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The development of Hungarian agricultural insurance system

Abstract. Agricultural insurance is one of the financial tools that agricultural producers can potentially use to cope with increasing risks in their activity. Experiences accumulated on insurance markets demonstrate that the development of a proper agricultural insurance product can not be reached without a governmental intervention mainly due to the systemic risk and information asymmetries. The aim of this paper is to present the Hungarian agricultural insurance system and its possible development. Using the farm level economic and meteorological data we assess the costs of introducing drought and soil submersion insurance products and the possible insurance premiums for these agricultural products.

Key words: Hungarian agricultural insurance system, insurance premium, drought and soil submersion risks insurance.

Introduction

Agriculture is particularly exposed to adverse natural events, such as floods or droughts and the economic costs of natural risks may even increase further in the future because of climate change. Agricultural insurance is one of the financial tools that agricultural producers can potentially use to cope with increasing risks in their activity. Experiences accumulated on insurance markets demonstrate that the development of a proper agricultural insurance product can not be reached without a governmental intervention, mainly due to systemic risk and information asymmetries. The systemic risk is taking place when a risk affects a large number of farmers simultaneously. Therefore the systemic component of agricultural risks can generate major losses for agricultural insurers [Mahul & Stutley 2010]. The information asymmetries in case of agricultural insurances are derived from an adverse selection and moral hazard. Both are connected to the difficulties associated with measuring risk and monitoring farmer behaviour. Adverse selection arises due to the lack of information which in turn results in inaccurate premium rates that make high risk farmers more likely to purchase an insurance. This can lead any insurance plan to be unprofitable and eventually to its failure.

A moral hazard occurs when insured farmers alter their production practices in some way that changes their underlying risk, which is not easily observable by the insurers.

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Typically, this involves a failure to use good farming practices, to care for the crop, or to supply adequate fertilizer or water.

A governmental support for agricultural insurances is a common practice helping farmers better access the risk management tools. Especially under certain conditions, the support of insurance can be regarded as a Green Box measure within the WTO agreements [Managing… 2009]. The World Bank conducted a survey on agricultural insurance programs in 65 countries and found that almost two-thirds of the surveyed countries provide agricultural insurance premium subsidies, with subsidies usually in the order of 50% of the original gross premium. Governments also provide public reinsurance (32% of surveyed countries), subsidies on administrative and operational expenses (16%) and loss adjustment subsidies (6%). At the same time, governments can also provide support with legislation and research, development and training [Mahul & Stutley 2010].

The aim of this paper is to present the Hungarian agricultural insurance system and its possible development. Using farm level economic and meteorological data, we assess the costs of introducing drought and soil submersion insurance products as well as the possible insurance premiums for these agricultural products. The paper is organized as follows: Section 2 presents the development of Hungarian agricultural insurance system in the last two decades and the main characteristics of the agricultural insurance market. In section 3 the conceptual framework of calculations is explained and the data used for calculations are described. The results of calculations are presented in section 4. Section 5 offers some concluding remarks.

Empirical background

The Hungarian agricultural insurance system experienced major transformations since the beginning of the post-communist transformations in the 1990s [Bielza et al. 2008; Felkai & Varga 2010; Kockázatok… 2009; Varga et al. 2011]. The production cooperatives that were the dominating organizational form in agriculture before 1990 contracted at least hail risk insurance at one of the two existing state owned insurer firms every year. At the beginning of transformation period, most of these cooperatives got bankrupt and obviously were replaced by small individual farms without any experience and proper knowledge of risk management. Therefore the hail risk coverage in Hungarian crop production has decreased from almost 100% to 40%. Consequently, the supply of agricultural insurance has not become popular during the transition and after the EU accession among Hungarian insurance companies. More than 40 insurance companies have been operating in the Hungarian economy in the last two decades and in the first part of the transition period only five insurance companies developed their agricultural insurance product portfolio. Due to poor financial performance of agricultural insurance products, the number of insurance companies providing agricultural insurances was reduced to four companies and only three insurance companies supplying agricultural insurance remain in 2012.

The main reason of poor financial performance in the Hungarian agricultural insurance market is the high premium/damage ratio which has led to a lower profitability of agricultural insurances as compared to other insurance products.

The Hungarian agricultural insurance supply was characterised by covering only a limited number of risk types like hail risks, fire risks, storm and winter frost risks, while the largest damages of crop production are caused by drought and spring frost.

The government introduced an agricultural insurance premium subsidy for the farmers contracting agricultural insurances up to 30% of insurance premium in 1997 for solving the above presented problems, for extending the risk avoiding community in case of agricultural insurance and for facilitating the introduction of new insurance products in case of risks which previously could not be insured. This intervention programme has failed to provide the expected results and the insurance premium subsidy programme was stopped in 2003. Increasing natural risks in agricultural production determined the government to establish the National Crop Damage Compensation System [Nemzeti Kárenyhítési Rendszer, NAR] in 2006. By collecting financial means from farmers, the government supported the NAR up to 50% of the received payments from the farmers. In case of higher claims than the funds collected from farmers the compensations decreased proportionally.

However, the NAR and the low penetration of agricultural insurances proved to be ineffective in dealing with the increasing risks in the Hungarian agricultural production and a new agricultural insurance system based on two pillars started to operate in 2012. The first pillar is the continuation of the National Crop Damage Compensation System with two important changes: the participation of farmers is compulsory above a certain farm size and there is a more severe control of the damage compensations. The second pillar is focusing on the development of agricultural insurance market by introducing an insurance fee support for farmers contracting insurance policies of hail, fire, storm and winter frost damages as well as for drought, cloudburst and spring frost which previously were not insurable risks.

The new insurance scheme entered into force on 1 January 2012 with an aim of increasing the efficiency of farmers' protection against environmental damages. Natural disasters and extreme weather events caused significant damages to the producers and, as it was mentioned previously, those damages were not covered sufficiently by the National Crop Damage Compensation System. After serious weather events, it often happened that the government provided compensation from ad hoc funds even to those farmers who had had no insurance and had not participated in the national compensation fund. Obviously, in those circumstances farmers had no real interest to pay any extra money for risk management policies. This situation is often referred as the lack of self-provision and it characterises the Hungarian society in general.

The first pillar is very similar to the above mentioned damage mitigation system (NAR). The most important change is that the participation of farmers is compulsory above 10 hectares of farm land in case of crop production, 5 hectares in case of vegetable production and 1 hectare in case of permanent plantations. The deposit paid by farmers varies between different land uses. The sum thus accumulated from farmers' deposits is supplemented by the government in an equal amount from budgetary sources. However, only those producers will receive full damage compensation under the new system, which provides motivation for farmers to become self-providers, who have acquired insurance from an insurance company with regard to at least 50% of their activities, while those with no insurance may receive only 50% of the maximum possible damage mitigation allowance.

The second pillar comprises a supported, private agricultural insurance construct for those producers who wish to decrease their production risks to a higher level than the protection provided by the NAR damage mitigation fund. Farmers can take out insurance policy on a voluntary basis, however, as it was said earlier, without a private insurance the

level of compensation that they can get from the national fund (NAR) is significantly lower.

The distribution of elemental damages in Hungarian agriculture in the last two decades is almost constant (Figure 1). The highest compensation for Hungarian agricultural production was paid for drought damages (42 %) following by hail damages (21 %). Varga [2010] estimated in average a yearly 70 Hungarian forint (HUF) billion damage in the Hungarian cereal production basing on the yield drops in the period between 2000 and 2008.

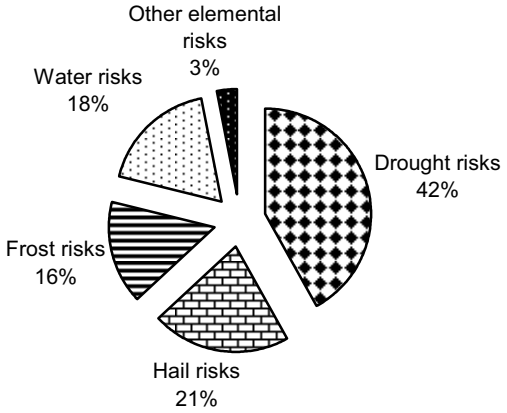

Fig. 1 The distribution of elemental damages in Hungarian agriculture in 2009, %

Source: authors' own elaboration based on data from the Association of Hungarian Insurance Companies (MABISZ) in 2010.

The insurance premium paid for hail and fire insurance represented about 85% of the total agricultural insurance fees since 2002 (Figure 2) while the most important natural risk in Hungarian agriculture is drought. There is a discrepancy between existing insurance products and the actual farm exposure to risks. For the main risks as drought and spring frost, no insurance products were supplied before 2012.

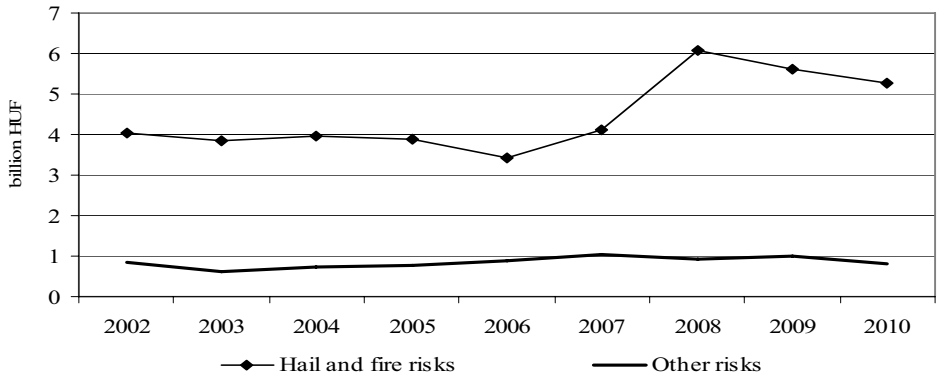

Fig. 2 Annual insurance fees collected by insurance companies from crop production, HUF billion

Source: authors' own elaboration based on data from the Association of Hungarian Insurance Companies (MABISZ) in 2010.

Crop insurance demand is particularly low in Hungary as only 40% of arable land was covered by hail and frost insurance contracts before 2012. The main reason for that is the poor income situation of many farmers which implies that the insurance products supplied in the market were not affordable. Moreover, the farm managers' willingness to pay is additionally reduced by the lack of trust in the insurance system, the lack of experience with "true" insurance systems and the wrong signals imposed by the governmental ad hoc payments.

Table 1. Incentives for increasing insurance demand in Hungarian crop production, %

Importance ranking*	Cheaper insurance premium	Deductible	Drought	Soil submersions	Inundation	Spring frost	Other
	Protection against						
1	58.8	1.8	8.8	4.7	0.6	5.3	20.0
2	11.7	25.9	30.2	14.8	6.2	7.4	3.7
3	11.8	14.6	21.5	34.7	6.9	8.3	2.1
4	5.3	23.3	13.5	15.8	15.8	24.8	1.5
5	9.8	22.3	8.0	13.4	23.2	20.5	2.7
6	6.1	18.2	15.2	12.1	21.2	23.2	4.0
7	18.7	6.7	10.7	8.0	34.7	8.0	13.3

* 1 - most important, 7- least important.

Source: Prepared at the Financial Policy Department in AKI basing on data collected from a survey of Hungarian farmers.

Spörri et al [2012] analysing the experiences of Hungarian agricultural insurances concluded that 'premium subsidies alone might not be a conclusive strategy to support the insurance use and improve its impact on economic performance of farms. Strategies to

enhance the knowledge and trust are needed to ensure that farm managers are able to utilize insurance products for readjusting their production decisions and improving their performance'.

A survey conducted by the Hungarian Research Institute of Agricultural Economics (AKI) in 2011 found evidences that the insurance penetration in Hungarian crop production can be increased by reducing insurance premiums and supplying better adapted insurance products (Table 1). The majority of crop producing farmers (58.8%) considered the most important requirement for a business insurance product to be provided at low insurance premium. Other important requirements for an agricultural insurance product are to cover risks caused by drought (30.2%) and soil submersion (34.7%).

Conceptual framework and data

Increasing demand for agricultural insurance can be achieved, as we presented in the previous section, by extending the available agricultural insurance products in the market to other risks. In this section we analyse the introduction of insurance contracts for drought and soil submersion. As there are no collected empirical data of the damages caused by drought and soil submersion in Hungarian agriculture, we apply a model based on estimation using the Hungarian FADN meteorological and special survey data.

We consider a crop damage when the yield drops below the average yield of previous nine years. The farm level yield data are confronted with the farm level meteorological data in order to assess the influence of drought and soil submersion. A special survey was applied for collecting data on the farmers willingness to pay for drought and soil submersion insurance products.

Farm level monthly meteorological data were obtained by interpolation of precipitation, insolation, average temperature, minimum temperature and maximum temperature between neighbouring meteorological stations. These meteorological data were collected by 100 automatic stations.

We considered a farm injured by a drought when the yield was below the damage ceiling and the monthly rainfall in one month between March and September was lower than 10 mm. In case of soil submersion damage, farms with yield lower than the damage ceiling and with monthly rainfall higher than 80 mm between March and September were taken into account. The damage ceiling in case of wheat and barley is 4 tonne per hectare, in case of maize is 6 tonne per hectare and in case if sunflower and rapeseed 2 tonne per hectare.

Results

Extending risk management tools for Hungarian agricultural producers by introducing insurance products for drought and soil submersion risks accompanied by the subsidised insurance premiums needs an assessment of the costs and the level of insurance premiums. Average and high damage costs and insurance premiums are presented in case of different damage ceilings as a share of the average production value in Table 2. The insurance premiums of crop products for drought and soil submersion risks in case of average damage years in the period between 2001 and 2009 are ranging between 10% and 14%, and in case

of high damage years between 20% and 40% of production value. We considered 2003 as a high damage year for wheat, barley and sunflower seed in the analysed period; and 2007 for maize and rapeseed, because farmers recorded the highest damages in case of these crops in these years.

Table 2. Total damages and insurance premiums for different damage ceilings and crops

Crop	Damage ceiling, tonne/hectare	Average damage covering costs as a share of average production value, %	Insurance premium for an average damage year, %	High damage covering costs as a share of average production value, %	Insurance premium for a high damage year, %
Wheat	4	9.3	12.5	28.8	38.3
	3.5	5.5	7.3	19.9	26.6
	3	2.9	3.8	12.5	16.6
	2.5	1.3	1.8	6.9	9.2
	2	0.5	0.7	3.1	4.1
	1.5	0.2	0.2	1.1	1.4
Barley	4	9.0	12.0	17.4	23.1
	3.5	5.7	7.7	12.5	16.7
	3	3.4	4.5	8.2	11.0
	2.5	1.8	2.4	4.9	6.6
	2	0.9	1.1	2.4	3.2
	1.5	0.3	0.4	1.0	1.3
Maize	6	10.3	13.8	31.9	42.5
	5	5.8	7.8	19.6	26.2
	4	2.8	3.7	10.0	13.3
	3	1.1	1.4	3.9	5.2
	2	0.3	0.4	1.0	1.4
Rapeseed	2	7.7	10.2	20.2	27.0
	1.5	3.3	4.3	9.5	12.7
	1	0.9	1.2	2.3	3.0
	0.5	0.1	0.1	0.1	0.2
Sunflower	2	7.7	10.3	16.9	22.6
	1.5	2.6	3.4	6.1	8.1
	1	0.5	0.7	1.4	1.9
	0.5	0.0	0.1	0.1	0.2

Source: calculations carried out at Financial Policy Department of AKI.

A successful introduction of drought and soil submersion risk insurance required an assessment of the farmers willingness to pay for this insurance product. We have collected data about farmers' willingness to pay for insurance products by a special survey of the farms included in the Hungarian FADN System.

The calculations based on the survey and the FADN data reveal a very low level of farmers' willingness to pay as compared to the production value. The willingness to pay for drought and soil submersion insurance is below 2% even in the case of a complete damage compensation. In case of wheat, for example, only 1.8% of farmers declared that they would agree to pay 9% insurance premium in the case of 90% damage ceiling, while 17% of farmers opted for a 0.5% insurance premium. This low willingness to pay further decreases in case of lower damage ceiling, for example in case of 70% damage ceiling 36% of farmers have chosen the 0.5% insurance premium. If our aim is to attain a risk community of 50% in case of drought and soil submersion insurance, the insurance premium should be between 1 and 2%.

The costs of introducing drought and soil submersion insurance products for Hungarian farmers are higher than the farmers' willingness to pay for these insurance products (see Table 2 and Table 3). However, the increasing risks caused by drought and soil submersion in Hungarian agriculture require a development of Hungarian agricultural insurance system by extending the risks management tools and introducing drought and soil submersion insurance policies. Reducing costs of these insurance products or increasing farmers willingness to pay can be achieved by subsidising insurance premiums.

Table 3. The distribution of farmers' willingness to pay for drought and soil submersion insurance in case of different damage ceilings

Crop	Damage ceiling, %	Insurance premium as a share of production value, %								Total, %
		0.5	1.0	2.0	3.0	5.0	7.0	9.0	above	
Wheat	90	17.0	35.7	22.3	12.5	10.3	0.0	1.8	0.4	100
	70	36.1	29.3	12.0	11.5	9.6	0.0	1.4	0.0	100
	50	52.7	22.3	12.5	10.3	2.2	0.0	0.0	0.0	100
Barley	90	22.7	33.5	18.4	11.9	10.8	0.0	1.6	1.1	100
	70	38.3	29.4	12.8	9.4	8.3	0.0	1.7	0.0	100
	50	56.2	18.4	11.9	10.8	2.7	0.0	0.0	0.0	100
Maize	90	18.2	34.6	20.6	12.6	11.7	0.0	1.4	0.9	100
	70	37.9	29.3	12.6	10.6	8.1	0.0	1.5	0.0	100
	50	52.8	20.6	12.6	11.7	2.3	0.0	0.0	0.0	100
Sunflower	90	17.4	29.2	21.5	16.7	12.5	0.7	1.4	0.7	100
	70	36.8	25.7	11.8	10.3	11.0	1.5	2.9	0.0	100
	50	46.9	21.5	16.2	13.4	2.1	0.0	0.0	0.0	100
Rapeseed	90	15.4	22.0	19.8	20.9	14.3	3.3	2.2	2.2	100
	70	30.4	29.1	16.5	7.6	8.9	5.1	2.5	0.0	100
	50	47.9	19.8	15.8	12.1	4.4	0.0	0.0	0.0	100

Source: calculations carried out at Financial Policy Department of AKI.

Conclusions

More frequent adverse natural events have been increasing the risks exposition of Hungarian agriculture, which necessitates the development of an agricultural insurance system. This paper analyses, after presenting the development of Hungarian agricultural insurance system in the last two decades, the possibilities of drought and soil submersion risks insurance products introduction.

The up to now experience suggests that the reason behind the poor development of agricultural insurance system is related to both the supply and demand side of the market. Referring back to the mitigation potential of agricultural lands is also necessary here. It should not be forgotten that farmlands can play a significant role in mitigating the risk from the potentially vulnerable urban areas where costs could be significantly higher.

The new two-pillar risk management system has just entered into force in Hungary. The aim here is more to develop an efficient compensation system with a fair contribution from all stakeholders. The previous system failed in that context, the new has had no time to demonstrate its ability yet. However, due to the special characteristics of agricultural sector, it can be assumed that the public sector has a significant role in the compensation of extreme weather related agricultural damages and the state involvement is often necessary to provide a suitable environment to companies to develop agricultural insurance products that cover damages caused by extreme weather events.

A survey of Hungarian crop producers carried out in the Research Institute of Agricultural Economics (AKI) has revealed the farmers' low willingness to pay for drought and soil submersion risks insurance, while high damages caused by drought and soil submersion are characteristic for the Hungarian agriculture. The introduction of drought and soil submersion risks insurance has higher costs than the farmers' willingness to pay for these insurance products. The introduction of this new risk management product can be achieved with a government intervention by subsidising agricultural insurance premiums.

Extending risk management tools for agricultural producers by introducing new insurance products and subsidising the insurance premiums for farmers is going to increase the risk avoiding community which reduces the costs of operation for insurance companies and increases the income stability of the farmers.

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