Effectiveness of Poultry Insurance Application on Promoting the Production of Meat Poultry Firms: Case Study in Fars Province

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Abstract: Starting agricultural insurance operations in Iran since 1984 agricultural insurance funds have always expanded and diversified their services and tariffs. Although, some important goals such as promoting the welfare and increasing of production operated efficiently to realize these goals as a result of insurer weakness in understanding insurance missions. This study evaluated the insurance efficiency on increasing the welfare of meat poultry rearing firms by increasing their production. Shiraz city in Fars province was selected as the study area. Then, by selecting a sample of insured and uninsured firms based on stratified systematic sampling, the required data was collected in 2009. In order to study the insurance effect, the production functions of insured and uninsured meat poultry rearing firms were analyzed through the Ramsey RESET test to determine the structural changes of models. Results showed that the insurance has not been able to shift the production function, but the slope of production function, has reduced in presence of insurance. In these conditions, although the inspired poultry-breeding firms have paid more costs of chicken and feed than the uninsured ones, but they have decreased their health care costs. This result could be linked to moral hazard in presence of poultry insurance.

Key words: Agricultural insurance • Poultry • Production Function Moral hazard

INTRODUCTION

The concept of a share of damages to compensate the data and the actual output and the factors necessary for economic operation in the interval before producing and consuming products against non-threatening hazards are preventable, if the predicted probability is possible. The role of insurance adjustment pressure losses are risks so that actual damages to an individual or a group to a farm or farms in a region specific time occurrence, it will not be focused but economic losses and social damages are widely distributed [1]. Agricultural insurance is strategic and benefits in this regard can be considered (budget) for policy makers of developing and developed countries [2]. Gradual paying premiums by underwriters as financial costs of insurance to prevent sudden economic paralysis form a small group. As a result, agricultural insurance guarantees to prevent stopped or decreased production and effects on targets agricultural sector [1]. When farmers know that catastrophic drop of income compensation due to them is out of control financially, farmer willingness to resource allocation for getting to maximum profit will be moved. Then, farmers tend to production of profitability crops with more hazard and uncertain developed technologies of adoption develop. Thus, increasing the agricultural value added and increase farm income and reduce poverty in rural can influence is the ultimate insurance [2].

Although the issue facing the insurance institutions for agricultural products, especially risks related to weather conditions has been [3] however, another challenge is the lack of enough information of farmers in the correct understanding of insurance as risk transfer programs [4]. Lack of adequate justification of policy holders in time of the contract about the method of paying compensation and type of damages under insurance, are issues such as moral hazard, adverse selection and co-variability that effect on insurance programs of crops and could be because of non-proper application for getting to targets [5-7]. In Iran, the law on agricultural insurance in Islamic Parliament was adopted on 11/5/1983 [8]. In this law, raising the income levels of farmers in the head and objectives of insurance and to reduce imbalances of income in the agricultural sector in

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comparison to other economic sectors are of great importance [9]. After the passage of this law and in various programs of developed expenditure insurance of agricultural activities was always in agricultural policy makers, so that, based on legal documentation contained in Article 18 of the 4th program, agricultural insurance activities by insurance agricultural funds during the fourth development plan, with the growth faced [10]. In this respect, research was as a basic of insurance plan of crops [11].

A variety of services and tariffs in 2009-2010 to insurance of crops gardening, various livestock, type of poultry, fish rearing and natural resources show the range of insurance fund of agricultural activities [10], so far, various. Different researches done in order to analyze the efficiency of insurance application of agricultural products as then believed Najafi and Ahmad pour Borazjani [12] in an index of financial analysis for agricultural insurance in 1984-89 to less than in 1990-99 and more than once. This self-sufficiency program represents the first stage due to the limited slope and coverage of insurance and the need for government subsidies and at the next stage due to the expansion of insurance services. Nikoii and Torkamani [5] showed that increasing the farm size of wheat growers, the possibility for adverse selection insurance increases and the role of the phenomenon of moral hazard in insurance wheat in some parts of Fars province is visible. Nikoii and Torkamani [11] nature being forced to believe and continue with the annual sugar beet insurance agencies provide necessary inputs and agricultural mechanization services in the production of beet sugar factories and the permanent care of the farms because the effect of insurance on increased levels of risk aversion of beet growers. While in the case of wheat, due of non-permanent of insurance covered and confidence to farmer's insurance system is not significant effect on the level of risk aversion.

Asadi [13] showed that the gross income of insured wheat growers is 6% more than non-insured group. However, significant differences do not have between the yield of wheat per hectare between insured and non-insured groups. Abdollahi ezat Abadi and Nejati [14] showed that pistachio producers, in addition to preference and own risk beliefs, as well as the policies of government, off-farm agriculture, financial problems, selection and moral hazard phenomena in decision of paying insurance correctly, are considered. These aspects will decrease willingness to pay them. Torkamani & Nikoii [15] and the insurance of wheat activity in most areas studied in terms of increasing production had random aspects and these increasing of production related to personal characteristics and management of insurers. Their beliefs are in the promotion of insurance of crop production system in order to increase production and role in the process of rural development in different areas depended on present extension services for raise awareness of farmers about insurance benefits and the method of increasing of production and efficiency of applying inputs. The results of Hosseini and Gholi Zadeh [16] indicated a reduced 13.4% of income in insured farm agriculturals and have been taken strategies such as, to supplement and even replace the program for increasing of insurance effect in coefficient of investment security is necessary. Karami et al. [17], believe that the most important affecting structures on permanent insurance including satisfaction rate of insurance, banks respond to the complaints, the amount of compensation received, the bank's reputation and apparent awareness of insurance. Because the operation of agricultural insurance in sub-sector of agronomy began in 1984 [18]. The most of research done to some of them mentioned, for efficiency analysis of insurance application system in sub-sector. For example, reference is made by some researches [13,15,19,20].

Other studies done in others sub-sector of insurance in sub-sector of livestock insurance [21-22]. This subject can be seen [14-23] in sub-sector of gardening insurance and in sub-sector of aquatic insurance [24]. Studies conducted so far show that the limited research is regarding to efficient of insurance application system under sub-section of poultry. Insurance types of poultry farms with the insurance business and breeder laying hen meat and gradually began in 1994 and to spread types of poultry insurance [10], so to undertake a study on the efficiency of insurance poultry application is issue that this study has been discussed. In this regard, Fars province as a case study area was selected. Specific goal of this study was to evaluate the impact of insurance on the efficiency of different inputs and increased utilization of poultry welfare by increasing their production.

MATERIALS AND METHODS

Fars province is a one of three successful provinces in the programs of agricultural insurance under poultry sub-sector [10]. Shiraz city in this province alone, more than 35% of chicken produced in the province is achieving [25]. Thus, Shiraz in Fars province as the target region has been studied. In order to collect data in this
study, the survey research was used. In this regard after, determining the study population sample size was determined based on stratified systematic sampling. In this method, preparation of list of operational units of insured and non-insured farms and sort them based on unit capacity, to selecting of systematically of units addressed based on the sample size was determined. Sample size of this study was 56 insured units and 41 non-insured. Then, to help one pilot study and analyzing of results and making necessary modifications in the measurement tools to collect information on population samples in 2009, was attempted. Data collection instrument was questionnaire. Experts and specialists achieved a professional questionnaire after several reforms. Preliminary tests also get the reliability of measurement tools and Cronbach's (α) coefficients for the different sections of the questionnaire were collected as between 74% to 83%.

In order to assess impact of insurance on increased production of operating unit's production, function of poultry meat production insured and non-insured were investigated. Insurance had two effects on the production function transfer of production of insured parallel of non-insured of production curve effect on marginal production of inputs that cause modified the slope of production curve [15]. In order to estimate the production function, given the large number of variables was examine by only two forms of transcendental and Cobb-Douglas production function. The general form of these two models is as follows [26].

\[
\begin{align*}
\ln y_i &= \alpha_0 + \sum_{j=1}^{m} \alpha_j x_{ij} + \epsilon_i \\
\ln y_i &= \alpha_0 + \sum_{j=1}^{m} \alpha_j x_{ij} + \sum_{j=1}^{m} \beta_j x_{ij} + d_j D_j + E_i
\end{align*}
\]

where the \( y_i \) value of production (kg / 1000 pieces) units i, \( x_{ij} \) costs of inputs (seed, expert, fuel, light, health, labor costs and chicken litter) and \( D_j \) is dummy variables of insurance. After estimate of production function in two forms Cobb-Douglas and transcendental by using that the least square ordinary(OLS). In order to selecting the best models used from F-test of constrained Least square.

\[
F = \frac{(R^2_{OLS} - R^2_{R_0})/m}{(1 - R^2_{OLS})/(N - K)}
\]

In this regard, \( R^2_{OLS} \), \( R^2_{R_0} \) determination of coefficient in 1, 2 above formulations, respectively, N the number of observation, K the number of non-constrained regression parameters tying 2 and m variable added in non-constrained regression. If estimated F with df (M and N-K) been more than F-table, model (transcendental) are accepted. After selecting the best model, in order to affect insurance on the production, RESET Ramsey test for determining the structural models generated was used. In this test, for obtaining the residual sum of squares to obtain the constrained and non-constrained models by F-test statistics, different assumptions for the study structural differences between constrained and non-constrained models were tested. General form for every instance, Cobb Douglas or transcendental functions for rearing units (insured and non-insured) was estimated in Shiraz was:

\[
\ln y_i = \alpha_0 + \sum_{j=1}^{m} \alpha_j x_{ij} + \epsilon_i
\]

\[
\ln y_i = \alpha_0 + \sum_{j=1}^{m} \alpha_j x_{ij} + \sum_{j=1}^{m} \beta_j x_{ij} + \epsilon_i
\]

Relations 4 and 5 are Cobb Douglas and transcendental production functions, respectively. General form of non-constrained model for each of the following hypotheses is:

- The effect of insurance on intercept variable or transfer of production functions of farmers is significant.

In this case, the general form of non-restricted Cobb Douglas and transcendental functions was in the relations 6 and 7, respectively.

\[
\ln y_i = \alpha_0 + \sum_{j=1}^{m} \alpha_j x_{ij} + d_j D_j + \epsilon_i
\]

\[
\ln y_i = \alpha_0 + \sum_{j=1}^{m} \alpha_j x_{ij} + \sum_{j=1}^{m} \beta_j x_{ij} + d_j D_j + \epsilon_i
\]

- The effect of insurance on the slope of the production function or marginal production is significant. General form of unbound Cobb Douglas and transcendental functions, respectively, 8 and 9 are relations.

\[
\ln y_i = \alpha_0 + \sum_{j=1}^{m} \alpha_j x_{ij} + \sum_{j=1}^{m} d_j D_j \ln(x_{ij}) + \epsilon_i
\]

\[
\ln y_i = \alpha_0 + \sum_{j=1}^{m} \alpha_j x_{ij} + \sum_{j=1}^{m} \sum_{j=1}^{m} d_j D_j \ln(x_{ij}) + \sum_{j=1}^{m} \beta_j x_{ij} + \sum_{j=1}^{m} \sum_{j=1}^{m} \epsilon_j D_j x_{ij} + \epsilon_i
\]
F-test for each of the constrained and non-constrained, selected as follows,

$$F = \frac{(R_{\text{SS}_R} - R_{\text{SS}_{\text{UR}}})((K-K^*)}{R_{\text{SS}_{\text{UR}}}/(N-K)}$$  \hspace{1cm} (10)

In this regard, $R_{\text{SS}_R}$ and $R_{\text{SS}_{\text{UR}}}$ represent the residual sum of squares for non-constrained and constrained of models, respectively. N number of observations and $k, k^*$, the number of parameters of non-constrained and constrained regressions, respectively. It calculates degrees of freedom ($K-K^*$ and $N-K$) which have been more than in the f-table. The non-constrained model is better than the constrained model. Then, impact insurance on transfer of production function (a hypothesis) or production function slope (b hypothesis) is significant. All the above relations using the software package is estimated in EVIEWS.

**RESULTS AND DISCUSSION**

Using information gathered from samples of meat poultry husbandry of firms in Sharaz the production function in two forms, Cobb-Douglas and transcendental, was estimated. Then, in order to select the top model of the F-test constrained least squares (relation ship 3) was used as follows.

- $R^2_R$ (Cobb-Douglas production function constrained model) = 0.843.
- K (number of regression parameters of non-constrained) = 10.
- $R^2_{\text{UR}}$ (Non-constrained transcendental production function) = 0.865.
- M (parameters added non-constrained regression) = 8.
- N (Number of observation) = 97.
- F calculation = 1.38.
- Table with df (8 and 71) = 2.14.

Thus, the calculation of F statistic lower than the F-table, then, constrained model with non-constrained model does not have statistically significant difference. So lack of significant difference between these two models, the model Cobb Douglas as a suitable model was selected. Because this function is easily calculated as the elasticity of production for the effect of insurance on the slope of production function. According to table 1, F statistic shows that all of regression statistical level of less than one percent is significant. This indicates that H0 hypothesis based on all coefficients being zero estimate in functions unacceptable. Also in this model, heteroscedasticity hypothesis by residuals was rejected. The results of Durbin-Watson test showed that colinearity is not in these models. The amount of R2 in models 1, 2 and 3 showed that 89.3%, 85.1% and 75.2% of the dependent variable is explained by the independent variables. Results obtained from unbound variables showed that fuel costs, labor costs, expert costs, the cost of chicken and grain cost, which are variables that affect its on increasing production of poultry meat operation units is significant. While the charges of bed, electricity and health care is not significantly on the production units. In this model, the interaction of insurance and the variables of insurance costs on the chicken and grain on increasing of production is positive and for the cost of health care is negative. However, coefficient of dummy variable of insurance and interaction of insurance and other inputs are not significant. Thus, compared to non-constrained model with constrained model without constant of dummy variable (model 2) by testing structural change, was discussed and the results showed Table F(α=0.05) with df (1, 79) = 3.96, calculation F with df (1, 79) = 1.01. Calculation F statistical is lower than F-table, then, insurance does not have effect on the change of constant. Also, compared to constrained model (model 1) and non-constrained model without dummy variable of slopes (model 3) showed that, Table F(α=0.1) with df (8, 79) = 2.82, calculation F with df (8, 79) = 2.84, that this test was significant at 1% and insurance changes caused slope of production function. Thus, the stability of dummy variables affecting on production function slope is confirmed and fit model in this area, is the model 2. All coefficients are significant variables showed the interaction of insurance and production factors inputs in this model. Since that sum of these coefficients is positive, we can say that insurance increases the slope of production function. Thus, insurance does not have transfer of production function, but the slope of production function decreased. On the other hand, the effect of increasing inputs on insured production more than non-insured. Therefore, in total, partly insurance on rearing poultry production in target region had a positive effect (Table 1).
Table 1: The results of Cobb-Douglas production function constrained and non-constrained for meat poultry rearing in Fars province.

<table>
<thead>
<tr>
<th>Model Variable</th>
<th>(1) non-constrained</th>
<th>(2) constrained without dummy variable of insurance</th>
<th>(3) constrained without dummy variable of insurance affecting on slope</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>t-test</td>
<td>Coefficient</td>
</tr>
<tr>
<td>Log bed cost</td>
<td>0.008</td>
<td>1.063</td>
<td>0.008</td>
</tr>
<tr>
<td>Log of labor cost</td>
<td>0.179</td>
<td>1.974**</td>
<td>0.181</td>
</tr>
<tr>
<td>Log of expert cost</td>
<td>0.198</td>
<td>1.676*</td>
<td>0.194</td>
</tr>
<tr>
<td>Log of grain cost</td>
<td>0.508</td>
<td>2.001**</td>
<td>0.498</td>
</tr>
<tr>
<td>Log of electricity cost</td>
<td>2.730</td>
<td>3.458**</td>
<td>2.689</td>
</tr>
<tr>
<td>Log of electricity cost</td>
<td>0.008</td>
<td>0.695</td>
<td>0.079</td>
</tr>
<tr>
<td>Log of electricity cost</td>
<td>0.005</td>
<td>1.693*</td>
<td>0.006</td>
</tr>
<tr>
<td>Log of health spending</td>
<td>-0.050</td>
<td>-0.338</td>
<td>-0.047</td>
</tr>
<tr>
<td>Insurance × bed cost</td>
<td>0.006</td>
<td>1.025</td>
<td>0.007</td>
</tr>
<tr>
<td>Insurance × labor cost</td>
<td>0.139</td>
<td>1.272</td>
<td>0.142</td>
</tr>
<tr>
<td>Insurance × expert cost</td>
<td>0.128</td>
<td>1.002</td>
<td>0.129</td>
</tr>
<tr>
<td>Insurance × chicken cost</td>
<td>0.726</td>
<td>2.091**</td>
<td>0.801</td>
</tr>
<tr>
<td>Insurance × grain cost</td>
<td>2.950</td>
<td>3.776**</td>
<td>2.879</td>
</tr>
<tr>
<td>Insurance × electricity cost</td>
<td>-0.006</td>
<td>0.585</td>
<td>-0.005</td>
</tr>
<tr>
<td>Insurance × fuel costs</td>
<td>-0.033</td>
<td>0.453</td>
<td>-0.041</td>
</tr>
<tr>
<td>Insurance × health spending</td>
<td>-0.232</td>
<td>-1.848*</td>
<td>-0.251</td>
</tr>
<tr>
<td>Dummy variable of insurance</td>
<td>0.00003</td>
<td>1.315</td>
<td>-</td>
</tr>
<tr>
<td>Constant</td>
<td>-22.82</td>
<td>-2.202**</td>
<td>-23.03</td>
</tr>
</tbody>
</table>

R²: 0.893
F: 453.202***
Rss: 21,557
D.W.: 2.003

* and ** are significant levels, respectively, 5 and 1%.

Coefficient of production function in selecting model shows that affecting of insurance on the cost of hatching and grain consumption is positive. This means that poultry rearing units with confidence insurance will pay more cost for these inputs. This can occur to buy into better quality inputs and with higher prices, or elevate consumption of this input. However, a significant but negative coefficient of the variable costs of health and insurance indicates that in the presence of insurance, poultry rearing units expenses less than for health and medical expenses. This can be considered incorrect because investors are insured by insurance. With the view that if there are damages, insurance to pay damages cause the cost of health problems will decrease. These conditions with no significant insurance effect on other production factors, including bed preparation, labor expertise, electricity and fuel have caused insurance is unable to increase its mission of raising poultry production units and ultimately increase of welfare utilization [20-25].

**Conclusion and Suggestions:** According to background studies and the agricultural side of macro-insurance goals, a general result can be reached and that, although agriculture insurance in principle is very important practically, it can be a tool to achieve a macro-objective in the agricultural sector, but the insurance units of meat rearing poultry in the study area, lack of appropriate management units caused that insurance can not increase production and welfare. This situation has been so far linked to reduced health costs phenomenon of treatment and the presence of moral hazard insurance. However, reform executive regulations and supervision necessary on performance insurance to justify exploitation, insurance fund performance towards positive results, is reformed, therefore, based on results. This suggests proposals for insurance reform and improvements in poultry rearing units, which are offered as follows:

- Holding classes in order to justify exploitation units familiar with insurance seems necessary. For this purpose, short-term training of personal insurers increases their awareness of management techniques to justify the benefits of insurance and damage insurance necessary. If part of the premiums collected by insurance funds, for classes to prevent damage, such as diseases control and encouraging managers in the control of system diseases, successful operations have to be allocated and will be useful.
In order to avoid moral hazard phenomena in the units covered by insurance, it is suggested that experts in these units, especially those who have more history, make visits to the necessary actions brought by requiring managers to implement appropriate management help, to minimize product damage or in getting maximum production.

Units have a history of more damage so be somewhat sure that the interest of the owners to minimize losses then a significant effort to lower health issues can be undertaken.

Recommended that in addition to poultry rearing units that always the relevant research is one of factors to motivate managers and has been useful to increase the absorption and application of new technologies for enhancing production capacity, expansion of extension services to introduce these technologies to the owners, optimum use of inputs and appropriate management. As method for applying the supplementary insurance system and at its continues in order to raising efficiency [25-29].

REFERENCES


