

## MORAL HAZARD IN THE USE OF AGRICULTURAL CREDITS BY IRANIAN FARMERS: A CASE STUDY DEZFUL TOWNSHIP

Mohammad AGHAPOUR SABBAGHI

Agricultural Management Department, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran, Email: aghapoor@ut.ac.ir

*Corresponding author:* aghapoor@ut.ac.ir

### *Abstract*

*The presence of moral hazard in the use of the granted facilities in the agricultural sector is among the most important challenges of Iran's agricultural system. Given the high degree of such moral hazard in Dezful Township, in the present study the factors influencing it, has been examined in this city. In this study the binary Logit model was used and the data was obtained randomly through questionnaire from 249 farmers who were granted farm facilities in the year 2015. The study results showed that the variables like age, having occupation other than farming and the loan interest rate have a positive effect on the moral hazard and the other variables including the education level, the education major, income level, size of irrigated lands, having break period, experts visit and the degree of mechanization have negative effect on the moral hazard in farm facilities. Making the necessary predictions and implementing regular visits upon granting the facilities and considering the personal qualifications like holding agricultural related degrees are among the most important recommendations of the present study in order to reduce the moral hazard in Dezful township.*

*Key words:* moral hazard, agricultural sector facilities, Logit Model, Dezful township

### INTRODUCTION

Investment in agriculture sector in addition to paving the way for production growth and employment in the sector, would help in the production growth and employment in other sectors as well so that it creates more employment opportunities in rural areas and prevents from immigration of the villagers to the cities [14]. The agricultural facilities are regarded as the main policy making means for the growth and production as well as using new technologies in agriculture sector [13]. The agricultural development requires change of the production methods from the subsistence farming to the commercial method and this change requires optimum allocation of the financial resources [1]. Farming credits as one of the subsidiaries of the rural credits are allocated to the poor and vulnerable employees working in the agriculture sector to boost their welfare and the production [8]. Target setting in relation with this credits in developing countries must be towards villagers, because the best part of active workforce of such countries is working in the agricultural sector [5].

Iran's agriculture sector is one of the most important sections of the country's economy; however the investment in this sector is not considerable compared with other sectors since of its performance and capacity. On the other hand the high risk of activity in agriculture sector and low income of the small-sized farms units necessitates the provision of credits for financing of the agriculture sector [11]. In Iran in order to support the agriculture sector producers in the frame of development programs and annual budgets, considerable amounts of credits in the form of loan with managed funds are allocated to them. Keshavarzi Bank (Agribank), which is known as the main financial and credit institution of the agricultural sector of Iran, pays about 70 percent of the required credits by this sector to supply the needed current facilities for the maintaining and exploitation of the production capacities of this sector. One of the major challenges concerning the agricultural credits is the manner of using this credit facilities by the farmers. Evidences suggests that despite the allocation of huge capitals in the form of bank facilities to the agriculture sector, significant part of the farmers receiving

agricultural loan, use in other sectors. Fulfilling the consumption and subsistence needs, restoration and building construction, paying the past dues and debt, trip, non-agricultural economic activities, [12]. Indeed, the cash nature of the loans causes mobility to another sectors and convertibility of them. The mobility of agriculture credits by itself has been caused the “ethical risks” [16]. Researchers consider different factors effective this moral hazard in the use of the granted facilities. In the studies like Bashiru et al [4], Wongnaa & Awonyu-Vitor [18], Oboh & Ekpebu [10], Afolabi [2], Varmazyari et al [17], Mohamadi-Yeganeh [9], Sharifi- Renani et al [15], Fouladi [7] in addition to the personal specifications of loaners, consider some variables as type of farming facility, interest rate of facilities, no. of inspections after granting the loan and the existence of break period as effective moral hazard in the use of the granted facilities.

Statistics in Dezful Township indicate that many credits granted by Keshavarzi Bank, Dezful branch have been invested in the other sectors such as industry, according to acquired information from Keshavarzi Bank across the township moral hazard reaches to more than 80 percent. In other words, moral hazards regarding the credits received by the farmers are a serious risk in financing the agriculture sector which will result in outflow of capital in long term. Accordingly, in a case study the factors effective this moral hazard concerning the using of credits in agriculture sector across Dezful Township area in the year 2015 has been investigated.

## MATERIALS AND METHODS

The dependent variable in this study is a dummy variable in the form of zero and one values (‘zero’ for those that have been used the loan in agriculture sector and ‘one’ for the farmers that have used the facilities in a sector other than the agriculture sector). Hence in the present study the Logit Binary Model has been used. In this model, the variables relevant to the personal, economical and agricultural characteristics of borrowers and the granted

facilities' features have been considered in deviation of the received facilities.

$$y_i = a_0 + \sum_{i=1}^{10} a_i x_i + \varepsilon_i \quad (1)$$

In the above relationship  $y_i$  shows the moral hazard in the received facilities, indicating two ‘one’ value (using in other sectors) and ‘zero’ value (using in agricultural sector).  $x_i$  is The  $i$ th explanatory variable that affected manner of received facilities using by the farmers. The explanatory variables in this study are as follows:

Age ( $x_1$ ): is a continuous variable that shows the age of the receiver of facilities at the time of obtaining loan.

Education level ( $x_2$ ): Indicative of the education level of the borrower

Field of education ( $x_3$ ): as a dummy variable has the value of ‘one’ for the degree of education related to agriculture and ‘zero’ value for other disciplines.

Size of irrigated lands ( $x_4$ ): is a continuous variable that shows the total irrigated lands owned by the receiver of facilities at the time of receiving the loan.

Having a second occupation besides farming ( $x_5$ ): a dummy variable having the value of ‘one’ when the farmer has another profession beside farming, and the value of ‘zero’ when the farmer is active only in the field of farming.

Break period ( $x_6$ ): in this variable the values of ‘1’ and ‘2’ are considered for loans with and without break period respectively.

Annual Income ( $x_7$ ): a continuous variable that shows the annual income of the receiver of the facilities.

Degree of mechanization ( $x_8$ ): a variable that measures the degree of mechanization of farming.

Profit of the received credibility. ( $x_9$ ): The facility interest rate by type of contract that can be expressed as a percentage.

Number of inspections by the bank experts. ( $x_{10}$ ): shows the number of inspections by the bank experts regarding the loan consumption method in order to confirming the good performance and physical progress.

The statistical society in this study comprises all 900 villager farmers receiving farm facilities in Dezful Township from Keshavarzi bank. In the present study the personal interview has been used for gathering information and statistics. Also since we don't have any reason for using another sampling method such as Classification or Clustering, random sampling method was used to determine the sample size which on this basis and using Morgan table the sample size has been considered as equal to 269 farmer.

## RESULTS AND DISCUSSIONS

Table (1) represents the statistical features of some of the variables under study.

Table 1. Statistical features of some of the variables under study

	Average	Min	Max
Age	43.19	19	80
Annual Income(million Rials)	245	18	41
Farmland	4.14	1	20
granted facilities	65	10	250

Source: Own calculation.

As can be seen from the Table above, the average age of the under study society is about 43 years with broad distribution from 19 to 80 years old. Average annual income of the villagers is 245 million Rial which is a figure close to the national average of 230 million. The average 4 acres of farmland of under cultivated farmlands in Dezful city is indicative of the smallness of farm pieces. Finally the average granted facilities by Keshavarzi bank in the township is 6.5 million Rial, fluctuating between 10 to 250 million Rial. In part of the questionnaire the reasons for moral hazard in the received facilities is asked, the most important of which are referred to in Table (2).

The results presented in Table 2 shows that from the farmers' perspective the three factors including low profit of the agriculture sector compared with other economic sectors, lack of proper supervision on the loans' using and the income risk and lack of stable incomes during the year are among the most important reasons for the facilities deviation across Dezful Township.

Table 2. Reasons for moral hazard in using facilities in Dezful Township form farmers' perspective

Reason	Mean	Standard deviation	Coefficient of changes	Ranking
short-term reimbursement period	55/2	12/1	439/0	6
income risk and shortage of stable income during the year	81/2	07/1	38/0	3
Low interest rate of the profit resulting from farming activities compared with other sectors	21/3	78/0	242/0	1
high interest rate of facilities	76/2	09/1	394/0	4
seasonal nature of the activities in agriculture sector	44/2	09/1	446/0	7
Lack of proper supervision of the loan consumption	88/2	94/0	326/0	2
Lack of adequate support on the part of the state for agricultural activities	5/2	05/1	42/0	5

Source: Own calculation.

This suggests that the adoption of new strategies for increasing the agricultural sector profitability should be considered; something that has been emphasized in Bagheri et al., (2009) as well [3].

Table 3. The results of Logit model

Variables	Coefficients	T-value	Weight Elasticity	Marginal Effect
Intercept	0.28	0.11	-----	-----
Age	0.11	2.91***	0.09	0.05
Education	-0.09	-2.98***	-0.11	-0.07
Education	-0.13	-3.14***	-0.14	-0.04
Size of irrigated	-0.11	-2.99***	-0.09	-0.11
Having a	0.14	3.12***	0.16	0.11
Having break	0.22	2.88***	0.18	0.13
Income	-0.26	-2.01***	-0.25	-0.16
Degree of mechanization	-0.17	-1.99**	-0.15	-0.09
Facility interest	0.28	3.95***	0.21	0.1
No. of experts'	-0.35	-3.88***	-0.29	-0.18
R <sup>2</sup> Madala:0.52		LR: 191.12	R <sup>2</sup> McFadden: 0.53	

Source: Own calculation on the basis of data \* = level (10%) \*\* level (5%) \*\*\* = level (1%)

To investigate the presence or absence of heteroscedasticity in binary models, it would not be possible to use the typical methods like the Brooch-Pagan, Whith and Goldfield - Quant test methods. Davidson and McKinnon (1982) [6] introduced statistics titled LM2 for heteroscedasticity test in Logit and Probit models. This statistics is based on LM method in which a dummy regression using Logit and Probit estimation results is formed and this dummy regression is used for heteroscedasticity test. Results of this

statistics reject the heteroscedasticity assumption in this model. It is clear that the model's overall performance is very good. The variables in the model explain some 52% of the variation in the budget surplus and are jointly significant at beyond the 99% confidence level (as indicated by the F test at the bottom of Table 3). In Logit model, the initial estimated coefficients show only the explanatory variables effect on the dependent variables probability without value interpretation. In this case the marginal effect and weight elasticity having been reported in columns 4 and 5 of the above table. The elasticity has been calculated using the estimated parameters of Logit model and the mean of the relevant variables. Turning to the variables in the model, it can be seen that these generally behave as expected.

As can be seen from the above table, variables like the age, having a second job other than farming and the facility interest rate have positive effect and variables like the education level, education degree, income, size of irrigated lands, having break period, no. of experts' visit and degree of mechanization have negative effect on the moral hazard of facilities using.

In this table the positive sign has been obtained for the variable "Age", indicating that the age increase can cause the moral hazard of facilities using. Particularly, the elasticity estimates indicate that a surplus equal to 10% of age leads to a surplus of approximately 0.9% in the moral hazard of facilities using.

The negative factor obtained for the education variable shows that granting loans to the educated people decreases the probability of moral hazard, especially if education be related to agriculture. The same finding has been emphasized in Varmazyari et al. (2010) and Oboh & Ekpebu (2011) studies [10, 17]. The final effect resulted for the variable 'education degree' shows that averagely there will be 4% lower probability for those farmers having an agriculture related degree to moral hazard compared with other farmers.

The coefficient resulting for the 'irrigated lands' variable is 0.11 with negative sign, indicating that the increase in the area of cultivated lands produces negative effect on the moral hazard in facilities. A 0.09 elasticity

for this variable shows that an increase of about 10% in the area of cultivated lands shall decrease 0.9% probability of moral hazard. Possessing more areas of land in addition to influencing the financial power of the farmers for reimbursement of loans is considered an important motivation for investment of the received loan in agriculture sector. Having an occupation in a sector other than agriculture is one of the most important factors in probability of moral hazard. Considering the binary nature of this variable, the final effect was used for interpretation of this variable. This effect demonstrates that the farmers having a second job are disposed to moral hazard with 11% probability more than farmers who only active in the field of agriculture.

From among the important variables involving in the moral hazard, the lack of break period of loan reimbursement is notable. The positive coefficient of this variable shows that the moral hazard probability will increase by the lack of break period for the loan.

The 'income' is a variable in this study that its negative relationship with moral hazard has been proved at 1%. The study conducted by Mohamadi-Yeganeh and et al, (2012) [9] referred to the above as fact. These shows that financial empowerment of the farmers can result in their loan are used in agriculture sector and thereby preventing from moral hazard. The ability to make appropriate decisions on the investment of loan and having the proper authority to deal with the volatility and risk in the agriculture sector is one of the reasons for these findings. The obtained elasticity for this variable also is indicative of the fact that an increase of 10% in this variable reduces the moral hazard probability of agriculture facilities up to 2.5%.

The negative coefficient of the variable "degree of mechanization" reflects that the increase in the degree of mechanization in Dezful Township regions could in part reduce the moral hazard in facilities using in agriculture sector. On the one hand, self-mechanization of agriculture is something requiring capital and hence would be a point for using of the received loans. On the other hand, mechanization of agriculture can be considered as a factor effective in increasing

the income and dependency of the farmers to activities in this sector. The elasticity obtained for this variable shows that an increase of 10% in the degree of mechanization of the region can reduce the moral hazard probability up to 1.5% in facilities. The positive coefficient for the 'facility interest rate' indicates the potential increase in moral hazard in facilities using with the increase in the percentage of the interest of the granted loan. The elasticity obtained for this variable also shows that an increase of 10% in the interest rate of the can increase the facilities' moral hazard probability up to 2 percent. The findings show that one of the most important factors in reducing the moral hazard is the number of visits by the bank experts regarding the using of loans in agriculture sector. This finding has also been emphasized in Bagheri et al., (2009) [3] and Varmazyar, et al. (2010) [17]. The resulting elasticity for this variable shows that a 10 percent increase in the amount of visits can reduce the possibility of moral hazard for 9.2 percent.

## CONCLUSIONS

In this study, one of the major problems of the financial sector in rural communities of the country, called as moral hazard in facilities using in the agriculture sector across Dezful township region is taken into consideration. According to Dezful township farmers' views, the low profit in agriculture sector compared to other economic sectors such as industry and services, is the major cause of moral hazard. Hence the adoption of policies and plans for increasing the profitability of the agriculture sector and empowering its competitiveness vs. other economic sectors in absorption of investments is emphasized.

The results indicate that the implementation of regular and continuous monitoring by the bank can be considered a very important factor in reducing the moral hazard in the agriculture sector facilities. Thus the anticipation and implementation of regular visits by bank experts during granting facilities by banks is among the most important recommendations of this study. Also considering the negative effect of the size of irrigated lands on the moral hazard, development of plans and policies for

increasing the farmers' ownership and increasing their cultivated lands' area is recommended to reduce the moral hazard in line with the using of facilities in agriculture sector.

High income is among the factors effective in the reduction of moral hazard probability. Hence the decision making and planning to reduce the income risks and boosting the financial abilities of the farmers lies among other recommendations of this study to reduce the moral hazard in agriculture sector. Findings showed that the increase in degree of mechanization can reduce the moral hazard in agriculture sector facilities; hence, the planning and policy-making in order to increase the degree of mechanization in Dezful Township area (given the low degree of mechanization in the city), can be an effective factor in reducing the dependent variable.

Also taking into account the degree of agricultural mechanization at the time of granting such facilities can be considered one of the solutions to reduce moral hazard. Education is among the individual variables that can have positive effect on reducing moral hazard in the agriculture sector. Therefore, we would recommend that having education and knowledge, especially in the field of agriculture be considered as one of the qualifications in granting facilities by banks. Findings showed that activity in the non-agriculture sector is one of the reasons playing significant role in increasing the moral hazard in facilities using in agriculture sector.

This shows that policymaking for preventing the farmers from occupation in second jobs such as planning for increasing their income in the sector and decreasing the income fluctuations can be considered as significant factor for using facilities in agriculture sector.

## REFERENCES

- [1]Achoja, F.O., 2010, Velocity of micro finance among users in Delta state, Nigeria: implication for economic growth, *Journal of Agricultural Science*, 3, 275-282.
- [2]Afolabi, J. A., 2010, Analysis of loan repayment among small scale farmers in Oyo State, Nigeria, *Journal of Society Science*, 22 -2, 115-119.
- [3]Bagheri, M, Najafi, B., Moazezi, F., 2007, The factors affecting the non- reimbursement of agricultural

loans; Case Study: Fars Province, Journal of Agricultural Sciences Iran, 38-3, 90-81.

[4]Bashiru, M., Dumayiri, M., Sabutey, G. T., 2014, Analysis of the sources of farm investment credit in the Upper West region of Ghana, International Journal of Current Research Aca Review, 2, 1-15.

[5]Chowdhury, A., 2011, Performance evaluation of agricultural banks in Bangladesh, International Journal of Business and Management, 6-4 , 75-90.

[6]Davidson, R., MacKinnon, J.G., 1982, Convenient Specification Tests for Logit and Probit Models, Queen's Economics Department Working Paper No. 514,

[http://qed.econ.queensu.ca/working\\_papers/papers/qed\\_wp\\_514.pdf](http://qed.econ.queensu.ca/working_papers/papers/qed_wp_514.pdf), Accessed on September 25, 2017

[7]Fouladi, A., 2010, Investigating the causes of non-repayment of debts to the Keshavarzi Bank of Isfahan, Case study: West regional branches, Master's Thesis of Public Administration, Islamic Azad University, Khorasgan Branch, 12-21.

[8]Kundu, A., Mitra, S., 2010, Group lending scheme operating through primary agricultural credit society: A critical assessment, Journal of Managerial Economics, 8-3, 62-77.

[9]Mohammadi Yeganeh, B., Cheraghi, M., Hossein Zadeh, A., 2012, Analysis of factors affecting the deviation of agricultural credit in Rural Areas: A Case Study of Ghani Bigelow district, Zanjan Township, Journal of the village and the development, 15-2, 37-58.

[10]Oboh, V. U., Ekpebu, I. D., 2011, Determinates of formal agricultural credit allocation to the farm sector by arable crop farmers in Benue State, Nigeria, African Journal of Agricultural Research, 6-1, 181-185

[11]Pazhooyan, J., Motamed, A., 2009, Study of the effectiveness of Keshavarzi Bank granted credits on investment and employment in the agricultural sector, Journal of Peyk-e-Noor Quarterly, 2, 33-15.

[12]Perdana, A. A., 2005, Risk management for the poor and vulnerable, Economics Working Paper Series. Centre for Strategic and International Studies, Jakarta, 32-45.

[13]Rashid, S., Rab Nawaz, L., Zaheer Ahmad, S., 2013, Effect of micro finance on poverty reduction of small scale farmers of Pakistan, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development ,Vol. 13, Issue 2, 363-368.

[14]Sargo, A., Timofti, E., 2017, Public-Private partnerships financing instrument of the mechanism of economic growth and development of the agriculture sector, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 17, Issue 1, 381-386.

[15] Sharifi Renani, H., Ranjbar, H., Fouladi, A., 2011, A study of the factors contributing to the failure to reimbursement of agricultural facilities. Case study: Keshavarzi Bank of Isfahan province, Journal of Economics and Agricultural Development, 19-74, 100-77.

[16] Swinnen, J. F. M., Gow, H. R., 1999, Agricultural Credit Problems and Policies During, The Transition to

a Market Economy in Central and Eastern Europe, Journal of Food Policy, 24-1, 21-47.

[17]Varmazyari, H, Kalantari, K., Oral Shabanali Ghomi, H., 2010, Analysis of factors affecting the use of Keshavarzi bank facilities (Case study: Khoy Township), Journal of Rural Studies (scientific - research), 1-3, 83-108.

[18]Wongnaa, C. A., Awonyu-Vitor, D., 2013, Factors affecting loan repayment performance among yam farmers in the Sene District, Ghana, Agris Online Papers in Economics, 5-2, 111-122.