.07	26.93
6	26.17	27.2
7	26.28	27.47
8	26.38	27.47

As you can see from table data, lag 2 is optimum lag and the model is estimated like the following model:

VAR Model:

$$\text{INSURANCE} = C(1,1)*\text{INSURANCE}(-1) + C(1,2)*\text{INSURANCE}(-2) + C(1,3)*\text{PRICE}(-1) + C(1,4)*\text{PRICE}(-2) + C(1,5)*\text{SUBSIDE}(-1) + C(1,6)*\text{SUBSIDE}(-2) + C(1,7)$$

$$\text{PRICE} = C(2,1)*\text{INSURANCE}(-1) + C(2,2)*\text{INSURANCE}(-2) + C(2,3)*\text{PRICE}(-1) + C(2,4)*\text{PRICE}(-2) + C(2,5)*\text{SUBSIDE}(-1) + C(2,6)*\text{SUBSIDE}(-2) + C(2,7)$$

$$\text{SUBSIDE} = C(3,1)*\text{INSURANCE}(-1) + C(3,2)*\text{INSURANCE}(-2) + C(3,3)*\text{PRICE}(-1) + C(3,4)*\text{PRICE}(-2) + C(3,5)*\text{SUBSIDE}(-1) + C(3,6)*\text{SUBSIDE}(-2) + C(3,7)$$

After estimation and final evaluation, summarize parameter outlined in three relation regression:

VAR Model - Substituted Coefficients:

$$\text{INSURANCE} = 1.9673076386*\text{INSURANCE}(-1) - 0.971361220566*\text{INSURANCE}(-2) - 0.104694769434*\text{PRICE}(-1) + 0.11672605829*\text{PRICE}(-2) + 0.00568270698717*\text{SUBSIDE}(-1) - 0.00638416212213*\text{SUBSIDE}(-2) + 2.85242772638$$

$$\text{PRICE} = - 0.00962489299206*\text{INSURANCE}(-1) + 0.00862473248729*\text{INSURANCE}(-2) + 1.8881219915*\text{PRICE}(-1) - 0.883798994128*\text{PRICE}(-2) - 0.000195967867431*\text{SUBSIDE}(-1) + 0.000100043072468*\text{SUBSIDE}(-2) + 0.486480254882$$

$$\text{SUBSIDE} = - 0.514692133648*\text{INSURANCE}(-1) + 0.512303457198*\text{INSURANCE}(-2) - 0.231600565046*\text{PRICE}(-1) + 0.39892641776*\text{PRICE}(-2) + 1.88039315308*\text{SUBSIDE}(-1) - 0.890625474354*\text{SUBSIDE}(-2) - 31.3146762655$$

On basis of the results, from estimation of vector autoregressive model, wheat insurance in previous period has positive effect on wheat insurance now. While wheat insurance in two previous period has negative effect on recent wheat insurance.

Also, estimation of wheat price model and subsidies level in this model has effect on wheat but these effects statically are not important. On the other hand, wheat price in previous period has positive relation with the recent wheat and wheat price in two previous period has negative relation with wheat price in the recent year.

Wheat subsidies also from wheat insurance in the previous year with negative sign and two previous period with positive sign and Subsidies level in previous period and two previous period with positive sign is impressionable.

Impulse response function

In VAR model, interpretation of coefficient is difficult. Specially when coefficients with lag of one variable changes the sign. Therefore impulse response function is calculated and on base of this, variables behavior in time was investigated. Indeed, impulse response function, shows reaction of one variable due to variation in one of residuals. For impulse response function, Choleski analyses was used. In the following figure, impulse response function results of variables are estimated.

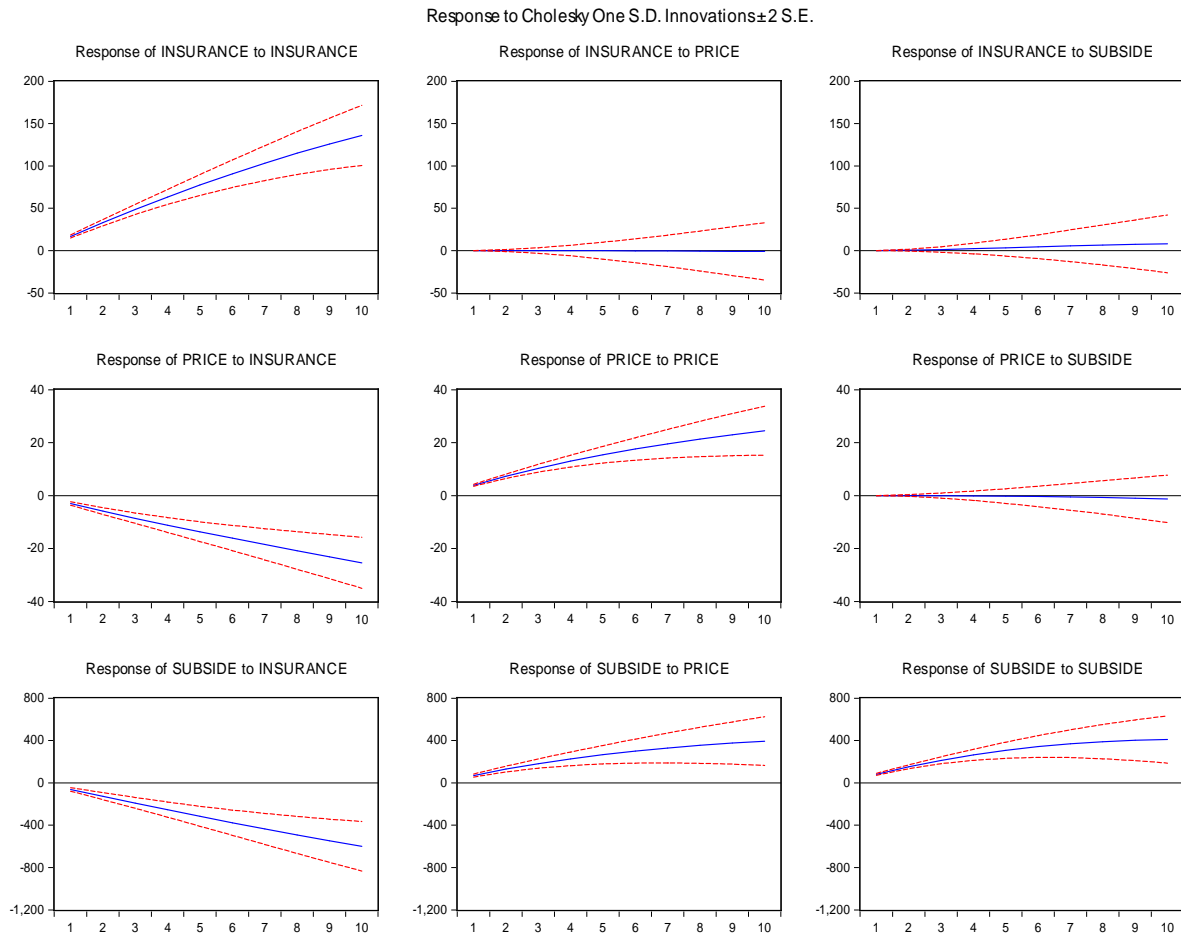


Figure 4. Impulse response function results

If a shock as big as one standard deviation cause in wheat insurance, it has negative effect on wheat price and wheat subsidies. Also, when there is shock as big as one standard deviation on wheat price, it has minimal negative effect on wheat insurance and it has positive effect on wheat subsidies. And if there is a shock as big as one standard deviation in subsidies in wheat, its variation on insurance and price is minimal.

Variance decomposition

With analyzing variance of predicted error, can investigate variation of variable how much are they effective, and how much they receive effect from other variable on systems. In the following table, variance decomposition are estimated:

Table 2. Results from variance decomposition

Variance Decomposition of INSURANCE:				
Period	S.E.	INSURANCE	PRICE	SUBSIDE
1	16.77398	100.0000	0.000000	0.000000
2	36.98416	99.98468	6.67E-06	0.015312
3	60.99736	99.95246	3.73E-05	0.047516
4	87.94982	99.91112	0.000113	0.088760
5	117.2130	99.86648	0.000259	0.133265
6	148.7968	99.82297	0.000500	0.176584
7	180.8001	99.78372	0.000864	0.215420
8	214.3850	99.75118	0.001373	0.247451
9	240.7612	99.72670	0.002052	0.271216
10	283.0704	99.71108	0.002918	0.286002

Variance Decomposition of PRICE:				
Period	S.E.	INSURANCE	PRICE	SUBSIDE
1	4.915580	38.37598	61.62402	0.000000
2	10.57554	39.40034	60.59943	0.000223
3	17.08870	40.42878	59.57056	0.001153
4	24.20856	41.47603	58.52068	0.003286
5	31.79329	42.54410	57.44875	0.007152
6	39.74071	43.62907	56.35707	0.013259
7	47.99603	44.72760	55.25034	0.022056
8	56.50873	45.83474	54.13187	0.033890
9	65.25323	46.94475	53.00627	0.048982
10	74.21446	48.05477	51.87782	0.067411

Variance Decomposition of SUBSIDE:				
Period	S.E.	INSURANCE	PRICE	SUBSIDE
1	123.7721	26.20459	31.46040	42.33600
2	266.8465	28.31311	30.37416	41.31273
3	431.1910	30.40099	29.41059	40.17742
4	609.9685	32.52356	28.54275	38.93369
5	798.5708	34.65466	27.74767	37.59767
6	983.5091	36.79220	27.02001	36.18779
7	1192.451	38.92354	26.35366	34.72380
8	1393.461	41.05509	25.74070	33.22091
9	1595.089	43.11460	25.18605	31.69934
10	1796.211	45.14869	24.67721	30.17410

As it was observed from the table results, in the first period 100% variation of wheat insurance is due to wheat insurance. Also, in this first period 38% variation in wheat price is due to wheat insurance, 61% is due to wheat price. And in the first period 26% of variation in wheat subsidies is due to wheat insurance, 31% of wheat price and 42% is due to subsidies

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