Why don’t Polish farmers participate in the agricultural production insurance scheme ? An analysis based on expected utility approach.

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Key message 1: a risky environment

- Increasing frequency of adverse events (floods, droughts, spring frosts) – climate changes
- Liberalization of international trade (mainly price risk, but not only)
- Changes in CAP

Increasing risk
=
increasing fluctuation of farm income

Key message 2: a risky environment = a need of risk management in agriculture

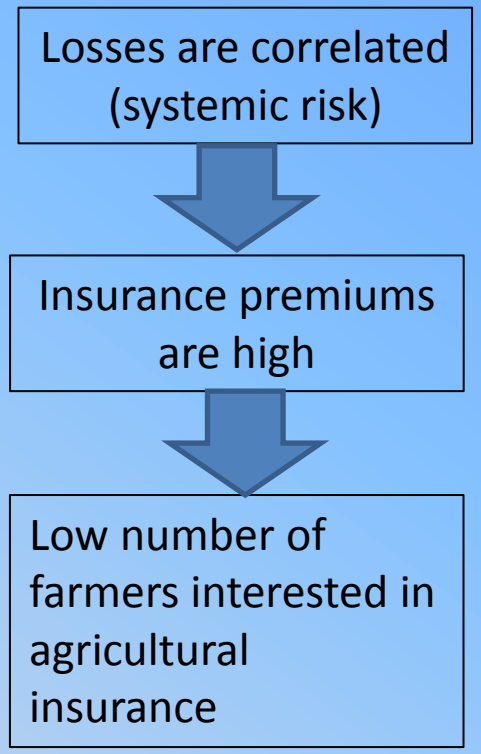
Strategies to cope with risk

	Farm/household/community	Market	Government
Risk Reduction	Technological choice	Training on risk management	Macroeconomic policies Disaster prevention (flood control…) Prevention of animal diseases
Risk Mitigation	Diversification in production Crop sharing	Futures and options Insurance Vertical integration Production/marketing Contracts Spread sales Diversified financial investment Off-farm work	Tax system income smoothing Counter-cyclical programs Border and other measures in the case of contagious disease outbreak
Risk Coping	Borrowing from neighbours/family Intra-community charity	Selling financial assets Saving/borrowing from banks Off-farm income	Disaster relief Social assistance All agricultural support programs

Source: OECD Secretariat based on Holzmand and Jogersen (2001) and OECD (2001).

Key message 3: creating an effective insurance marker requires fulfilling certain conditions

- number and size of the objects should be sufficient to calculate probable losses,
- the occurrence of the loss has to be incidental and should not be intended by the insured one,
- possible occurrences have to be severe in terms of their consequences, and the losses should be measurable.



Key message 4. insurances of agricultural production are usually supported by government

- In Poland – obligatory and subsidised insurances of crops and animals before 1991
- Since 1990 only insurance of the buildings and farmer's liability are mandatory
- No more subsidies to insurances of agricultural production

Withdrawal of the farmers from the insurance market

Current situation

- 2005- introduction a new legal act
- Farmers (receiving direct payments from EU) are obliged to insure:
  - at least a half of area under crops
  - at one risk factor
  - penalty fee (2 euro per ha)
  - subsidies: 50% (65% from 2016) of insurance premium, but the insurance rate max 6% of insured sum

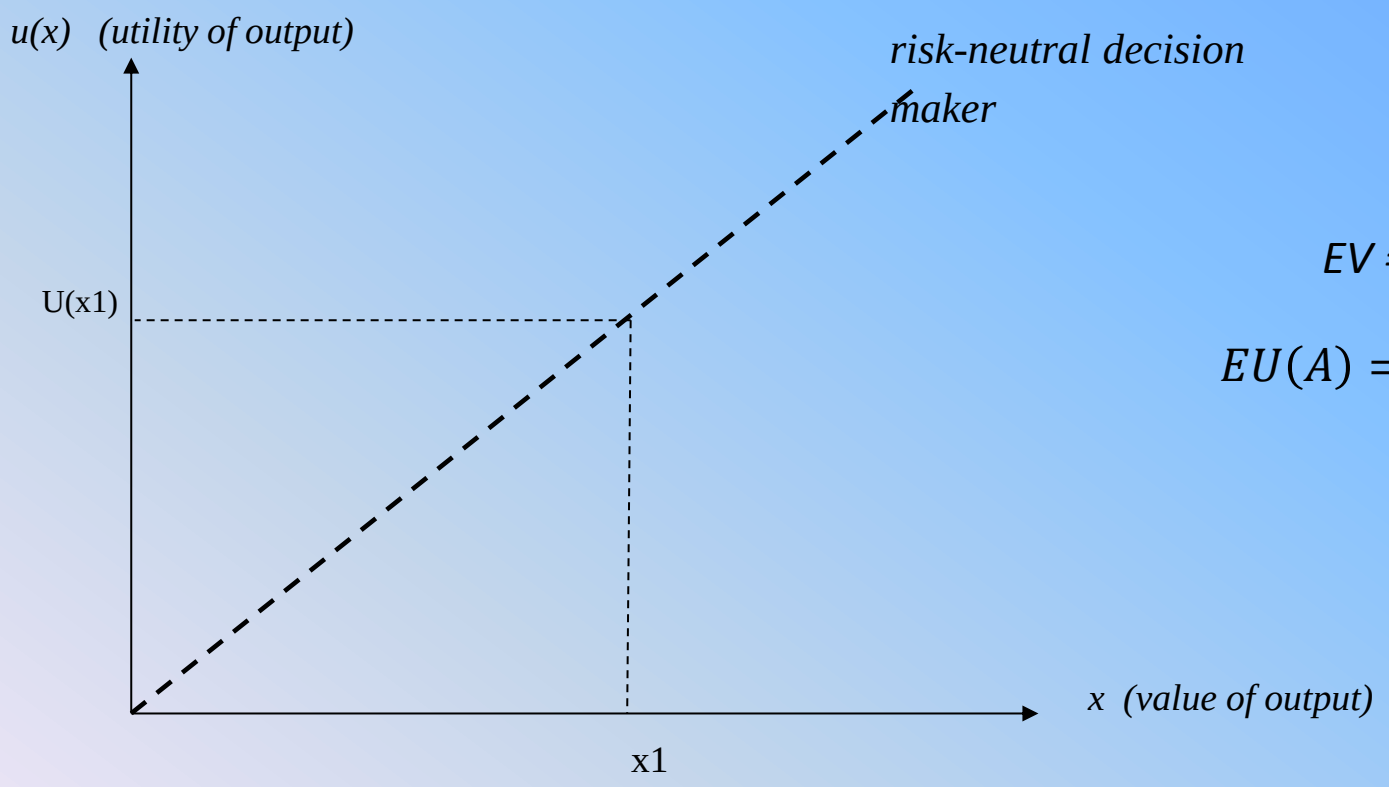
Current situation

Year	Number of contracts		Agricultural area under insurance [ha]
	crops insurance	animal insurance	
2006	10 738	318	311 740
2007	28 412	416	575 029
2008	87 150	220	1 832 036
2009	144 080	248	2 808 104
2010	150 833	279	2 845 777
2011	138 425	290	3 032 634
2012	135 707	292	2 751 439
2013	**151 101**	307	**3 398 812**

Number of farms taking UE direct payments: ~1,5 mln

14,6 mln ha

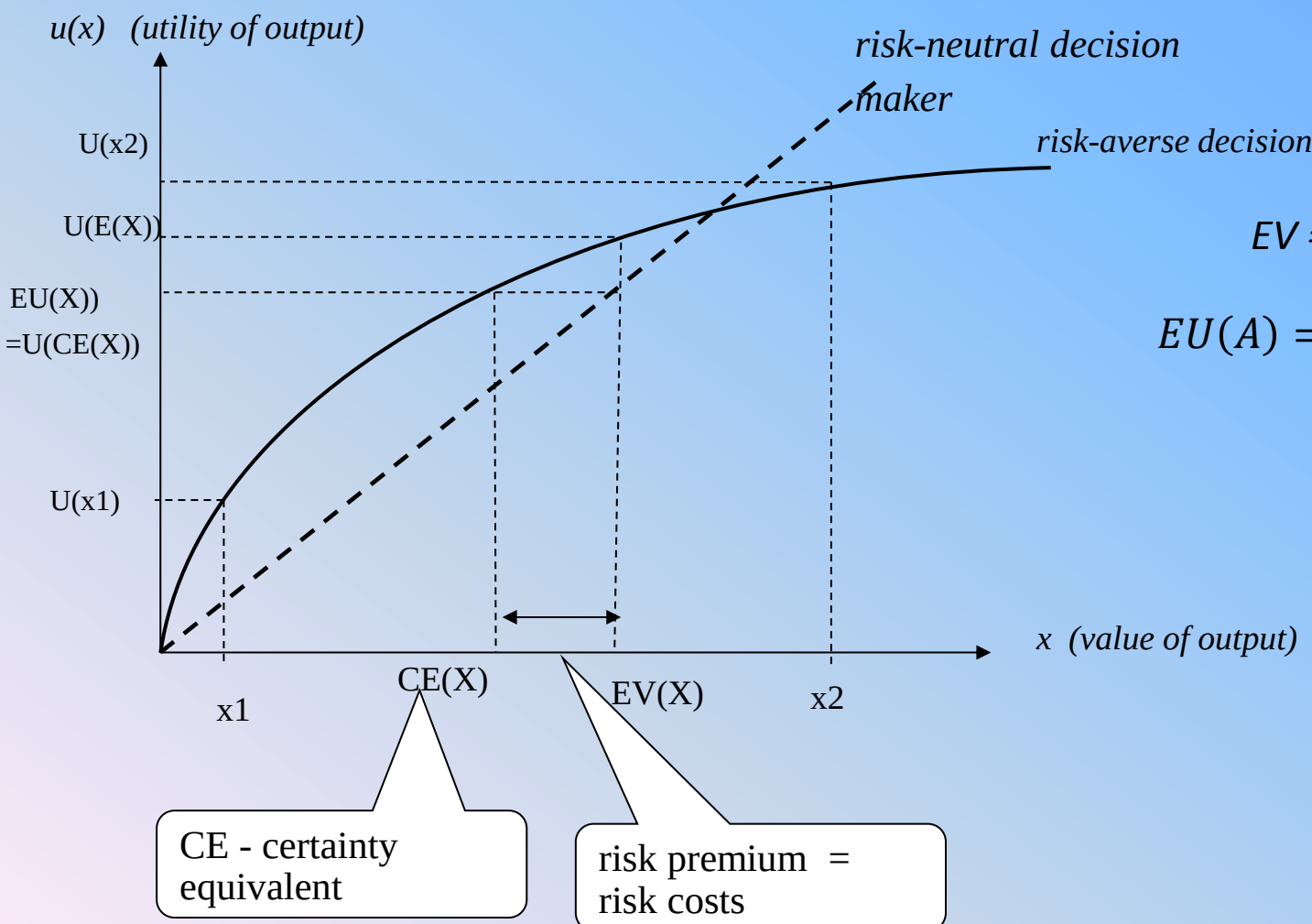
Expected utility theory



$$EV = p_A\, x_1 + p_B x_2)$$

$$EU(A) = \sum_{x \in X} P_A\ (x) U(x)$$

Expected utility theory



$$EV = p_A\, x_1 + p_B x_2)$$

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Expected utility theory

CE(X) = EV(X) – RP; *RP – risk premium*

RP = EV(X) - CE(X)

Under some assumptions RP can be calculated as approximation [Anderson and Dillon 1992, Hardaker 2000, Berg 2008]:

RP = ~*0,5*R_a*Var(X)*

where: R_a *- absolute risk aversion*

Var(X) - variance

Problem of risk aversion elicitation

$$R_a = \frac{-U(X)''}{U(X)'};$$

$$R_r = R_a X$$

Andrson, Dillon 1992:

R_r = 0.5 - very low or no aversion

R_r = 1 - average (normal) aversion

R_r= 2 - rather clear aversion

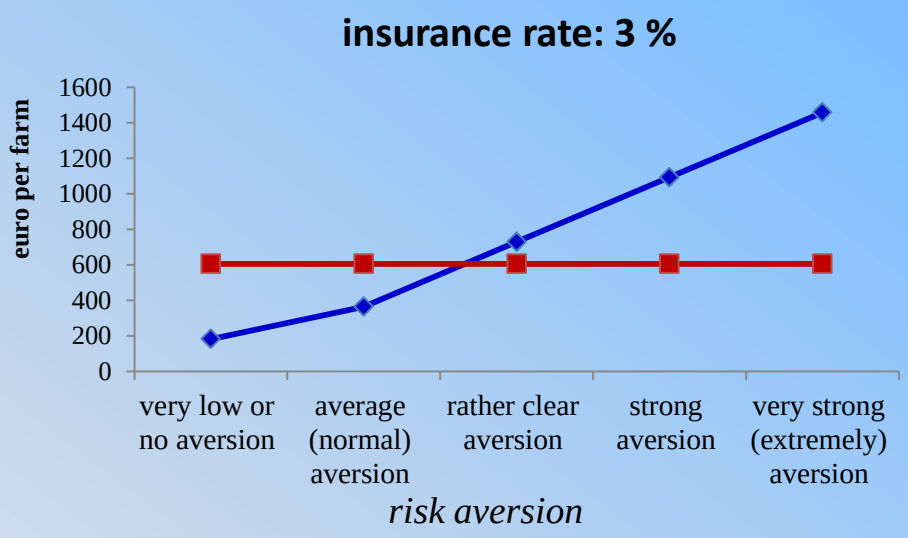
R_r = 3 - strong aversion very strong

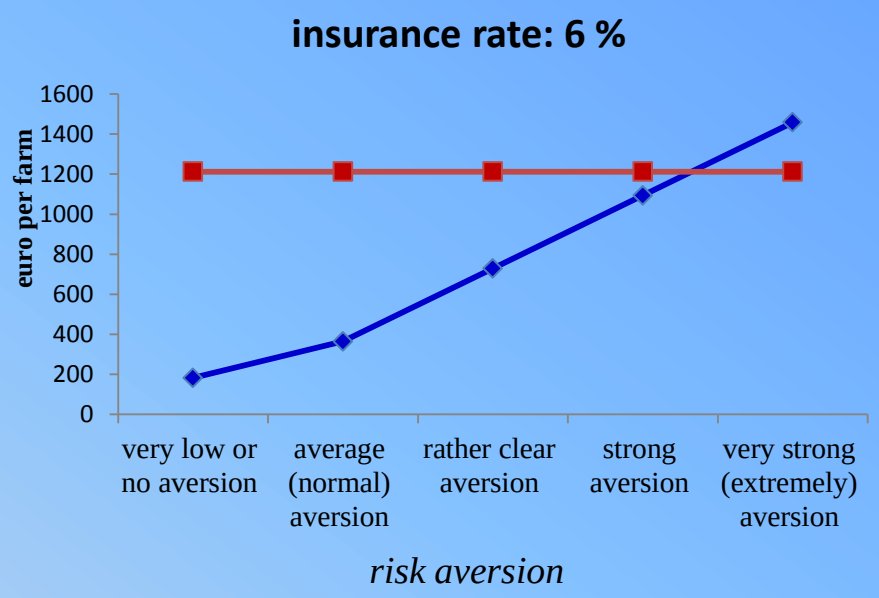
R_r = 4 - (extremely) aversion

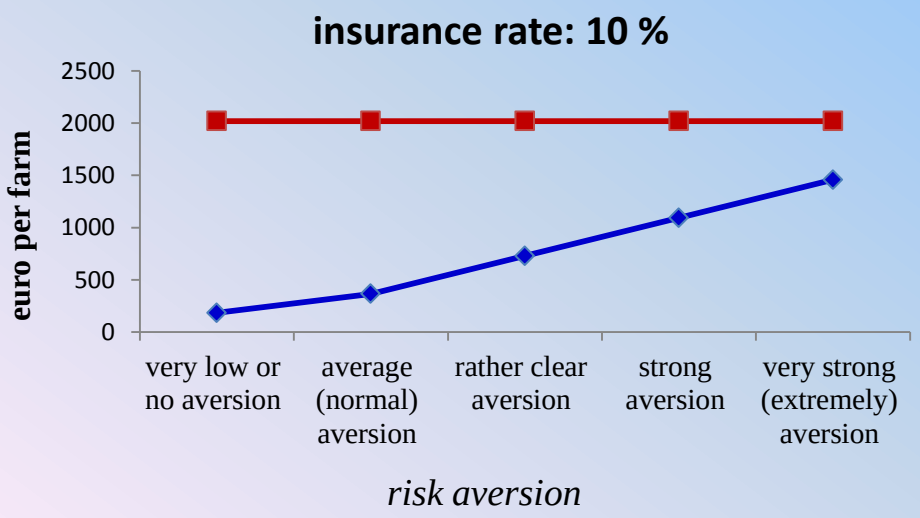
General assumptions of the simulations:

- Source of data: „average farm” in FADN type „field crops” (~29 ha of UAA, ~ 62% cereals in structure of sowing area)
- Argument of utility function: value of farm production
- 4 levels of farmers’ risk aversion
- 3 levels of insurance rate:
  - 3% (subsidised)
  - 6% (subsidised)
  - 10% (commercial)
- All parameters presented on farm level

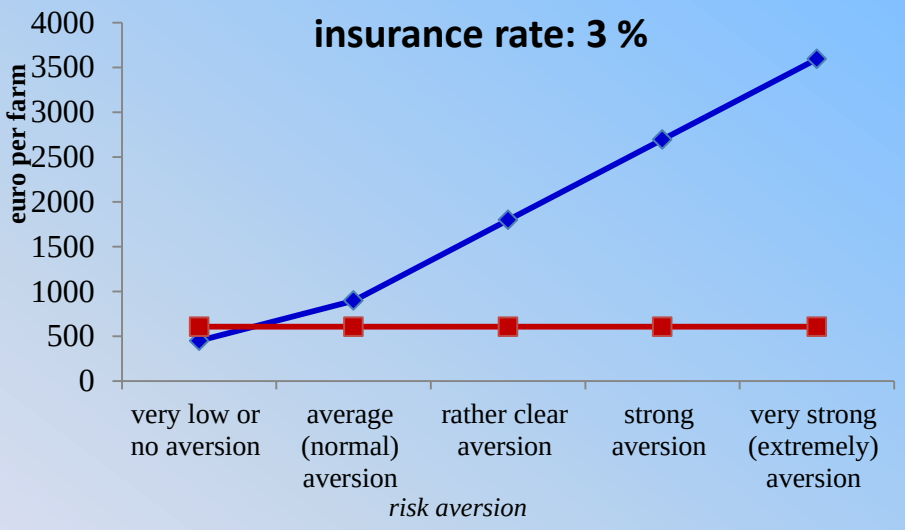
Results of simulations

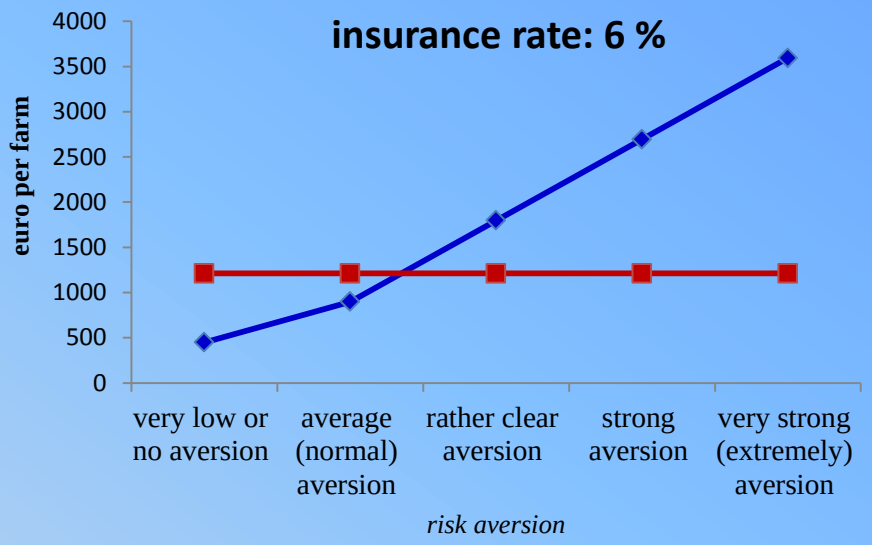


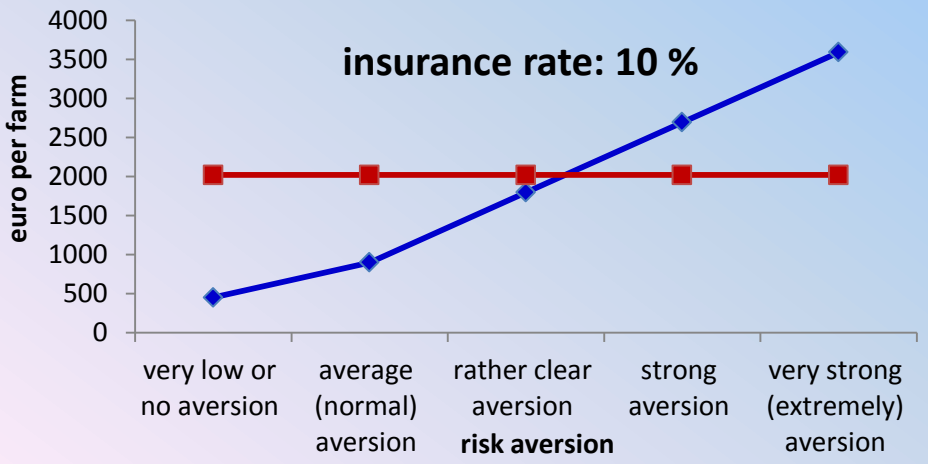




Results of simulations – no direct payments







Conclusions

- introduction of insurance scheme of agricultural production in Poland in 2005 did not cause massive participation of farmers in the insurance market,
- the main reason of low rate of farmers' participation in the system seems to be too high cost of insurance premiums, particularly if the risk of drought is taken into account,

Conclusions

- the simulations showed that even in the case of decision-maker with moderate risk aversion the insurance premium was higher than value of the of the risk premium (maximum accepted cost of risk in terms of EUT),
- the utility of „keeping risk” seems to be higher than transfer it by insurance market in majority of analyzed cases,

Conclusions

- In terms of EUT low rate of farmers participation in agricultural insurance scheme seems to be enhanced by existence of EU direct payments (reduction of variability of farms income).