Linking FARMIS and ESIM

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Overview

1) Objective

2) Creation of a Baseline

3) Compatibility Check

4) Results / Inconsistencies

Long term objective

- Develop a linkage between the European Simulation Model (ESIM) and the Farm Modelling Information System (FARMIS)
- Replace the German supply-component in ESIM by FARMIS
- Depict changes in income distribution among German farmers arising from changes in European policy

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European Simulation Model (ESIM)

- Comparative static partial equilibrium multi-country model for the agricultural sector
- Isoelastic supply functions (separate for yield and area) and demand functions
- 31 regions (EU Member States; USA, Croatia, Turkey, Western Balkans, RoW)
- Product coverage:
  - 15 crops
  - 21processed products
  - 6 animal products
  - Pasture, set-aside

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Farm Modelling Information System (FARMIS)

- Comparative-static programming model
- Representing the German agricultural sector
- Main database is the German Farm Accountancy Data Network (FADN).
- The core of FARMIS is a standard optimisation matrix
- Product coverage:
  - 27 main activities of crop
  - 22 activities of livestock production
- Detailed representation of production technology and regions as well as specific farm types

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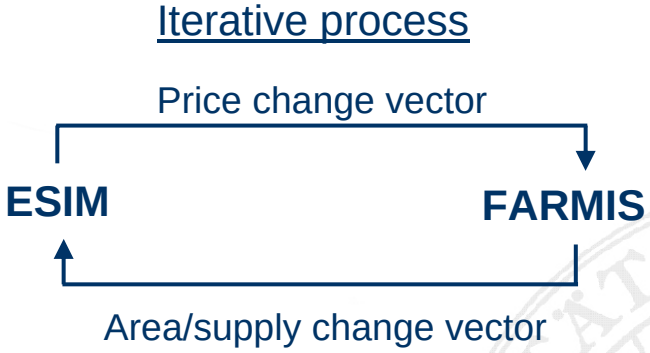
Linkage ESIM - FARMIS



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Preliminary Work
- Creation of a Baseline

The Baseline…

- …represents an expected, as realistic as possible development of the market.
- …acts as reference scenario.
- …serves as yard stick for scenarios to interpret impacts of external shocks.

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Baseline in ESIM

- Update macroeconomic Data
  - Population development
  - GDP growth
  - Exchange rates
  - Inflation
  - Technical Progress
  - …

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Baseline in ESIM

- Adapt policy parameter
  - Decoupling in 2006
  - Tariffs, Quotas
    - No Doha implementation
  - Health Check
    - Except milk quota abolition (only a slight increase due to Agenda 2000 and fat correction)
  - …

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Baseline in ESIM

- Calibration of the Model
  - FAPRI world price projections
  - Implement price changes of FAPRI between 2005 and 2015 to ESIM
  - Biofuel targets (10% share in total transport fuels in 2020)
  - Calibration parameters: biofuel demand, technical progress and demand of the RoW

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Compatibility Check

- Implementation of an 2005-2015 ESIM price change vector to FARMIS
- Run a FARMIS Baseline Scenario
- Compare changes in area / supply

First Inconsistencies
- Set-aside crops

- With abolition of obligatory set-aside: area of non-food rapeseed declined 66% in ESIM – in FARMIS only 10%
- → Shifting area allocation function of non-food rapeseed in ESIM

Change in total rapeseed area in %		ESIM	FARMIS
Without Shift		1.02	1.34
With Shift		1.25	1.31

First Inconsistencies
- Milk

- ESIM projects a decline in milk prices of 24% together with a still fulfilled milk quota in 2015
- The same price drop caused a strong decline in milk production in FARMIS
- To achieve a still fulfilled milk quota in 2015 a maximum decline in prices of 10% was possible in FARMIS

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First Inconsistencies
- Milk

- Possible reasons for unequal reactions:

Quota rents in base period

ESIM: 5.5 cent/kg	FARMIS: 4.8 cent/kg

Technical progress (annually)

ESIM: 2.1%	FARMIS: 1.2%

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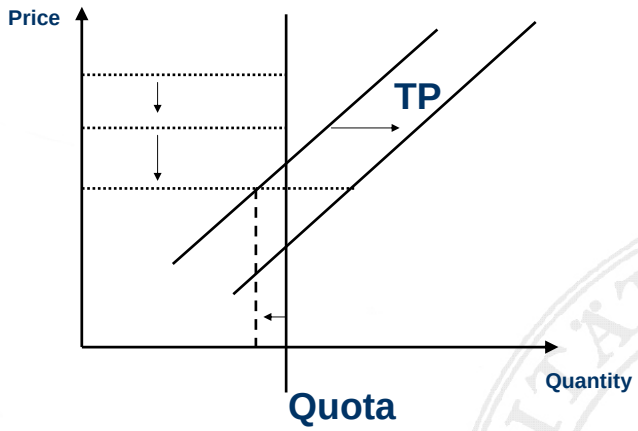
First Inconsistencies
- Milk / Effects of Technical Progress



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First Inconsistencies
- Milk

After adoption of 2.1% technical progress in FARMIS

SUPPLY (1000 t)	ESIM			FARMIS		
	base	2015	Change	base	2015	Change
MILK	28996	30448	1.05	28680	30042	1.05

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Basic Assumptions
- Milk

- Quota rent in ESIM:
  - 5.5 cent / kg
  - Source: Sckokai,P. et al (2007), REGIONAL DISTRIBUTION OF SHORT-RUN, MEDIUM-RUN AND LONG-RUN QUOTA RENTS ACROSS EU-15 MILK PRODUCERS.
  - based on long run marginal costs
  - not implemented: family labour costs
- Quota rent in FARMIS:
  - Derived from trade-prices of milk quota units

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Compatibility Check Results

	ESIM			FARMIS			
AREA (1000 ha)	base	2015	relative Change	base	2015	relative Change	Diff. in % points
BARLEY	1960	2174	1.11	2122	2440	1.15	0.04
CORN	442	468	1.06	377	413	1.10	0.04
CWHEAT	3072	3077	1.00	2981	2883	0.97	0.03
DURUM	9	8	0.92	8	8	1.00	0.08
FODDER	1089	1085	1.00	414	465	1.12	0.13
GRAS	4924	4919	1.00	4812	4812	1.00	0.00
OTHGRA	737	773	1.05	862	1289	1.50	0.45
POTATO	286	240	0.84	260	240	0.92	0.09
RAPSEED	1313	1644	1.25	1077	1412	1.31	0.06
RYE	595	641	1.08	557	607	1.09	0.01
SETASIDE	1165	316	0.27	1125	248	0.22	0.05
SMAIZE	1247	1006	0.81	1099	846	0.77	0.04
SUGAR	430	280	0.65	438	262	0.60	0.05
SUPPLY (1000 t)							
BEEF	1258	1165	0.93	1285	1021	0.79	0.13
MILK	28996	30448	1.05	28680	30042	1.05	0.00
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Compatibility Check Results
- Future tasks

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Compatibility Check Results
- Beef

- In FARMIS exists a link between technical progress in milk production and beef production
- Increase in milk-output per cow reduces the amount of milk cows
- This link doesn't exist in ESIM (milk and beef are simply complements)

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Thank you for your attention !
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