

One size policy does not fit all: Latent farmer groups in crop insurance markets

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Introduction

Farms and farmers are not a homogeneous group. They differ significantly in their objectives in farming, risk exposure and **risk attitudes**. However, agricultural policies aimed at stabilizing income do not take into account these farm-level differences.

Crop insurances are promoted with premium subsidies throughout the world, and with subsidies governments are able to regulate crop insurance markets. Due to international commitments, for example, the pressure to limit the minimum threshold for the farmers' deductible is high (WTO, 1994).

In developing crop insurance markets, one of the main problems to be solved is the setting of appropriate premium and subsidy levels for crop insurance schemes in order to fulfil the policymakers' objectives of a high participation rate among farmers. This is a challenging task due to the heterogeneity among farms regarding their risk attitudes and positions. Thus, it is typical that high-risk farmers start to over-present and low-risk farmers to under-present in the risk pool, which leads to losses on the side of the insurers.

In this study, the aim was to reveal how farmers differ in their willingness to pay for crop insurance. Data from a choice experiment were analysed with the latent class approach to reveal the number of latent groups and differences in farmers' WTP for crop insurance.

Methods

As crop insurances are completely new products for Finnish farmers, we could not make assumptions about underlying farmer groups. Thus, a latent class model was used to investigate the different farmer segments. The heterogeneity is included in the model with latent number of classes. The farmer classes were determined purely based on the choices made by the individuals in the choice experiment (CARD1).

INSURANCE CARD 1	Insurance 1	Insurance 2	No buy
premium €/hectare	12	16	I would not purchase insurance
Deductible	20%	20%	
Insurance type	Yield index	Farm insurance	
compensation €/hectare	300	600	
MY CHOICE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Results

A model with three farmer classes was selected based on Bayesian information criterion (BIC) statistics and reasonable class sizes. The Wald p-values indicate that the attributes were jointly significant, while further tests show that only the price attributes were class dependent. However, this is very important in the economic interpretation of the results.

IP €/ha	Class1	Class2	Class3
Deductible (10%)	-2.42	-5.04	-3.67
Scale (€1/ha)	0.044	0.014	0.059
WTP*)	6.03	-10.92	6.55

*) Deductible 30% and scale €300/ha

Farmers in class 1 (42% of farmers) were named as **catastrophic loss preventers**. Their IP for the deductible is higher compared to the rest of the farmers. With increasing deductible levels, which they are willing to accept, they need to cover a larger part of yield risk by themselves. We named farmers in class 2 (30% of farmers) as **risk lovers**. They have the lowest IP for the scale. Risk lovers WTP for insurance products is on average terms negative. The third farmer class, comprising 28% of farmers, was named as **shallow loss preventers**. They are willing to pay premiums of €6.5/ha for each scale of €100/ha they receive. While having a highly negative IP for the deductible than class 1 farmers, they would not opt for higher deductible insurances.

Conclusions

A new finding in this study was that stated preferences methods could be efficiently used in dividing risk-averse farmers into more distinctive groups. By applying well-recognized econometric methods from other industrial areas, we defined farmers as being *catastrophic loss* and *shallow loss preventers*. These groups have earlier been recognized in quality terms, i.e. based on their preferences for risk taking, but have not been measured in a quantitative manner. In the data representing Finnish farmers, the number of *catastrophic loss preventers* exceeded the number of *shallow loss preventers*.