Market-type and government supported risk management in the Hungarian agriculture

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Abstract

In 2012 Hungary introduced the two-pillar risk management system. The first pillar refers to an “all-risk” fund, where the participation of agricultural producers is obliged above a certain size. The second pillar is market based voluntary insurance with state-support scheme.

Our research question: what are the key factors influencing the insurance decisions of producers? We have unbalanced FADN data of 1395 producers with 7177 observations between 2001 and 2012. Based on random effect panel probit model we have found that income, diversity, concentration and size of area were playing significant role in farmers’ decisions. Naïve expectations were also present.

Introduction

Most farmers think about potential losses when they think about risk. The word "risk" was derived from the early Italian word ‘risicare’, which also means to dare. In this sense the “risk” implies the element of choice and is definitely action-oriented. It is important to not forget about the potential reward associated with risk and daring to farm. (Miller et al., 2004)

The sources of risk in agriculture are many and various. The markets for agricultural inputs and outputs have a direct effect on farming risk, particularly through prices. A variety of exposures related to weather, pests and diseases or personal circumstances determine production in ways that are outside the control of the farmer. Unexpected changes may occur in access to credit or other sources of income that affect the financial capability of the farm. (OECD, 2009)

Our main concern is the risk associated with weather as well as pest and diseases in Hungary. In 2012 the government has announced the two-pillar risk management system. The first pillar refers to an “all-risk” fund, in which the participation of producers is obliged above a certain size. The second pillar is market based voluntary insurance with state-support scheme. The main goal of regulation is to pool the production associated risk among producers, insurance companies and state as broad as possible.

Before the two-pillar one there was no proper risk management system in operation. It was possible to insurance on crop but the insurance policy provided adequate coverage only against hail, fire, storm and flood. The National Agricultural Risk Mitigation System was aimed to protect farmers against other types of risk but due to low compensation level it did not mean real support.

Crop insurance was not preferable to insurance companies because of the low willingness to take charge on the farmers’ side. Producers could rely on ad hoc payment of government, so the crop insurance did not get widespread. The two-pillar risk management system was aiming at to solve these problems ((Kemény & Varga, 2010)).

Research on crop insurance demand became an important issue in the 1980s in the US, as participation was rather below the levels desired by policy-makers (Knight & Coble, 1997). The literature was quite consistent in finding that the demand for crop insurance was price inelastic, suggesting that subsidies would be required to increase participation (Coble & Barnett, 2012). We might also expect that the Hungarian subsidy scheme would significantly increase the participation.

Theoretical considerations

Economic agents' anticipation of the future levels of yields, prices, interest rates, etc. is essential to understanding economic motivation and ultimately economic choice. In naive expectation theory agents' anticipation of next period's market price is last period's price. Production responds to the lagged price, and consumption responds to current price. The internal consistency of this cobweb model cannot provide an appropriate explanation of the market behavior (Irwin & Thraen, 1994). The same holds for production choices. However we suggest that naïve expectations are present in the risk-related decisions of the Hungarian producers.

Previous studies (Sherrick et al., 2004) prove that management abilities play significant role in taking out insurance. We have also assumed that the qualification of the manager executive positively contribute to insurance decision of the farm.

According to earlier publications (Kemény et al., 2010) (Sherrick et al., 2004) we expect positive impact of size (expressed in area of land) on insurance.

With increasing diversity of production the possible risk is also growing (Menapace, Colson, & Raffaelli, 2012). Therefor we expect more intense insurance activity if the diversity is bigger.

Data and Method

We have drawn our sample from the Hungarian FADN database. We used unbalanced panel of 1395 producers, ranging from 1 to 10 (as an average of 5.1) years of observation, containing all in all 7177 observations, between 2001 and 2012. We were interested in the effect of different factors on the probability of taking out insurance; therefore we applied random-effect probit model.

The FADN database consist of approximately 1900 sample farms in every year between 2001 and 2012. From this 1900 farms ca. 1000 deal with crop production as main activity. The data collection based on accrual accounting in case of corporate farms and individual farms, too. We were concentrating on the five main crops like wheat, corn, sunflower, rapeseed and barley.

For testing the naïve expectation of the producers we have calculated the yield change. National yield change is counted as the weighted average of yield changes of five main crops with area of land as weights as follows

$$\Delta h_o = \frac{\sum_{i=1}^{5} \Delta h_{i,t} \cdot T_{i,t}}{\sum_{i=1}^{5} T_{i,t}} = \frac{\sum_{i=1}^{5} \frac{h_{i,t}}{h_{i,t-1}} \cdot T_{i,t}}{\sum_{i=1}^{5} T_{i,t}}$$

where
Δh_o: national yield change (%)
$\Delta h_{i,t}$: yield change of crop i in year t compared to yield of year $t-1$ (%)
$h_{i,t}$: yield of crop i in year t (t/ha)
$T_{i,t}$: area of land of crop i in year t(ha)

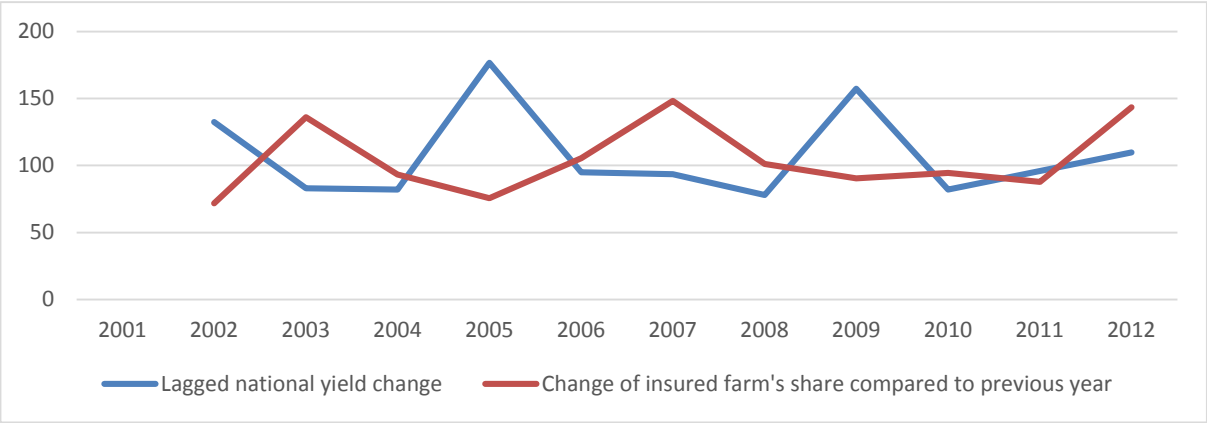
i: wheat, corn, sunflower, rapeseed and barley
t: years between 2001 and 2012

The yield change may have an effect on next year crop insurance. FADN contains only insurance premium cost data related to crop insurance until 2012, but it is assumed that the actual year premium is paid in actual year. Some of crop insurances are contracted in autumn but the premium is paid only next year. Unfortunately, there are no data about insurance contract and the date of contract. Hereinafter we made the assumption that yield change compared to previous year affect next year insurance.

Results

The base of naïve expectation is that the expected future value of the variable examined is the current value of this variable. If we consider naïve expectation in yield changes than it is assumed that the expected yield change in the next year is equal to yield change in actual year. Figure 1 illustrates the spread of crop insurance among crop producers as main activity and national yield changes based on the five main crops. We might expect that naïve expectations have got some effect on willingness to take out insurance.

Figure 1. Lagged yield change and change of insured farm's share (%)



Source: (own edition, based on FADN data)

In our probit regression analysis we took into consideration those factors which may affect the probability of producers in taking out the crop insurance and which were previously characterized in the theoretical part. Because of the manager's qualification is more related to manager's ability or personal beliefs that may better prevail in case of individual farms, we have divided the total sample into two groups, first individual- and second corporate farms. Table 1 comprises the results.

Table 1. The results of RE panel probit estimation

Variable	Total	Individual farms	Corporate farms
Manager's age	0.00203916	0.00207184	0.0099325
Manager's qualification	1.71E-02	.04779953**	1.18E-02

Lagged equity	-5.75E-07	-8.72E-07	-4.66E-07
Lagged net income	2.648e-06*	-1.19E-06	3.125e-06*
Diversity	.11504762***	.08623412***	0.10878856
Concentration	-.46690286***	-.46915125**	-.86558093**
Wheat acreage	.00110884***	.00272297***	.00081534**
Barley acreage	0.00036748	-0.00078083	0.00007835
Corn acreage	.00187487***	.00340452***	.00117341***
Sunflower acreage	.00195602***	.00272738***	.00140376**
Rapeseed acreage	.00135686**	.00431775***	-0.00005029
Lagged individual yield ch.	-.00046909*	-.00057121*	-0.00026206
Two-pillar risk management	0.02066643	0.09782095	-0.12128706

Source: (own edition, based on FADN data) ** p<.1; ** p<.05; *** p<.01*

Conclusions

The Hungarian risk management system was based on National Agricultural Risk-mitigation System (NAR) until 2011. Before year 2009 the participation was voluntary, but due to low compensation level the interest in NAR was moderate. After year 2009 the participation was obligatory for certain group of farmers but the problem was not solved. Therefore in year 2012 the two-pillar insurance risk management system was introduced.

The first pillar is an all-risk fund what is obligatory for a significant part of crop producers. The second pillar is the possibility of state-support crop insurance that is completely voluntary.

The aim of this research was to find the factors that determinate the participation in crop insurance. We used random effect panel probit model. The independent variables include information about management ability, financial indicators, size of operation, measures of diversity and yield changes. We performed the analysis separately on individual and corporate farms, too.

We can conclude that production risk in Hungarian agriculture comes together with relatively low level of insurance as basic risk management tool. There are many factors and attributes which differently affect the insurance decisions of the producers. Among these factors we can identify naive expectations, manager abilities, size of operation and measure of diversity, which have different influence on insurance decisions, depending on whether the farm is individual or any kind of corporation. We did not find significant effect of the newly introduced insurance-support scheme on crop producers.

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