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LIVESTOCK INSURANCE AS A RISK MANAGEMENT TOOL ON DAIRY FARMS

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Original scientific paper

SUMMARY

Faced with fast changing environment, livestock epidemics and EU accession, risk management is of utmost importance for Croatian farmers. Insurance is risk management strategy which enables risk transfer from farmer to insurance company. It has a positive effect on income stabilization and consequently could lead to higher level of specialization, credit access and competitiveness. Nevertheless, livestock insurance is relatively unimportant on dairy farms. Reasons are twofold. Uncompleted requirements for risk to be insurable, adverse selection and moral hazard problems reflect on untoward premium rates. Demand for insurance, on the other hand, depends on the farm structure, access to other risk management instruments as well as dairy farmer's management capacities.
The objective of the paper is to analyze risk management on dairy farms with focus on livestock insurance. Survey on 20 farmers in the Northwest Croatia has been made. Farmers' risk perceptions, application and evaluation of risk management strategies were collected. Governmental insurance premium subsidy was also analyzed.
Survey data were analysed by descriptive statistics while decision analysis toward livestock insurance with stohastic decision tree.
European Union experiences with livestock insurance presented stand in creating suggestions for possible setting out of current constraints of livestock insurance in Croatia.

Key-words: livestock insurance, risk management, decision analysis, dairy farm

INTRODUCTION

The risk environment for farmers is constantly changing: price, production and legal risks (more government regulation) are increasing while financial compensations from government are decreasing, (consequences of liberalisation).
Risks can be classified into various types. Hardaker et al. (2004) distinguished between business and financial risks. Business risks include production risks (yield risk), price risks personal and institutional (or legal) risks. Financial risks refer to the risks related to the way a farm is financed.
Risk and profit are in general positively correlated. Taking more risks can increase farmer's profit. Risk management typically requires evaluation of tradeoffs between changes in risk, expected returns, entrepreneurial freedom and other variables (Harwood et al., 1999). Tools for risk management in agriculture are distinguished in strategies concerning on-farm measures (diversification of a production) or risk sharing strategies like marketing contracts, production contracts, hedging on futures markets, or the participation in mutual funds and insurances. The sharing of risks is based on the concept of pooling. Lots of independent losses in the pool result in the same average loss but variance decrease. In addition, if the pool consists of large numbers of independent risks, relative variation of actual loss from average loss further decrease (law of large numbers) (Rejda, 1998.) Insurance is probably the best known risk pooling tool.
In order for a risk to be insurable, two basic requirements have to be met among others: managing the adverse effects of "asymmetric information" (includes moral hazard and adverse selection) and overcoming the implications of "systemic risks" (a lot of people suffer a loss at the same time).

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The market failures of agricultural risk sharing instruments in transition economies like Croatia restrict potential for efficient risk management and consequently generate highly uncertain business environment. Additionally, risk and low profitability often constraint external funds inflows influencing fewer investments and deteriorating farm's income stability and competitiveness.
The main type of risk in the livestock sector is the sanitary risk, but catastrophic climatic events can also have a direct impact on the animals (floods, etc.) and other weather events can affect pasture and forage availability and therefore on the economic sustainability of the farm. Livestock insurance in Croatia is mainly associated with production under contract like diary, meat processors (pigs, poultry and fattening cattle). Based on the strictly commercial base farmers can insure livestock with the insurance companies and guaranteed on market value. Basic risks covered by livestock insurance are death in consequences of illness or accidental, diseases and emergency slaughtering. Additional coverage includes stillbirth (cows and claves and mare and colt), therapy, quarantine, show and exhibitions. Premium in livestock insurance depends on: 1) animal species, 2) category of animal (fattening, breeding, egg production etc.); 3) level of risk; 4) insurance mode; 5) insurance coverage (franchise), 6) technical result (bonus- malus); 7) allowance and discount; 8) other basis by the premium groups.
Gross premium in livestock production (period 2000-2004) was 21 million kunas while average damages were 19.5 million kunas (Table 1). Together crop and livestock insurance had share of only 2% (year 2004) in the group "property insurance" and about 17% in the sub-group "other property insurance". Share of cattle in livestock insurance premium is about 50%.

Table 1. Livestock insurance in Croatia

	Insurance		Damages	
year	Number of insurance policies	Premium	Number of insurance policies	Damages (HRK)
2000	5477	12175.71	4107	12340.89
2001	5615	14086.27	4200	11609.28
2002	5883	19740.00	5645	17387.00
2003	6153	25492.00	6826	25670.00
2004	6133	36691.00	8581	30790.00

Source: Croatian Financial Services Supervisory Agency (HANFA)

Nevertheless, livestock insurance is relatively unimportant on dairy farms in Croatia. Possible reasons are twofold. Uncompleted requirements of insurable risk reflect on untoward premium rates. Demand for insurance, on the other hand, depends on the farm structure, access to other risk management instruments as well as dairy farmer's management capacities.
The objective of the paper is to analyze risk management on dairy farms with focus on livestock insurance. Using a survey as an instrument for measuring farmers' attitudes toward risks and risk management and simulation models the paper aimed determine efficiency of livestock insurance in alleviation of direct and consequential loss in dairy farming.
European Union experiences with livestock insurance and conducting research could present stand for suggestions of efficient risk management on dairy farms.

MATERIAL AND METHODS

Primary data have been collected by a survey. The survey was developed based on the similar research in the Netherlands on the large sample of livestock farmers (Meuwissen et al., 2001) and the research done by the author on the horticultural farms in Croatia (Njavro et al. 2005). Survey consists of four parts: 1) demographic and farm resources data, b) perception of risk sources, 3) assessment of risk management strategies and 4) livestock insurance. Most questions are closed questions mainly in the form of Likert-type scale ranging from 1 to 5. Area of research was North-west part of Pannonnian region, namely Koprivnica-Križevci County and within four settlements Đurđevac, Ferdinandovac, Molve and Virje. Face-to-face interviews were carried out on the non-probability sample of 20 specialized, above average, dairy farms. Questionnaire was pre-tested before survey started.

Survey data were analyzed by means of descriptive statistical methods.
Efficiency of livestock insurance is presented in decision tree. Decision tree is a diagram that shows decisions and events of the problem in their chronological relationship. Software package Precision Tree was used
Two scenarios (branches) are presented: with and without insurance. Expected value is difference between premium price and indemnity of loss (in the case with insurance) and the chance of loss in the case without insurance.
Secondary data about livestock insurance schemes in EU are based on the study „Agricultural Insurance Schemes". The study was commissioned by DG AGRI while the author participated in the study as a consultant. The aim of the study was to improve the knowledge about climatic and sanitary risks in EU agriculture and to examine the role and the functioning of agricultural insurance as a risk management tool.

RESULTS AND DISCUSSION

Survey encompassed specialized dairy farms. Number of cows per farm as well as milk production per farm is above national and county average (Table 2). The dominant form of registration is commercial farm.

Table 2. Production characteristics of surveyed farms

	Croatia	Koprivnica-Križevci county	Surveyed farms
Cows per farm	3*	4*	18
Milk production (liters per cow)	3165	2886	6084

Source: *Agricultural Census 2003, Statistical Yearbook 2005** and Survey

Head of household average age is 42 years while his/her average level of education is secondary school (11). Beside milk production other livestock productions are present, mainly fattening cattle and pigs but in smaller extent. Also, except production of grain for livestock feed and for market and meadows, other crops are relatively unimportant.

Table 3. Sources of risks (1-not relevant to 5-very relevant)

Source of risk	Mean	Standard deviation
Family health concerns	4.85	0.49
Livestock's diseases	4.75	0.55
Enforcement of payment for sold products	4.55	0.60
Climate risks	4.30	0.47
Access to market	4.25	0.64
Price variability of livestock products	3.85	0.59
Changes in costs of production	3.80	0.62
Counterpart risk	3.75	1.07
Crop price variability	3.65	0.59
Changes in production technology	3.10	0.85
Consumer preferences	3.00	0.86
Changes of interests rates and ability to repay loans	2.95	1.15
Changes of agricultural policy	2.55	0.89
Property rights (enough own land and inheritance rights)	2.30	1.22
Lack of labor force (in or out family)	1.95	1.00
Environment policy	1.85	0.67
Burglary	1.60	0.68
Accession to the EU and others trade and political integrations	1.40	0.60

Source: Survey

Risk family health concerns are perceived as a very relevant risk source. It is followed by livestock diseases and the group of market risks (payment enforcement, access to market, output and input price variability) (Table 3). A source of risk with the average scores below 3 indicate that they were generally not perceived as important (Meuwissen et al., 2001). In our case those are legal risks and financial risks (changes of interest rates and ability to repay loans).
Although difficult to compare, in the paper written by Meuwissen et al. (2001) the highest scores were given to risks related to meat price, epidemic animal disease and milk price.

Table 4. Risk management strategies assessment (1-not important to 5-very important strategy)

Strategy	Mean	Standard deviation
Financial(cash) reserves	4.35	0.81
Spreading sales	3.90	0.64
Production for known buyers	3.85	0.75
On-farm enterprises diversification	3.75	0.55
Spatial and time diversification	3.65	0.49
Adequate production technology	3.55	0.60
Own agricultural land	3.50	1.15
Crop insurance	3.35	1.27
Livestock insurance	3.10	1.25
Organized input supply	3.05	0.94
Off-farm sources of income	2.95	1.36
Life insurance	2.90	1.21
Consultancy services	2.70	0.92
Stocks of spare parts	2.20	0.89
Labour force (quality and quantity)	2.00	0.79
Leasing/renting machinery	1.90	0.85

Source: Survey

There is a logic between market risks importance and marketing strategies (spreading sales and production for known buyer) perceived as very relevant factor (Table 4). Standard deviation is relatively low in the mentioned cases indicating consensus. Table 4 shows that, in general, risk-sharing strategies were perceived as less important risk management strategies than on-farm strategies. On per strategy basis, financial (cash) reserves were perceived as the most important. Higher level of management and finance knowledge would probably lead to better use of financial leverage and investment portfolio in contrary to cash reserves.
Together with livestock diseases, climate risks are also perceived as very relevant. On the other hand, crop insurance and livestock insurance (strategies to cope with the mentioned risks) are lower on the list of importance although with high variation. The majority of surveyed farmers do not use livestock insurance or use it from time to time. The very often reason for buying livestock insurance is loan (the role of guarantee). The list of risks covered by insurance policy was perceived as limited (Table 5), especially in the case of diseases and the costs of veterinary services.

Table 5. Satisfaction with different aspects of livestock insurance (1- not satisfied to 5- completely satisfied)

	Mean	Standard deviation
Coverage of risks	1.50	1.10
Insurance flexibility regarding production of interest	1.65	1.18
Livestock insurance premium	1.70	1.30
Indemnity period	1.95	1.39
Quality of loss estimation	2.05	1.47
Quality of insurance agents	3.05	2.14

Source: Survey

Farmers are generally satisfied with insurance premium subsidy. Additionally, the research showed how level of "awareness" about livestock insurance could lead to the situation where even highly subsided premium (100% in on of the municipalities!) is not enough for farmers to decide to use insurance!
Efficiency of livestock insurance is presented in decision tree (figure 1). Subjective probability of risk was set at 7% (expert estimation). Expected value of insurance cost in scenario with insurance (the insured sum of 15,000.00 kunas and premium of 1,600.00 kunas) is -250 kunas. It is lower then in scenario without insurance where cost of non-use of insurance could reach 1350 kunas. According to these numbers risk averse person would probably opt for livestock insurance.

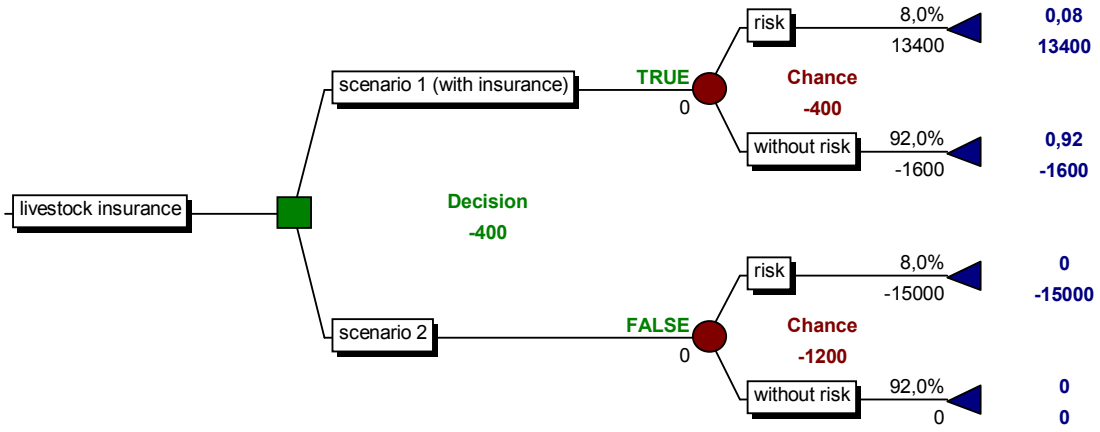

Figure 1. Decision tree for livestock insurance

Situation with livestock insurance in EU is very heterogeneous. From highly subsidized insurance schemes to market oriented insurance supply. Nevertheless, recurring crises (Avian Influenza, BSE, Foot and Mouth diseases and contaminated feed products) but also frequent business risks put emphasis on livestock insurance and other risk sharing instruments and their development throughout EU. Due to various developments (enlargement of the European Union, budget constraints, larger range of covered risks by insurance) the current livestock insurance schemes as well as risk financing systems for livestock epidemics is being reconsidered and further developments could be expected.

CONCLUSION

Theoretical research on risk in agriculture and its management in Croatia is limited and consequently useful practical insight for policymakers, advisers, and developers and sellers of (new) risk management strategies is generally lacking. This research aims to give insight into economic impact of prospective livestock insurance as a risk management instrument.
By survey farmers' risk perceptions, application and evaluation of risk management strategies were collected. Survey encompassed specialized dairy farms.
Risk family health concerns are perceived as a very relevant risk source. It is followed by livestock diseases and the group of market risks (payment enforcement, access to market, output and input price variability).
In general, risk-sharing strategies were perceived as less important risk management strategies than on-farm strategies. On per strategy basis, financial (cash) reserves were perceived as the most important.
The majority of surveyed farmers do not use livestock insurance or use it from time to time. Often the only reason for buying livestock insurance is loan conditions (guarantee). The list of risks covered by insurance policy was perceived as limited especially in the case of diseases and the costs of veterinary services. According to decision tree analysis and model assumptions, risk averse person should select livestock insurance as a risk management tool.

In order to change presented situation and prepare Croatian dairy producers to EU accession the following should be taken into consideration: a) development of existing and introduction of the new livestock insurance schemes privately or through public-privately partnerships, b) adjustments of the exisiting disaster aid scheme (livestock epidemics), c) extend farmers knowledge about insurance and risk management in general through training and education and d) incorporate livestock insurance into broader, rural finance framework.

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