A prototype of an index-based margin insurance for agriculture in Austria

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Contents of the presentation

- Motivation and problem statement
- Agricultural production risk management in Austria
  - current state
  - weaknesses and a proposal for a solution: margin index insurance
- Necessary conditions for a margin insurance to work
- Concept and prototype
- Discussion and outlook
motivation and problem statement

- farm structure in Austria and level of education
- challenges of price volatility
  - more uncertainty about revenues and costs
  - specialisation and liquidity problems - not alleviated by EU direct payments
  - political measures: late, uncertain, no legal title, wrong incentives
  - tax credits - not relevant in Austria for most farms
  - price hedging instruments steep learning curve and intransparent markets
  - most frequently used: service of buying co-operatives
what is a margin insurance

\[
\text{margin} = \text{revenue} - \text{variable costs} = \text{t yield/ha} \times \text{price €/t}
\]

motivation and problem statement

types of income related insurance in Austria

- mandatory:
  - unemployment insurance for employees
  - public disability and accident insurance

- voluntary:
  - unemployment insurance for self-employed persons (since 2009) - but not for farmers
  - private invalidity and disability insurance
  - private health insurance: daily allowances (additional coverage)

- all these insurances have special features to make them operational
agricultural production risk management in Austria

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<th>Cereals / Grains</th>
<th>Maize</th>
<th>Potatoes</th>
<th>Rape</th>
<th>Soy Bean</th>
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<th>Grapes</th>
<th>Glasshouse</th>
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### Table Notes:
- **X** indicates the presence of the risk factor for the specific crop or animal.
- **x** indicates the absence of the risk factor for the specific crop or animal.

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Hail

Consumer's risk due to hail

Hail induces fusarium infestation

Frost

Drought

Re-cultivation

Storm

Drift

Siltation (mud)

Flooding

Predation

Spreading

Snow damage

Additional hassle and rot

Spoilage

Heavy rain

Death

Dead birth

Animal epidemics

Death failure of ventilation

Technical defects

Fire
Key data on the market for production related risks in Austrian agriculture

<table>
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<tr>
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<th>2000</th>
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<td>clients</td>
<td>71,897</td>
<td>67,866</td>
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<td>area, 1,000 ha</td>
<td>913</td>
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<td>premium volume, mn €</td>
<td>45.9</td>
<td>53.1</td>
<td>96.3</td>
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<td>farmer's losses, mn €</td>
<td>64.3</td>
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<td>premium subsidy, mn €</td>
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<td>amount covered, bn €</td>
<td>n.a.</td>
<td>n.a.</td>
<td>3.7</td>
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</table>
necessary conditions for an income related insurance to work

- low administrative costs
  - mutual insurer
  - index based system on margins instead of personal income
- avoid adverse selection: self selection into well designed product
- avoid moral hazard: farmer’s behaviour has no effect on outcome - index
- avoid accumulation risk
  - diversified farm products / inputs of which prices are uncorrelated
  - re-insurance
- no unconditional insurance of structural shifts:
  - limited payout period, regular renegotiation of insurance contract
  - automatic adaptation of premiums / indemnity levels
the concept and a prototype

introduction to INCAP
index based costs of agricultural production

INCAP consists of 2 activity groups.

- **Plant production activities**
  - Cereals, oilseeds, protein crops, root crops, catch crops, fallow land, silage, hay

- **Livestock activities**
  - Dairy cow and milk prod., heifer rearing, bull fattening, sucker cow + beef calf prod., piglet production, pig fattening
introduction to INCAP
index based costs of agricultural production

Activity

Gross margin components
- Revenue (e.g. grain, straw)
- Variable costs (e.g. seeds, fertiliser, plant protection)

Attributes
- Attribute types (e.g. farming system, tillage system, plant protection intensity, climate type, labour type)

Time
- Past/Present Future

Area
- Austria Provinces
- Communities

Dimensions
- Capture heterogenous production conditions and management systems
- Capture heterogenous production conditions and management systems
- Capture development over time

Differentiation within the dimensions
- Allow spatially-explicit analyses

Dimensions
- Differentiation within the dimensions
- Purpose

Each activity has at least 3 dimensions.

example
quality wheat, average 2011-2013

Variable costs for 48 combinations of quality wheat, no straw recovery, cropland, field size: 2ha, tax excluded in the reference year (average 2011-2013), €/ha.

See case study: time series for 1 specific activity-attribute combination

△ HighPPI. OwnLab
▼ HighPPI. HirLab
● MedPPI. OwnLab
● MedPPI. HirLab
− LowPPI. OwnLab
− LowPPI. HirLab

plant protection intensity
labour type
climate

Conventional farming
Organic farming

Attributes

plant protection intensity
labour type
climate

tillage system
farming system
introduction to INCAP

time series for 1 specific quality wheat production activity

Gross margins (€/ha)
for quality wheat,
yield for Lower Austria,
conventional farming,
standard tillage,
own+n hired labor, dry
climate, medium plant
protection intensity,
excl. tax

a prototype of a margin insurance
quality wheat in Austria
a prototype of a margin insurance quality wheat in Austria

a prototype of a margin insurance (conventional) milk in Austria
discussion and outlook

- at the moment just a little more than a prove of concept
- farmers' reaction and willingness to pay not yet known
  - they may be interested in income insurance instead of margin insurance
  - variable costs are not very volatile for many activities: only a small group may be interested ⇔ high accumulation risk
- not for all products / inputs there are adequate price indices available
- time series properties of candidate indices are not yet well understood
some sufficient conditions for an income insurance in agriculture to work

- control of accumulation risks
- details of contract are attractive for farmers
  - e.g. monthly benefits for milk producers
  - benefits at the time of sale for pig, piglet, grain producers
- combination with production risk insurance with discounts
- government support during introduction period / as a new policy instrument
- marketing and sales: wholesale buyers / dairies / producer organisations offer margin insurance as a service

the way ahead

- further validation of margin calculation tool
- research on adequate indices for various activities
- statistical properties / time series properties of relevant data
- development of more sophisticated prototypes for more activities
- micro-simulation of variants of products using data from existing firms
- farmers' willingness to pay for well designed products
- check of legal / agricultural policy context for such types of products
Thank you

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Heinschink, K., Sinabell, F., F. Lemacher, 2016a, Crop production costs in Austria: Validation of simulated results using farm observations. 26th Annual Conference of the Austrian Society of Agricultural Economics, Wien


