Farmers Responses to the Changes in Hungarian Agricultural Insurance System

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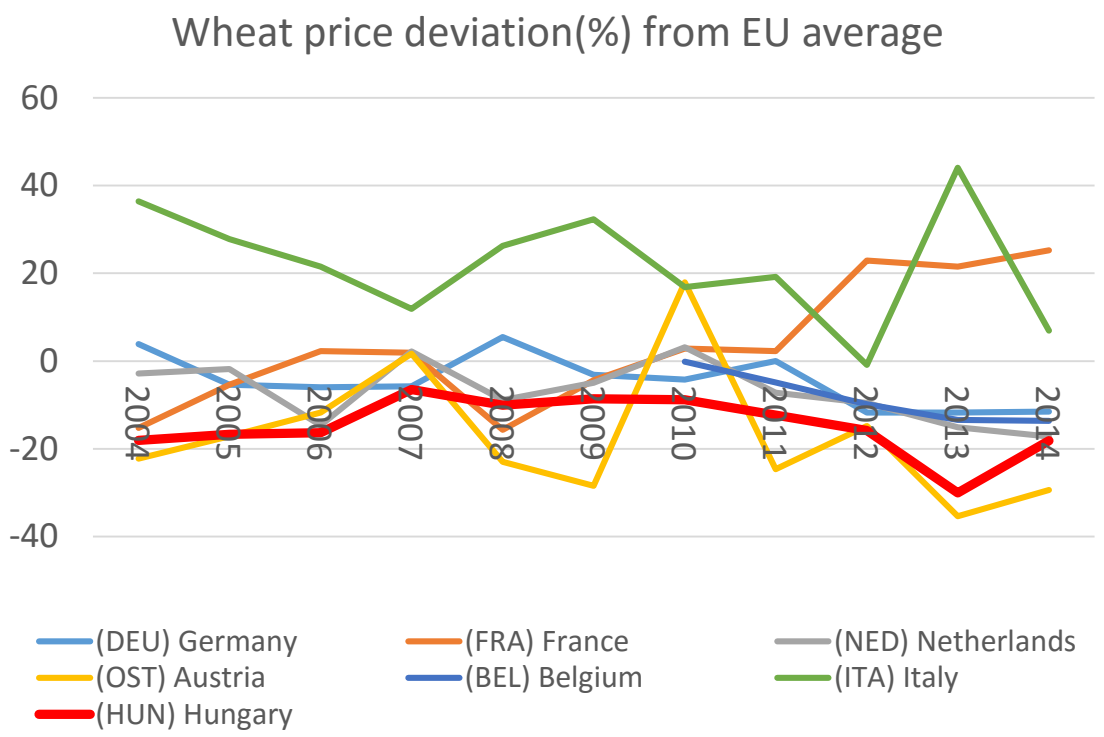
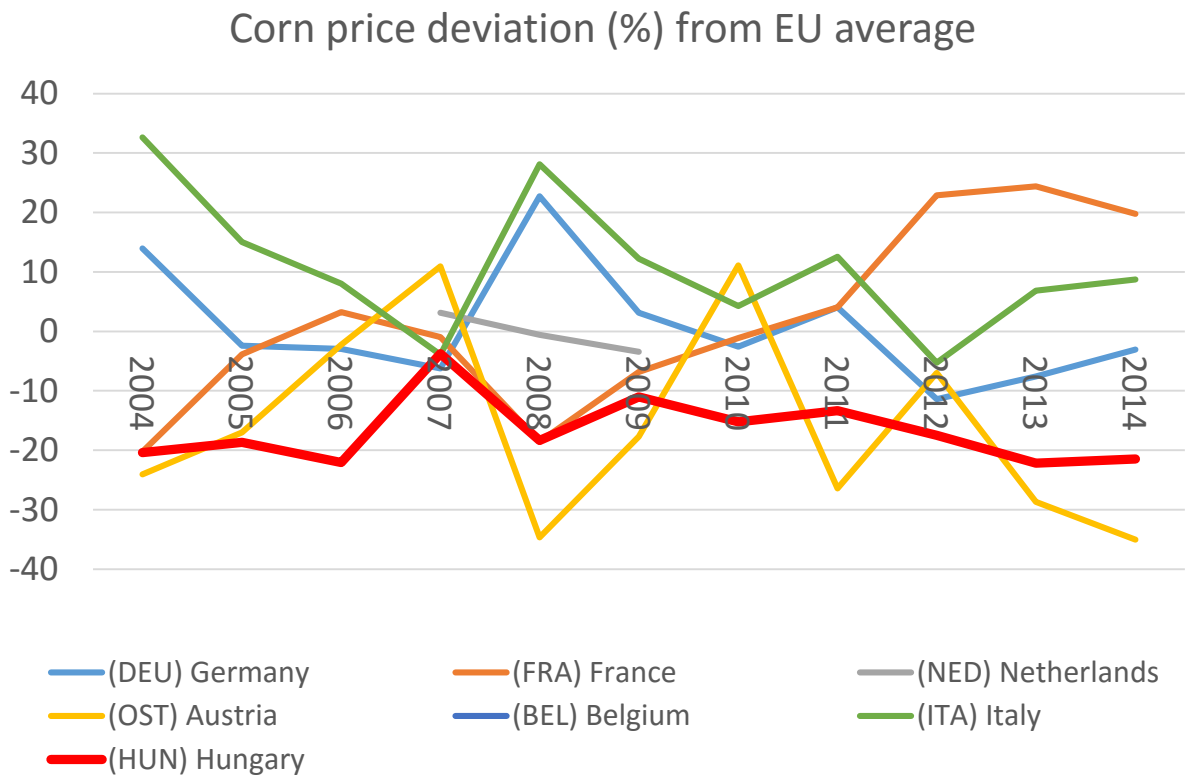
Outline

1. Grounds of high risk exposure in Hungary
2. Evolution of national (crop)risk management system
3. What factors influence insurance use?
4. Does insurance use effect efficiency?

Hungary – why so important to tackle risks?

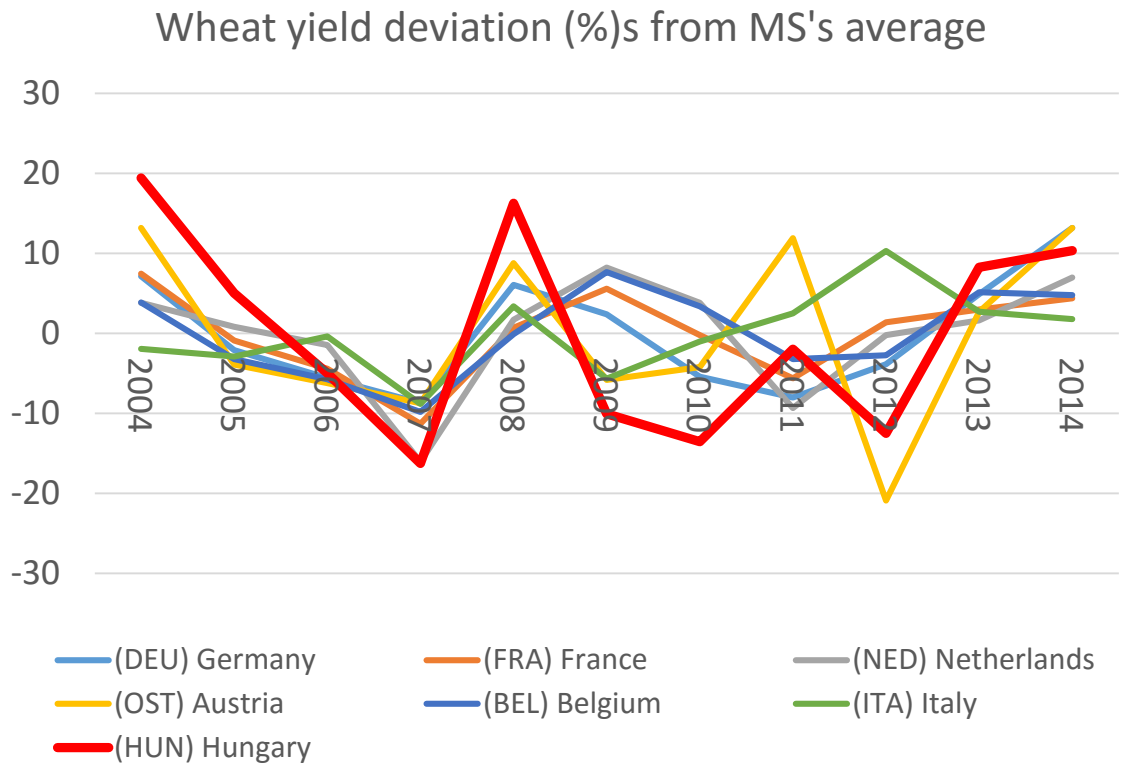


- Lower prices

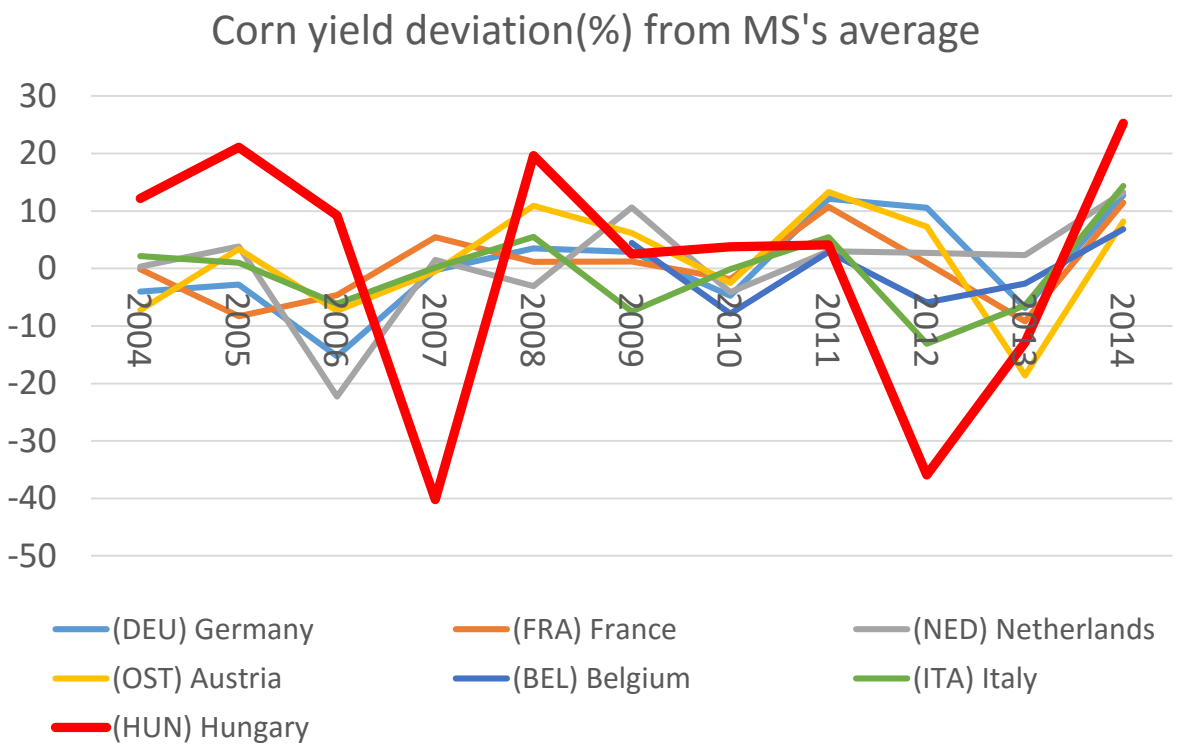


Source: Eurostat

Hungary – why so important to tackle risks?



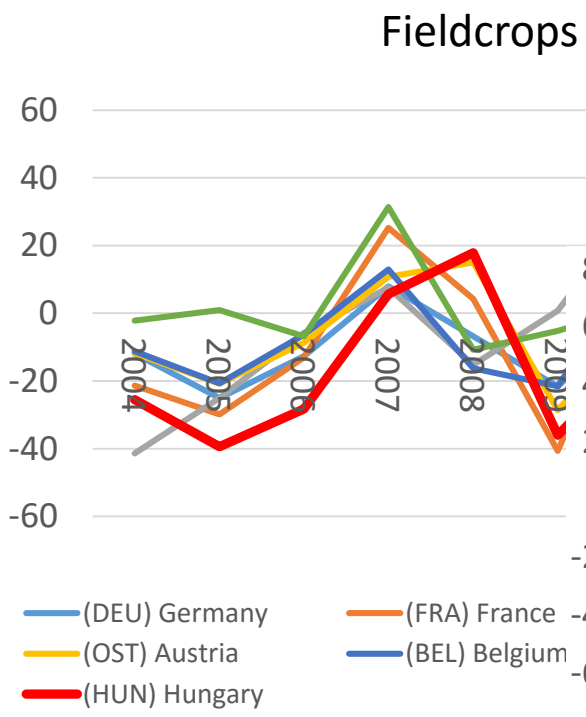
- Lower prices
- Greater crop yield variability

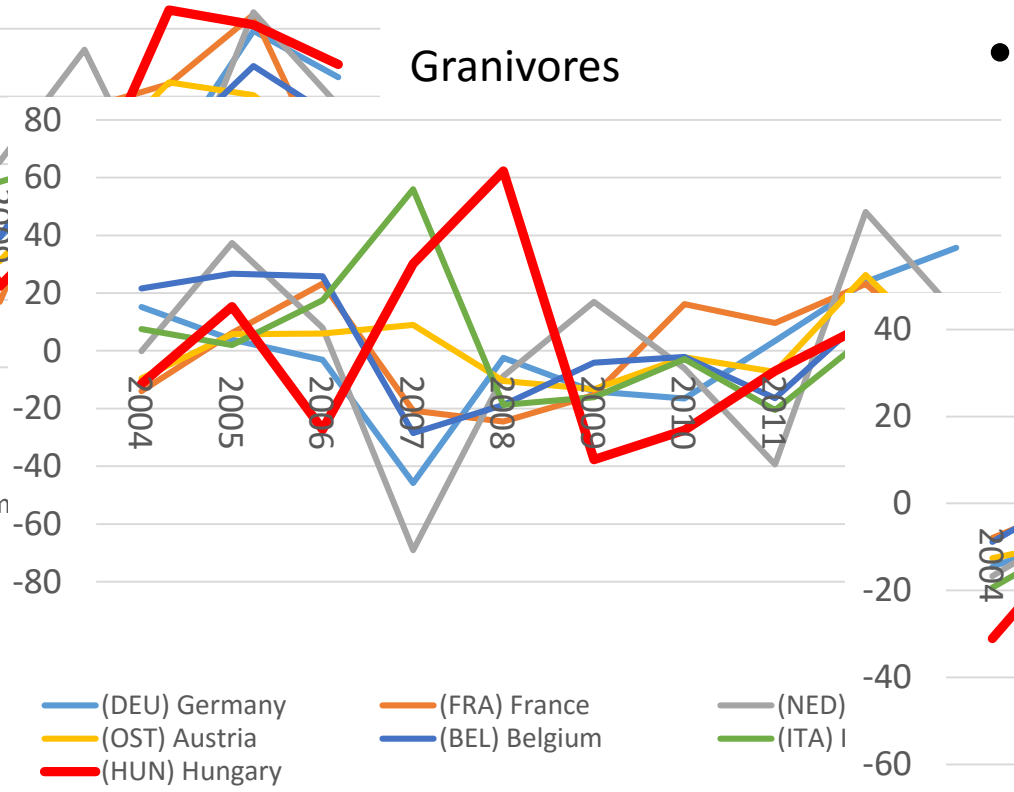


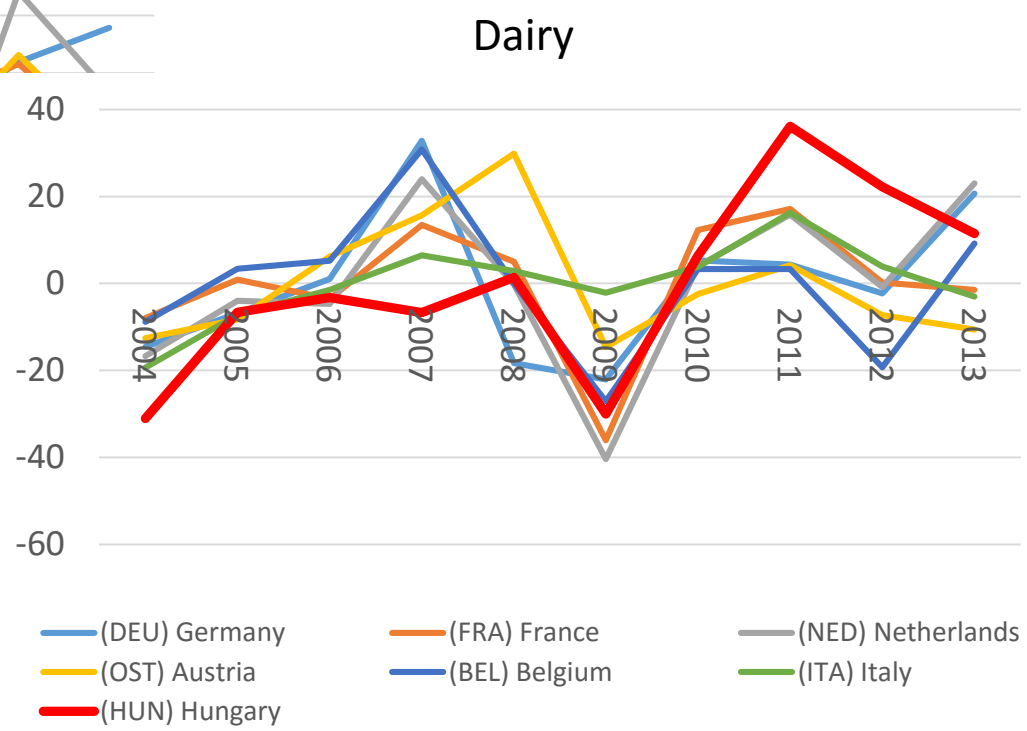
Source: Eurostat

Hungary – why so important to tackle risks?

- Lower prices
- Greater crop yield variability
- Greater income variability

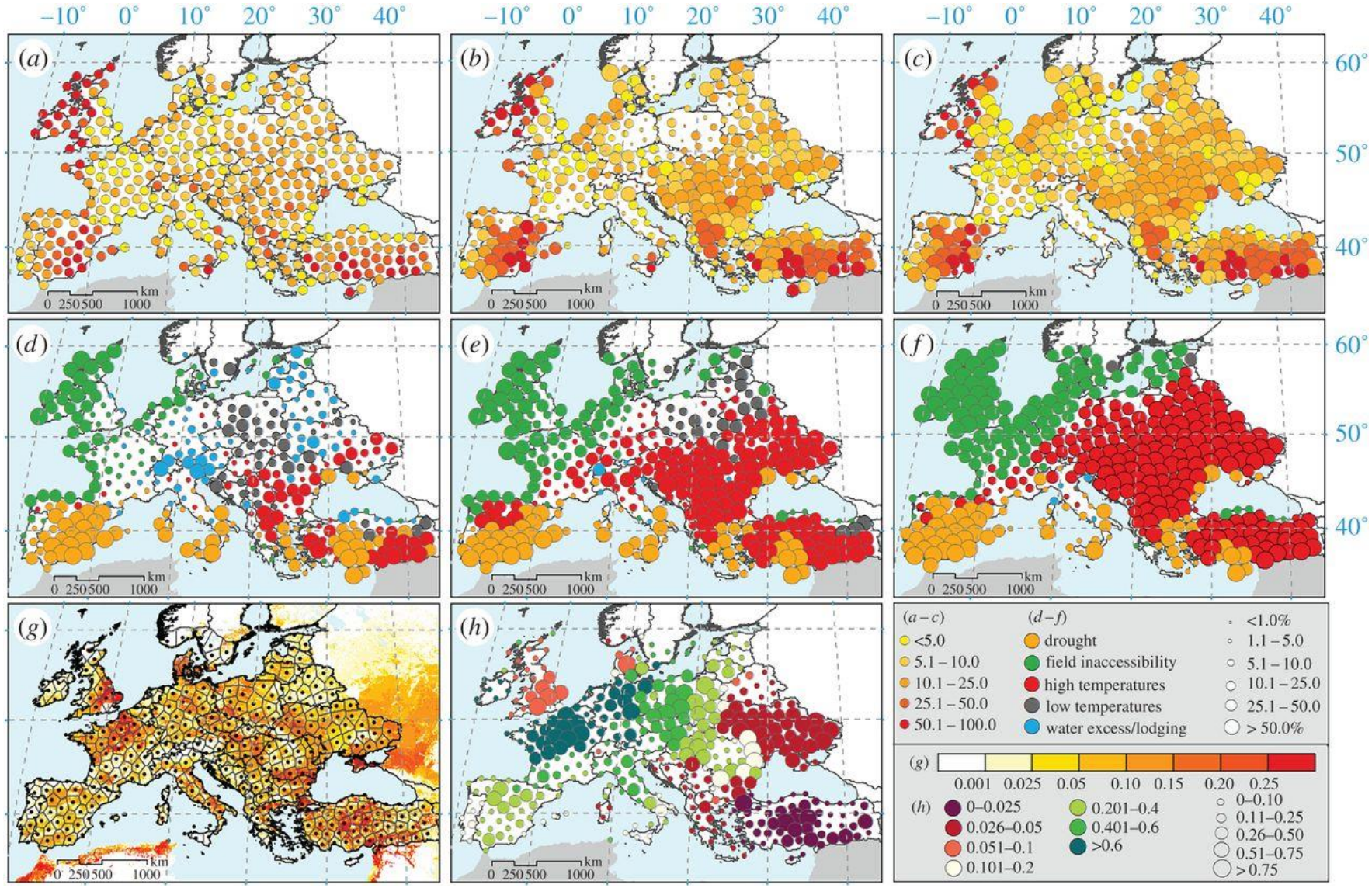






Source: EU FADN

Combined probability of a single adverse event over (a) the baseline, (b) GISS-RCP8.5 and (c) HadGEM-RCP8.5 scenarios with the size of the circle corresponding to the relative change compared to the baseline.



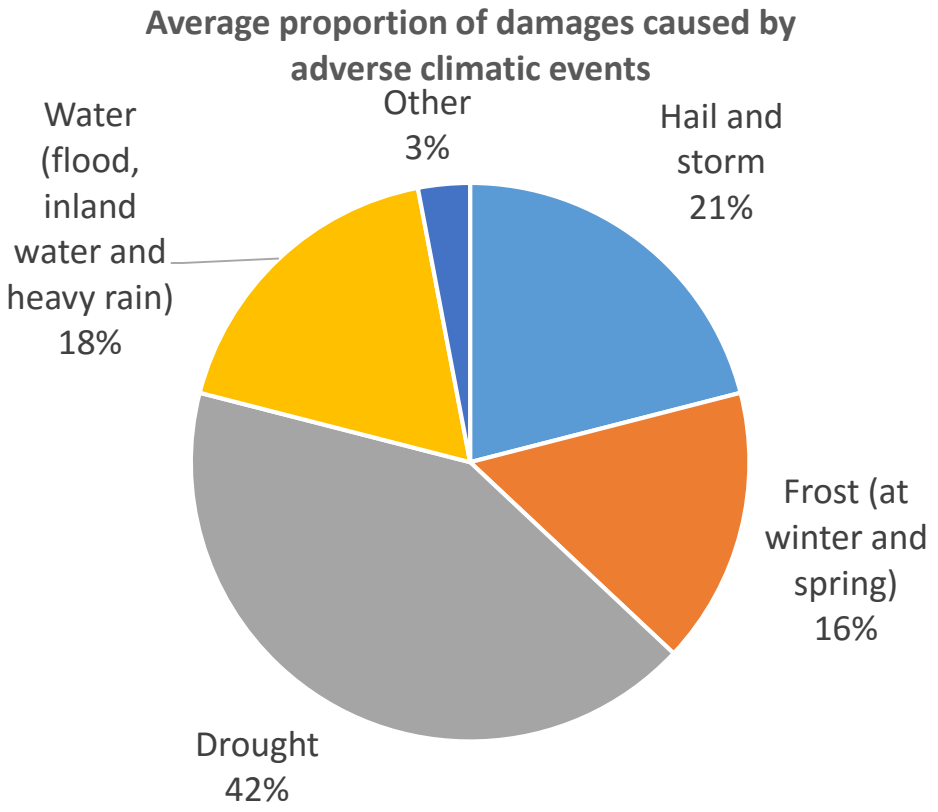
Miroslav Trnka et al. J. R. Soc. Interface 2015;12:20150721

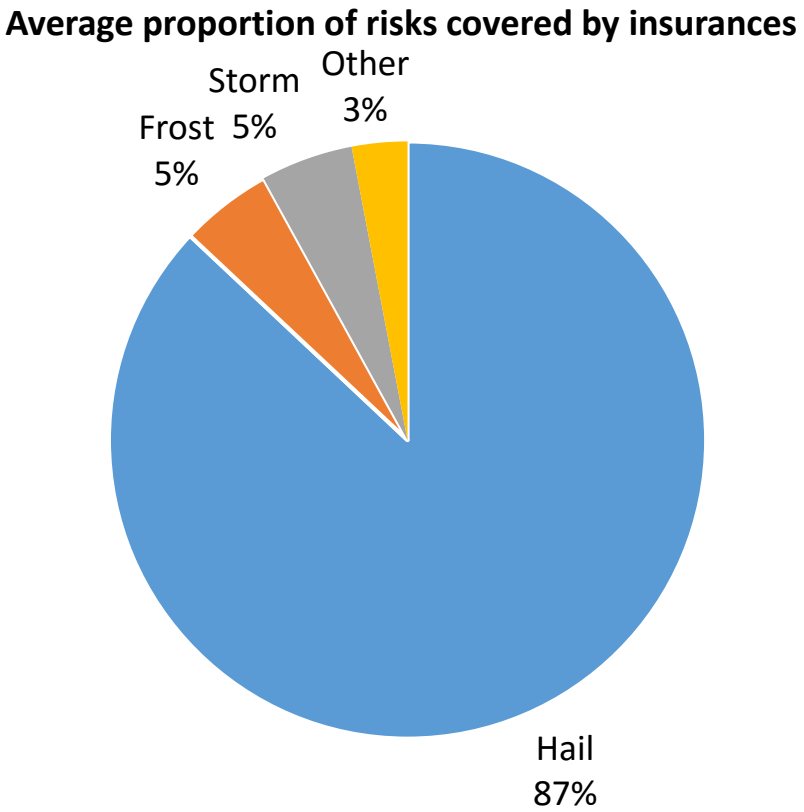
Possible risk management tools

- Price risk –> intervention (ebolished)
  - August of 2006: half of the EU's intervention stock (8.1 million tons) is comprised of Hungarian grain.
- Price risk –> use of futures
  - But the country and its stock market is too small.
- Production risk –> insurance&mitigation fund
  - Possible to implement in a tailored way at MS level
- Income risk –> Income Stabilisation Tool
  - Promissing opportunity, but almost impossible to implement…

Evolution of risk management system in Hungary

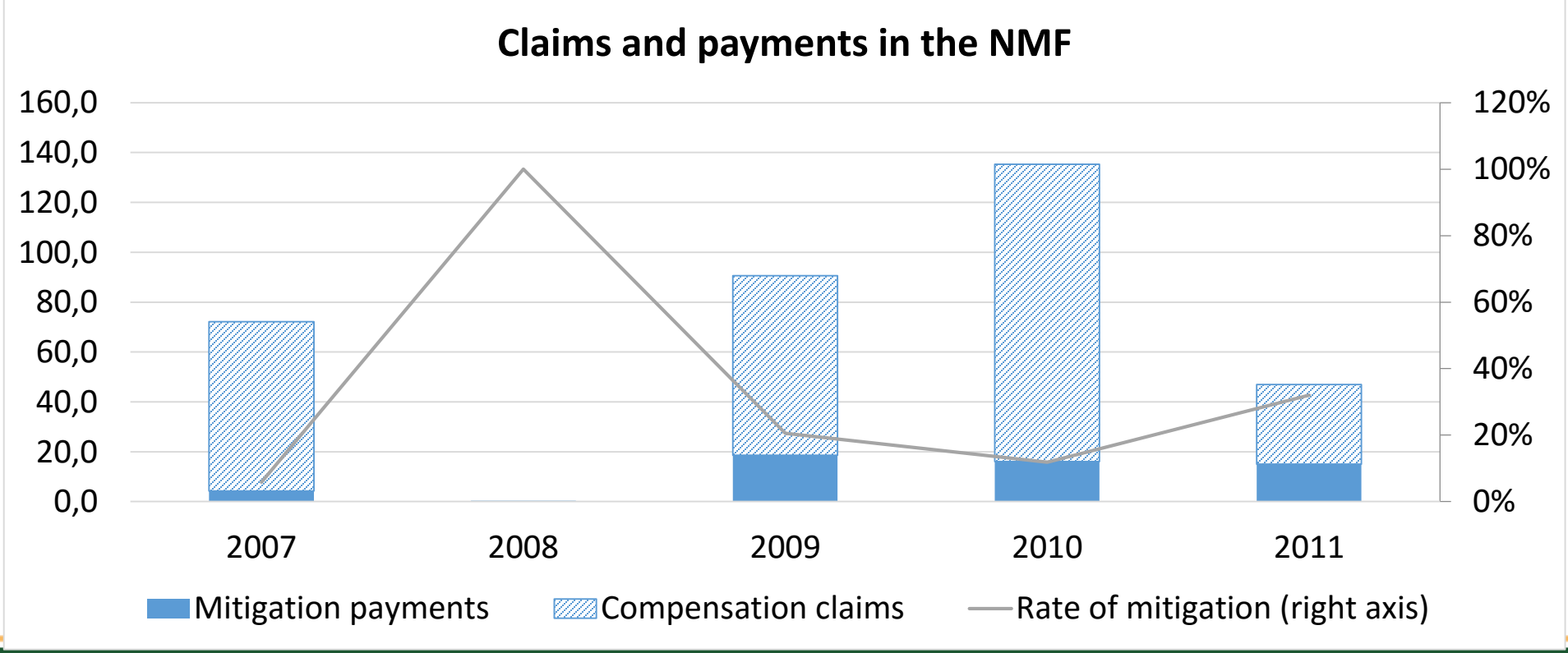
- 1st stage[1997-2003]: 30 % flat rate subsidy to insurance premiums
- Problems: continuous mismatch between risks covered by insurances and damages caused by risks, only 30-40% penetration





Evolution of risk management system in Hungary

- 2nd stage[2007-2011]: National Damage Mitigation Fund against all risks
- Problems: low penetration, very high compensation claims vs. low rate of damage mitigation, high administration burden, reduced number of insured farmers

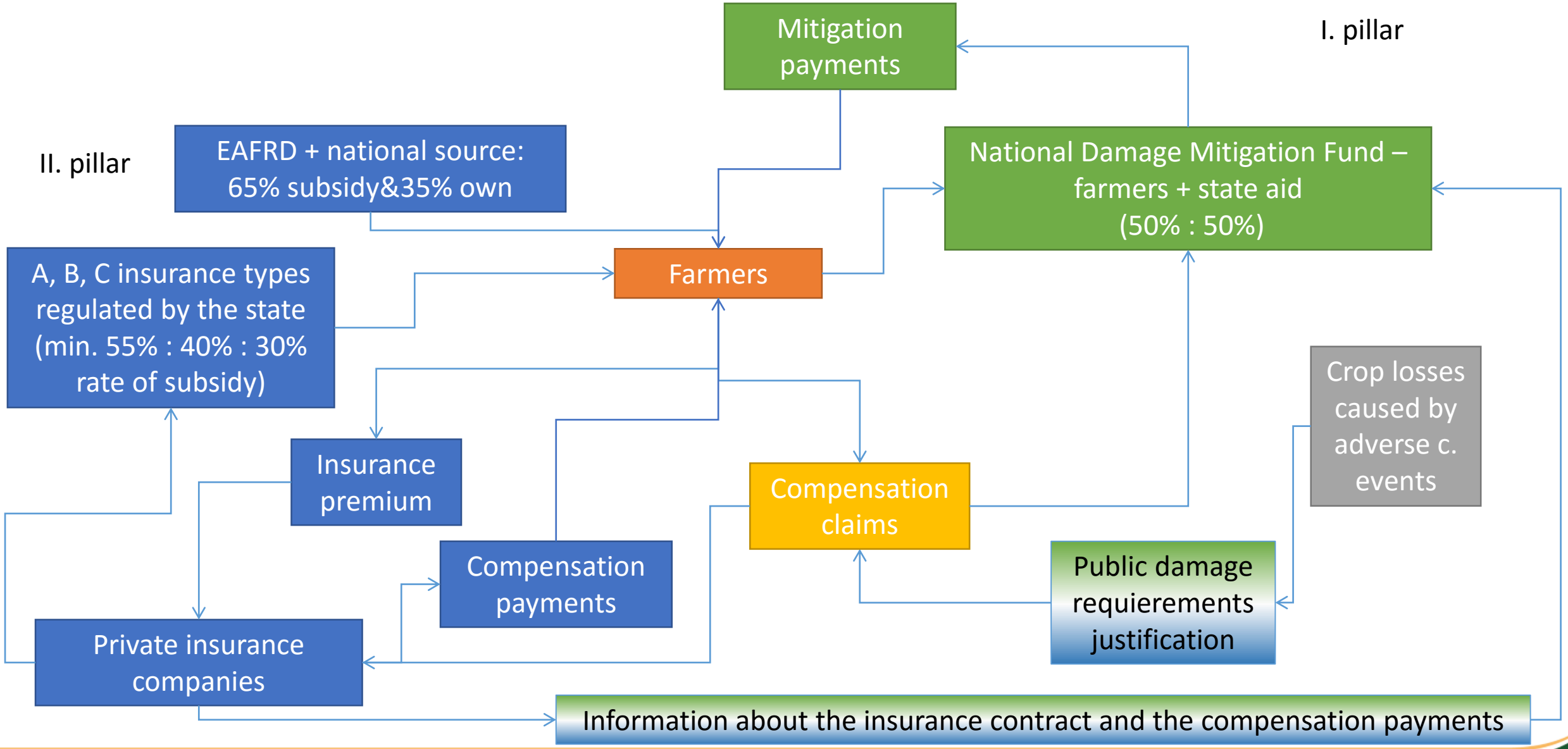


Evolution of risk management system in Hungary

- 3rd stage[since 2012]: Agricultural Risk Management System (ARMS)
- Two pillars: **I. pillar – Compulsory National Damage Mitigation Fund**
  - *mitigation over 15% loss of at farm level AND*
  - *30% loss of crop level by all climatic risks*

  II. pillar – Voluntary insurance schemes with subsidy
  - *compensation over 30%/50% loss of crop level by 8 risk types*
- Common risk definitions, common reference crop yields
- Interdependencies – only 50% of mitigation payments without insurance, the compensation payment is deductable from mitigation payments

Structure of ARMS



Covered risks in ARMS

Risks	Hail, Storm, Fire	Winter/spring frost	Drought	Heavy rain, flood	Inland water
I. pillar	>15% farm level, >30% crop level				
II. pillar	>30% crop level	>50% crop level	>50% crop level	>40% crop level	-
Private add. i.	>5% to <30% crop level	-	-	-	-

Insurance options in the II. pillar

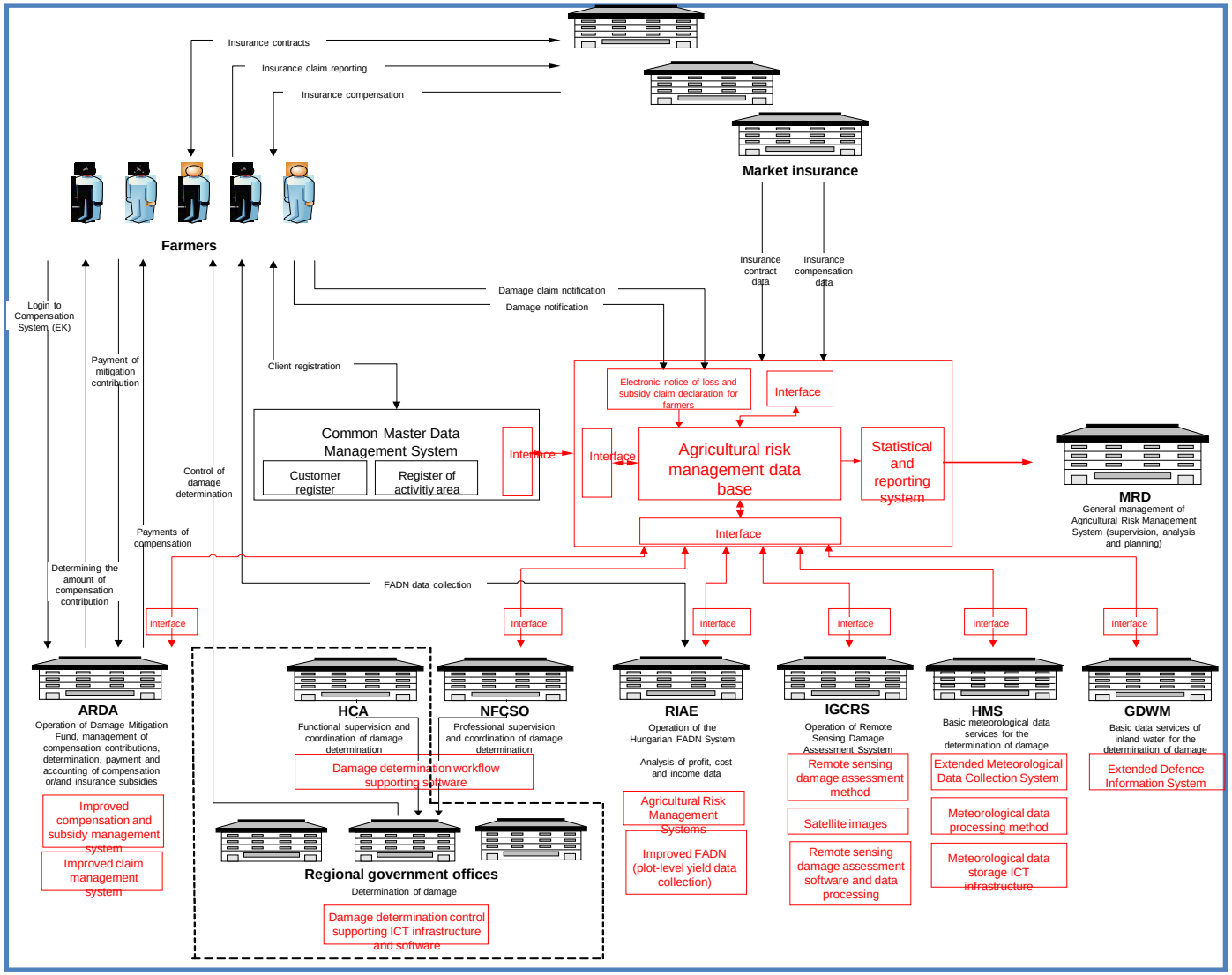
		A insurance	B insurances	C insurances
Covered risks	Hail	Compulsory	Optional	Optional
	Sorm		Optional	Optional
	Fire		Optional	Optional
	Winter frost		Optional	Optional
	Spring frost			Optional
	Drought			Optional
	Heavy rain			Optional
	Flood			Optional
	Inland water			
Subsidy rate	Maximum subsidy rate	65%	65%	65%
	Minimum subsidy rate	55%	40%	30%
Plants	Insurable plants	14 most important plants (corn, wheat, apple, etc.)	76 important plants (mainly fruits and vegetables)	All plants

- Fixed sum of subsidies
- By case of over-request reduction of subsidy rate
  - First by C from 65 to 30%
  - Second by B from 65 to 40%
  - Third by A from 65 to 55%
- Thereafter proportional reduction from 55/40/30%

Operation of ARMS

- Electronic notice of loss and claim declaration for farmers on a web application using mapping system
- Claim adjustment support and substitution with meteorological, remote sensing and water management indices
- Site inspection verification by electronic and GIS technologies
- Electronic notice of official decisions about the damage mitigation and the insurance premium subsidy

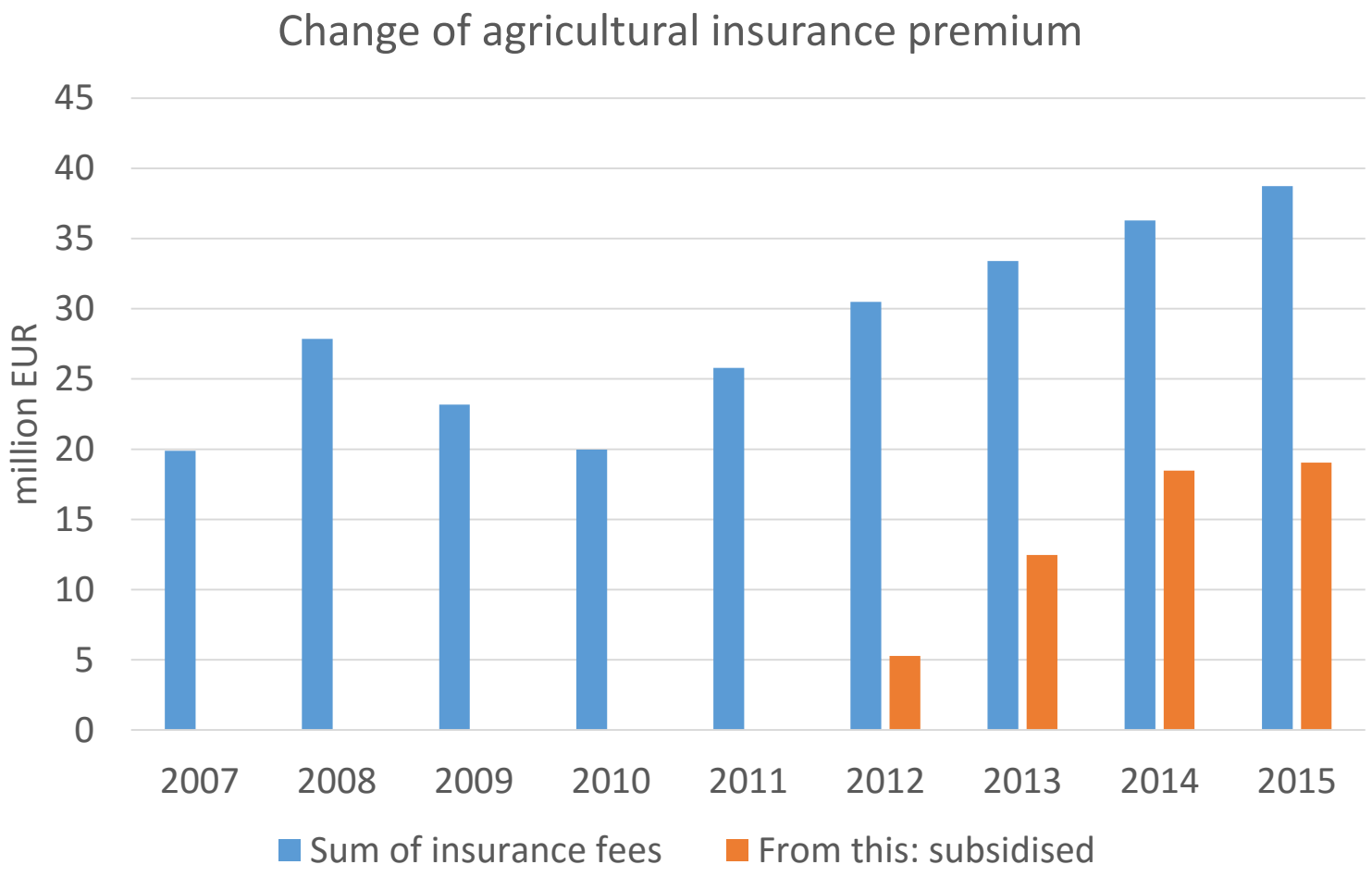
Operation of ARMS



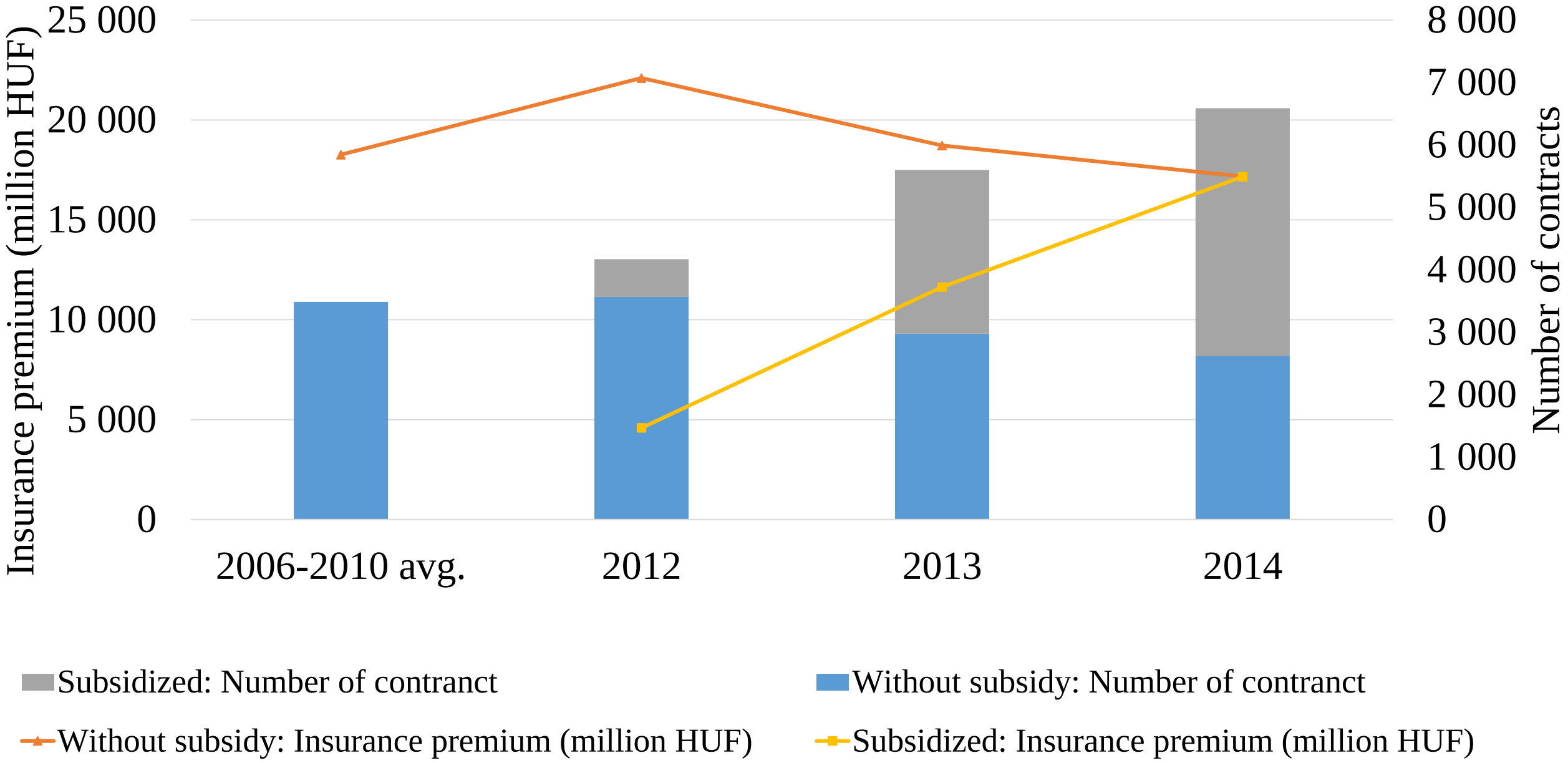
Main figures of the system:

- 77 thousand farmers
- 11 insurance companies and mutual funds
- 19 regional government offices
- 8 central offices and institutes

Successes of ARMS



- Increasing number of insured farmers
- Efficienter administration of a lot of new partners
- Precise control of compensation claims
- Complex databases making possibile developing new risk management tools


Insurance premium (million HUF)
25 000
20 000
15 000
10 000
5 000
0
8 000
7 000
6 000
5 000
4 000
3 000
2 000
1 000
0
Number of contracts
2006-2010 avg.
2012
2013
2014
Subsidized: Number of contranct
Without subsidy: Number of contranct
Without subsidy: Insurance premium (million HUF)
Subsidized: Insurance premium (million HUF)

Future plans in ARMS

- Establishment of III. pillar – Income Stabilisation Tool
  - Target groups: dairy, pig and poultry farmers – they could not be members of pillar I. and II.
- Reforming of „pillar IV.” – subsidised credits for damaged farmers
  - Connection of occurence of damages and crediting of farmers
- Establishment of „pillar 0.” – the hail protection system covering all the country
  - Installation of ground generators

Influencing factors of insurance use

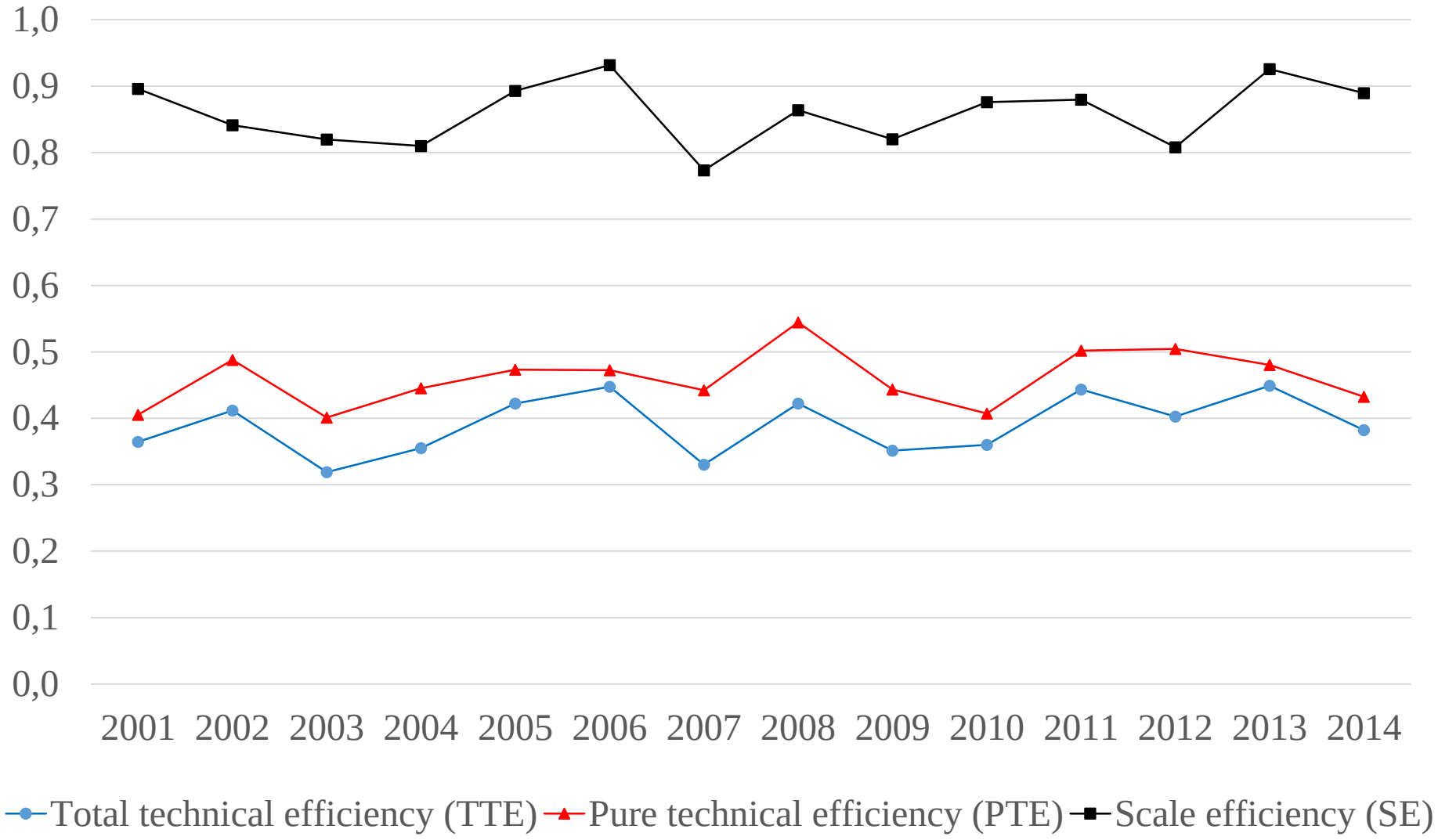
Dependent variable: „Insured”								
	Pooled probit		Pooled logit		Probit (RE)		Logit (RE)	
Age of manager	0,003 (0,001)	**	0,004 (0,002)	**	0,002 (0,002)		0,003 (0,004)	
Training of manager	0,088 (0,032)	***	0,150 (0,055)	***	0,155 (0,053)	***	0,262 (0,091)	***
UAA	0,001 (0,000)	***	0,001 (0,000)	***	0,002 (0,000)	***	0,003 (0,000)	***
Concentration	-0,384 (0,087)	***	-0,653 (0,150)	***	-0,461 (0,118)	***	-0,766 (-0,203)	***
Insurance last year	1,255 (0,029)	***	2,063 (0,049)	***	-		-	
Indebtness rate	0,508 (0,086)	***	0,853 (0,146)	***	0,608 (0,113)	***	0,043 (0,043)	***
ROE	0,019 (0,022)		0,033 (0,037)		0,025 (0,025)		1,023 (0,193)	
2007-2008 period	0,018 (0,044)		0,029 (0,075)		-0,074 (0,047)		-0,119 (-0,080)	
2009-2011 period	-0,053 (0,038)		-0,098 (0,065)		-0,098 (0,042)	**	-0,172 (-0,071)	**
2012-2014 period	0,128 (0,038)	***	0,214 (0,065)	***	0,112 (0,044)	**	0,184 (0,076)	**
constant	-0,974 (0,102)	***	-1,620 (0,176)	***	-1,461 (-0,118)	***	-1,290 (0,268)	***
rho					0,484 (0,016)		0,457 (0,017)	
Log-likelihood	-3002,55				-6588,12		-6588,24	
Log pseudolikelihood	-5291,62		-5290,87					

Concentration:
Calculated as the share of two major crops in the arable area.
Factors: Managemet, production, financial status, last year insurance, stage of ARMS

Main results:

- Concentration turned out to be negative
- Farms the size (UAA) affects positively the use of crop insurance in a robust way
- Indebtedness rate and the use of insurance are also positively correlated. This can be explained by the fact that in most loans requires the presence of insurance.
- Two-pillar ARMS started from 2012 led to positive significant effect on crop insurance use.

Efficiency analysis using DEA



Notes:

- Output oriented DEA
- Bootstraping to control overestimation
- FADN data
- Output variable: GVA
- Input variables: UAA, Labour, Capital, Inputs

Relationship between efficiency and insurance

	Technical efficiency		*Pure technical efficiency*		*Scale efficiency*	
Age of manager	0,0009 (0,0002)	***	0,0010 (0,0002)	***	0,0003 (0,0002)	**
Training of manager	0,0128 (0,0044)	***	0,0135 (0,0048)	***	0,0030 (0,0039)	
UAA	0,0000 (0,0000)	***	0,0002 (0,0000)	***	-0,0002 (0,0000)	***
Crop insurance premium	0,0018 (0,0006)	***	0,0015 (0,0006)	**	0,0010 (0,0005)	*
Investment rate	0,0000 (0,0000)	***	0,0001 (0,0000)	***	-0,0000 (0,0000)	***
Indebtness rate	0,1369 (0,0092)	***	0,1697 (0,0098)	***	-0,0293 (0,0083)	***
_cons	0,2918 (0,0101)	***	0,3226 (0,0009)	***	0,8797 (0,0090)	***
rho	0,3813 (0,0114)		0,42954 (0,0017)		0,3812 (0,0124)	
Log-likelihood	7400,70		6750,22		8444,81	

- Results are in line with Latruffe *et al.* (2004)
- Farms with large area (UAA) experience smaller scale efficiency compared to the smaller ones. This coincide with Latruffe et al. (2012) results, who found that 55 percent of Hungarian crop farms could increase their efficiency by reducing their size. Moreover, the investment and indebtedness rates are also decrease the scale efficiency.

Thank you for your attention!