
AgriFood
economics centre

# Modelling CAP reform and land abandonment in the European Union with a focus on Germany

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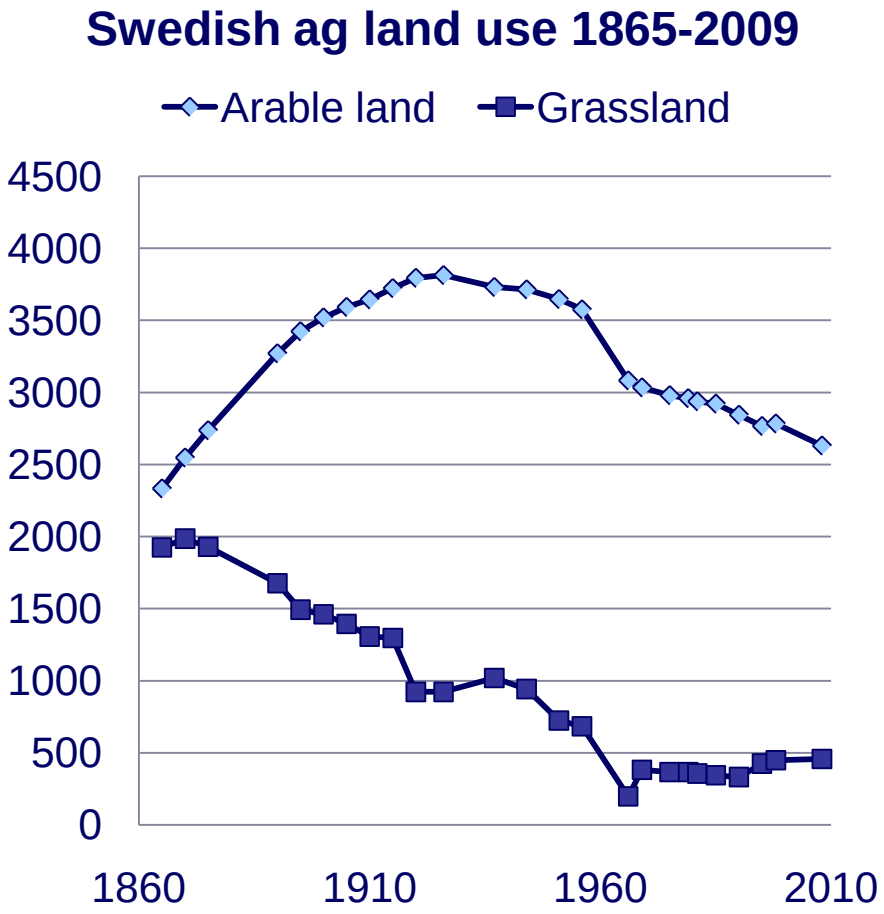
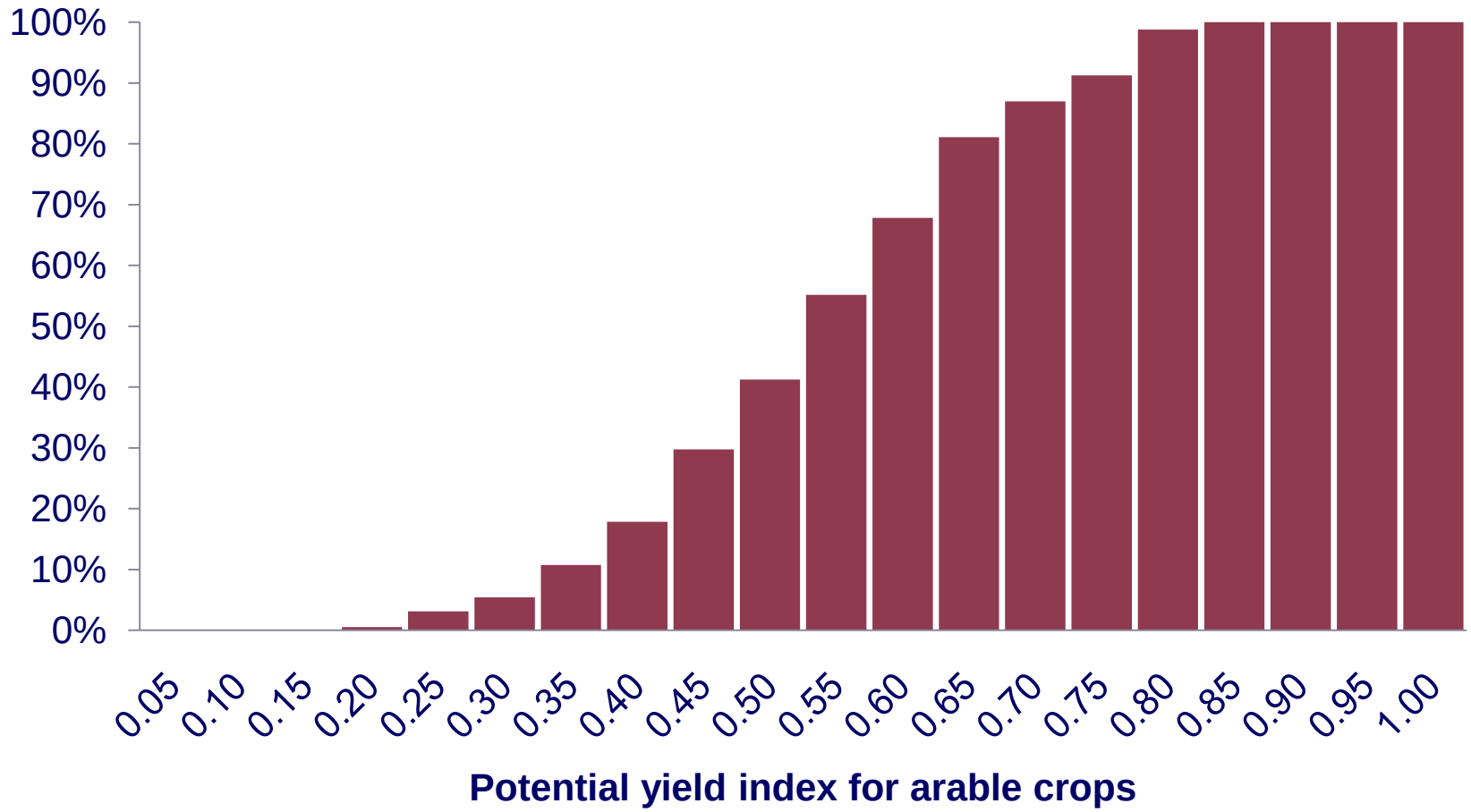
# Land use is dynamic

- Grassland and arable land develop differently
- Ag. land use ”peaked” around 1900
- Similar in other developed countries
- ”Forest transition”



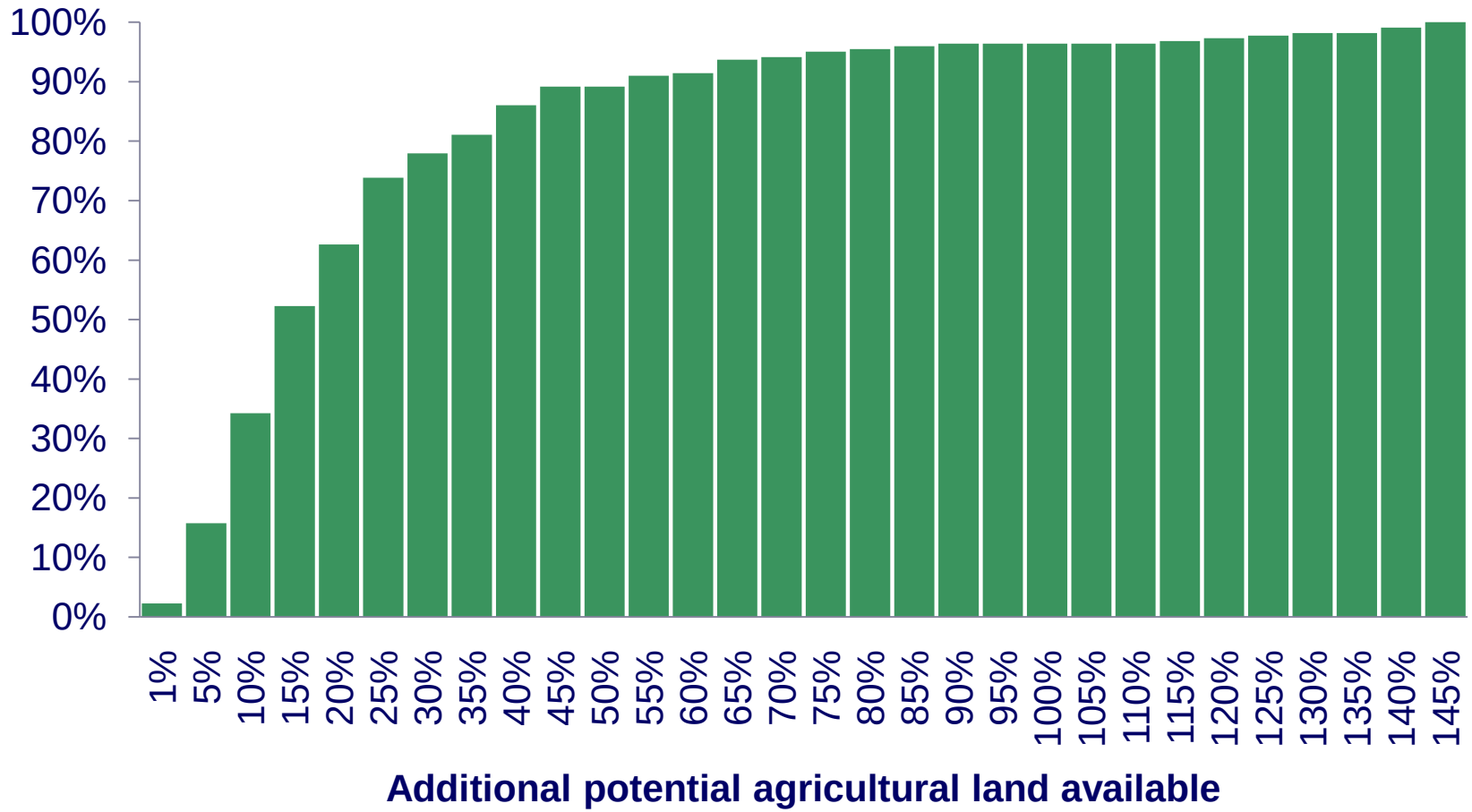

Notes: from 1969, only farms with at least 2 ha are accounted for. 1937 to 1956 definitions of grassland changed. Source: Statistics Sweden, various issues.

# Land is heterogeneous



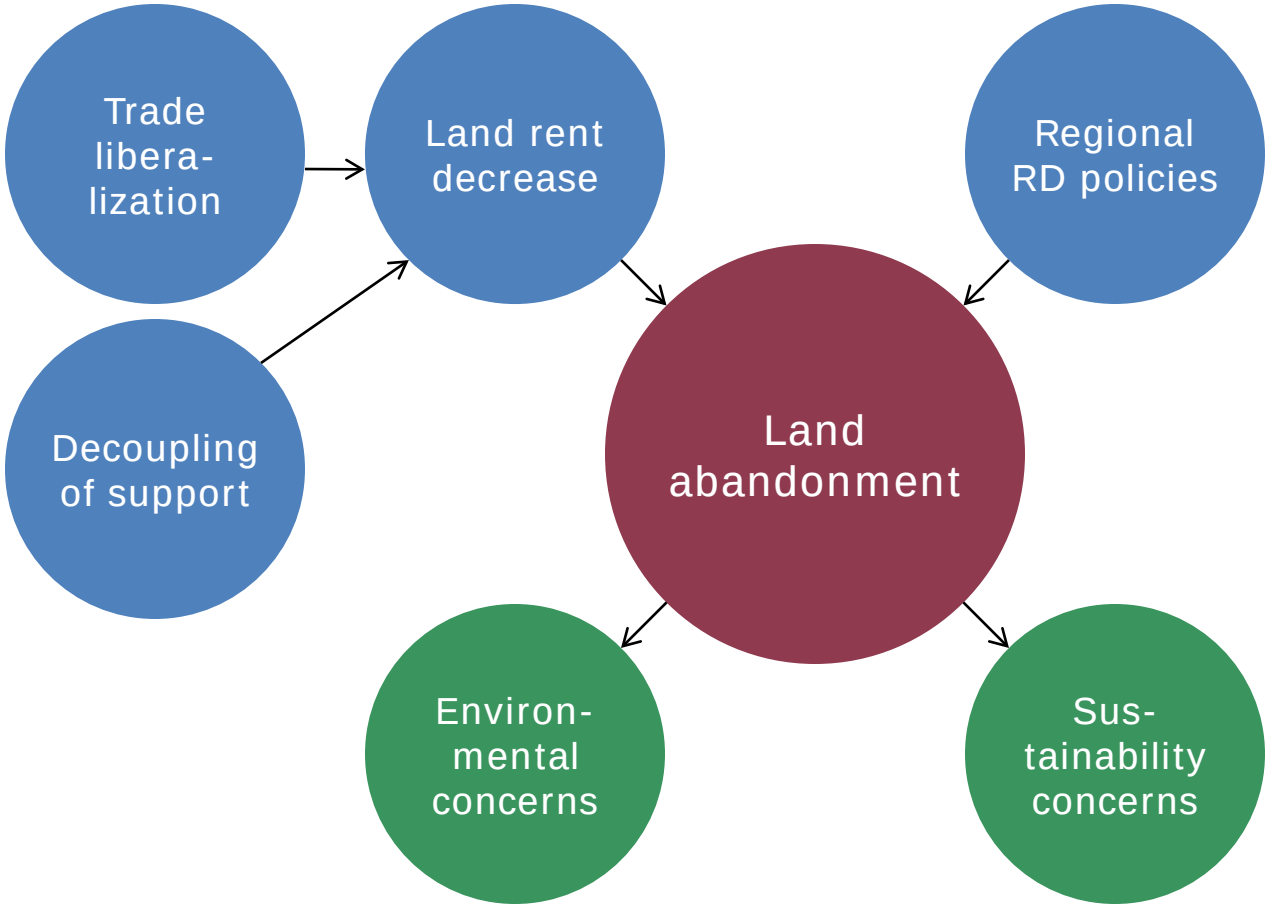

Distribution of potential cereals yields in Germany, all $km^2$ aggregated (Source: Dyna-CLUE model).

# Land is limited




Distribution of relative land buffers across regions in EU + Turkey and Balkans (Own computations).

# Land use and policy



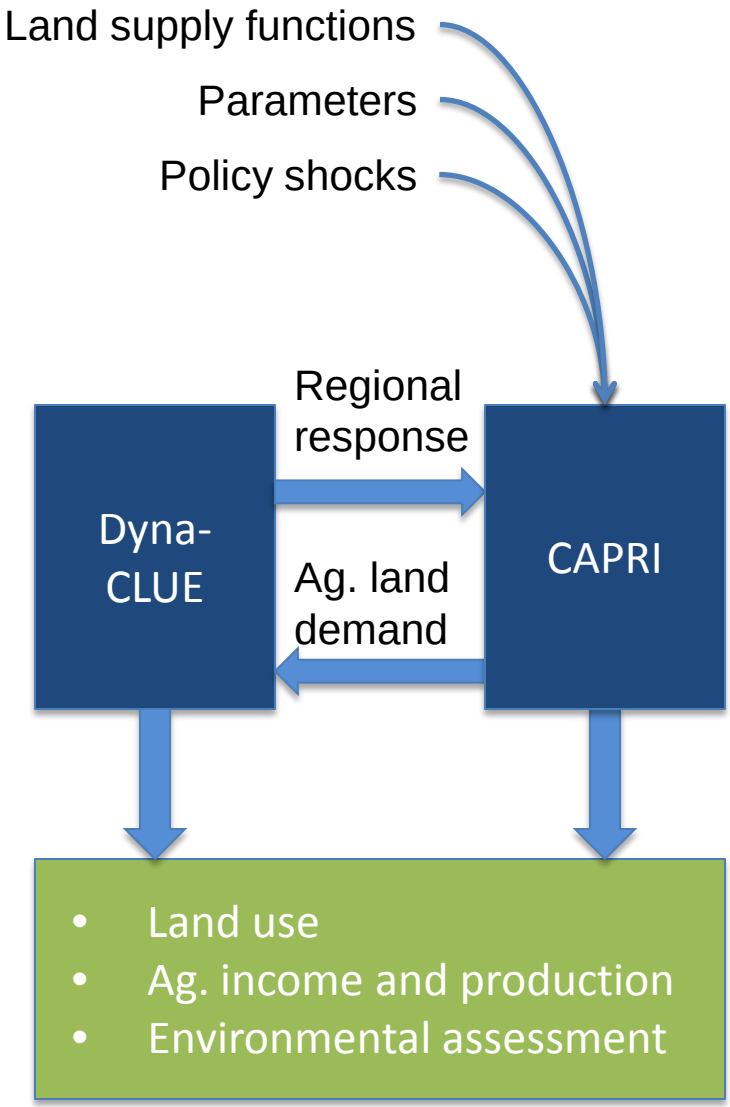
# Key research questions

- What does reduced first pillar support mean for agricultural land use?
- Where might we expect problems with ”undesirable” land abandonment?
- Which counter measures could be efficient?

# Method and data

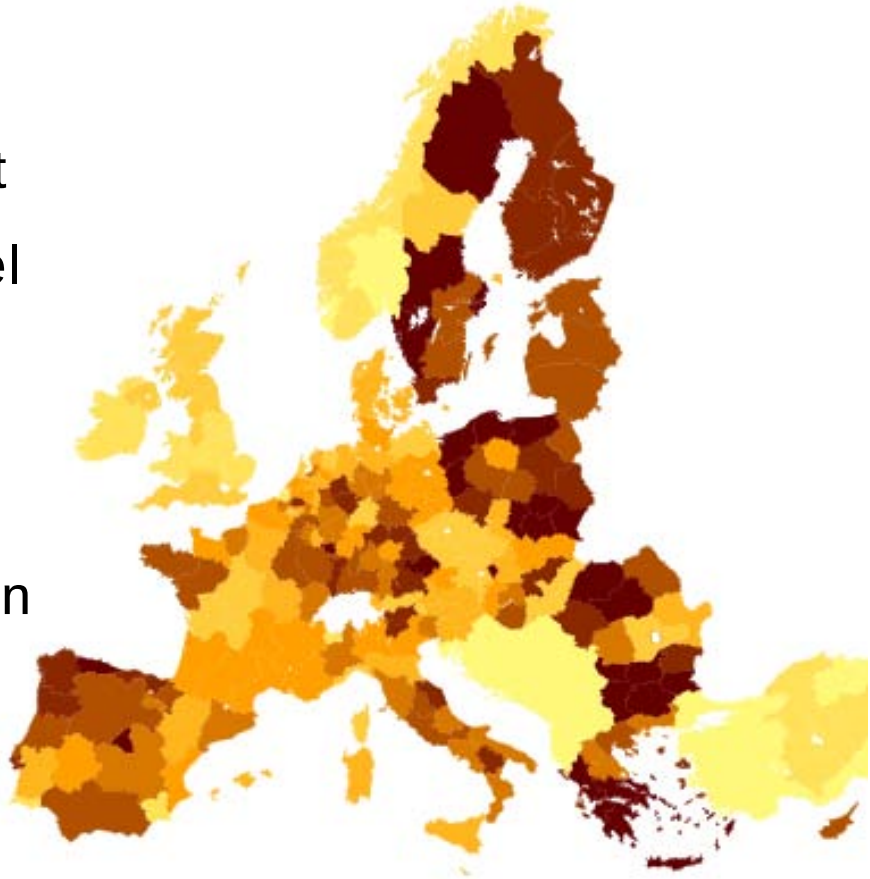
- Land supply elasticities from lit. (LEITAP)
- Land transformation elasticities from lit. (GTAP-AEZ)

  ”$\Delta x/x = \eta * \Delta\lambda/\lambda$”
- Use ag. sector model for land-rent impacts
- Use land use model for spatial allocation



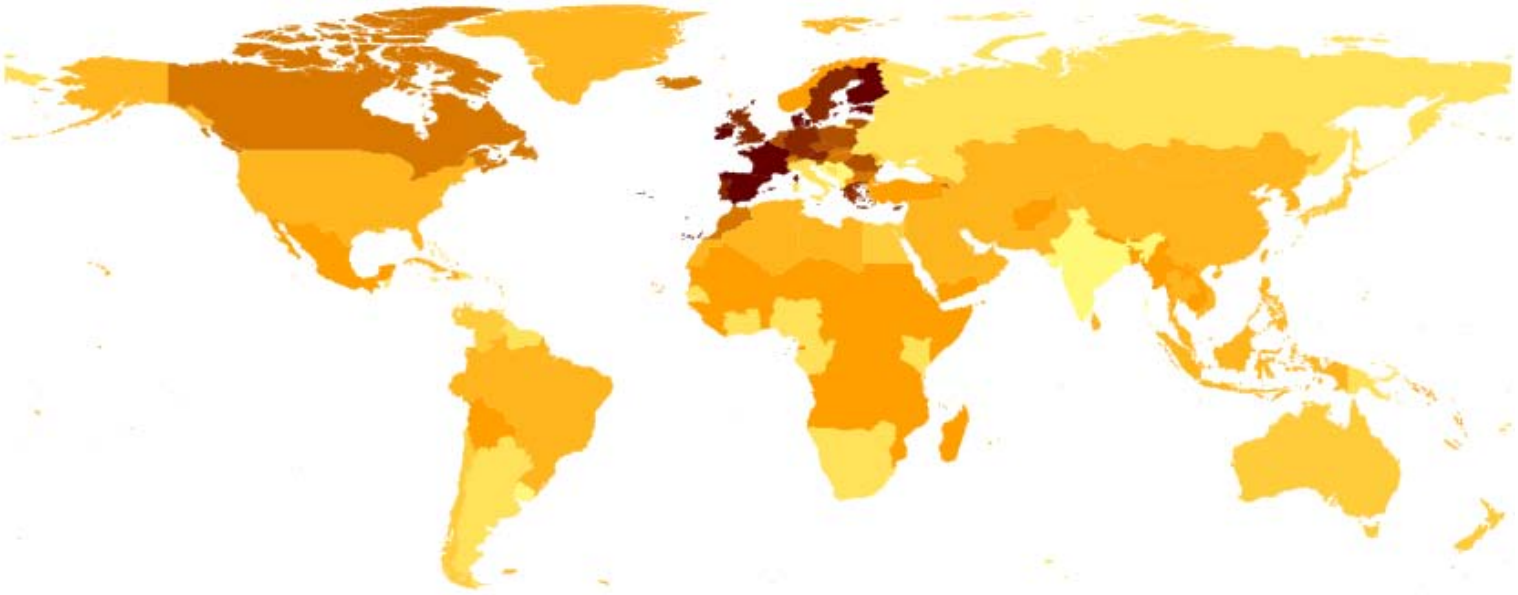
# Agricultural sector model: CAPRI

- Common Agricultural Policy Regional Impact
- EU 27+ at NUTS2 level
- Technology rich
  - Fertilization
  - Feeding
  - Young animals
- Detailed representation of pillar I payments
- Pillar II:
  - Less Favoured Areas
  - Natura 2000
  - Agri-Environment
- National aid

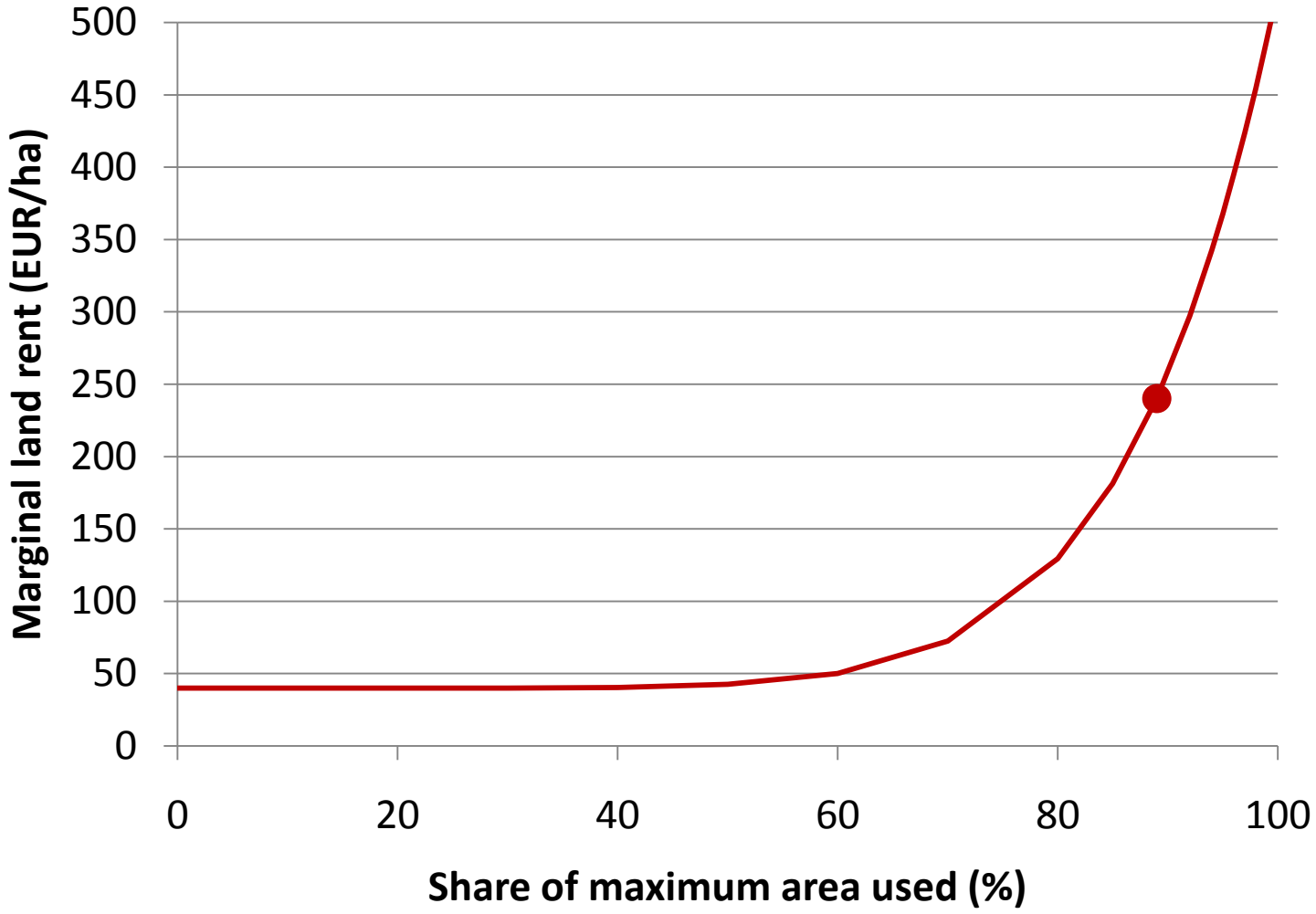


# Agricultural sector model: CAPRI

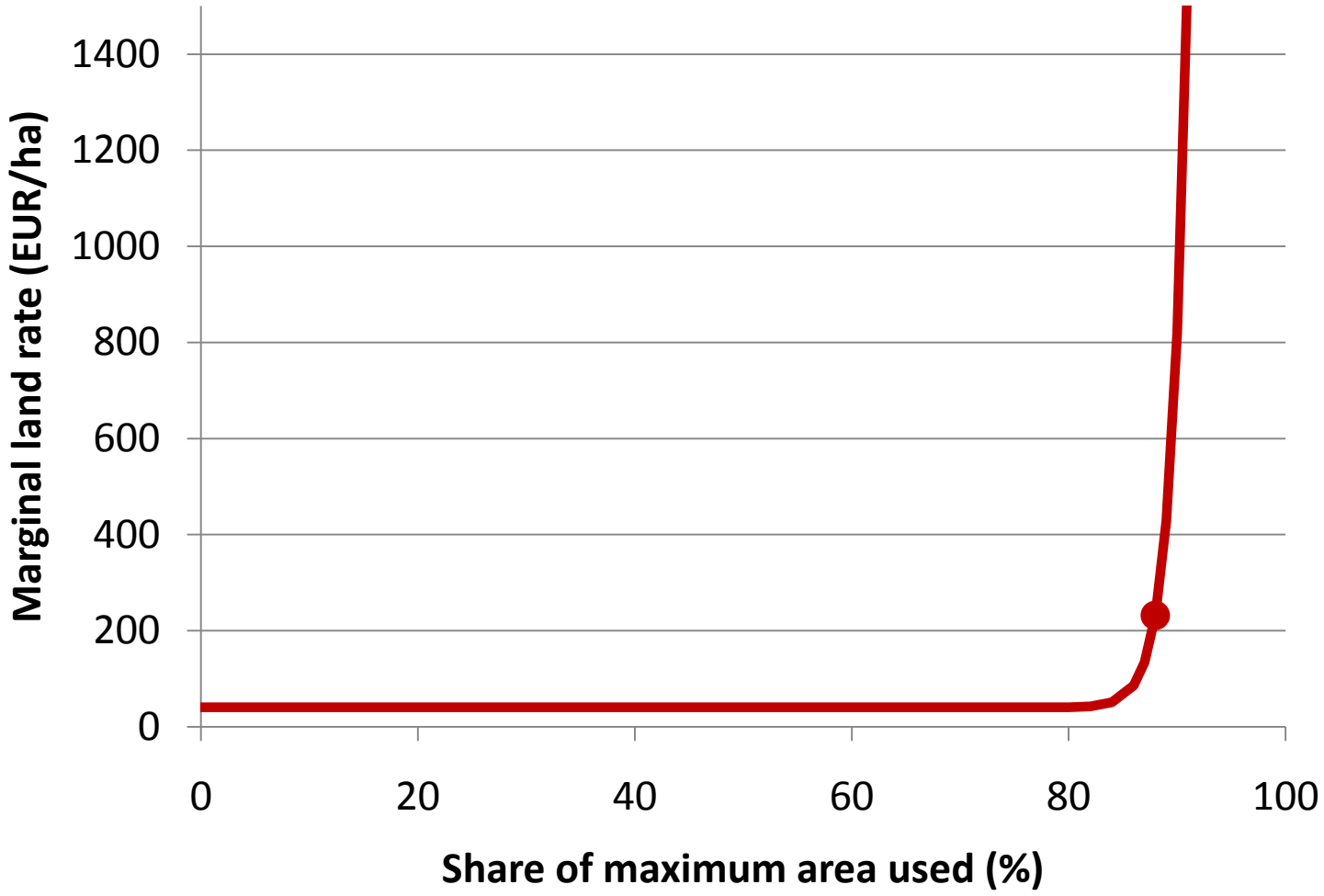
- Market model for price response
- Bilateral world trade with policies



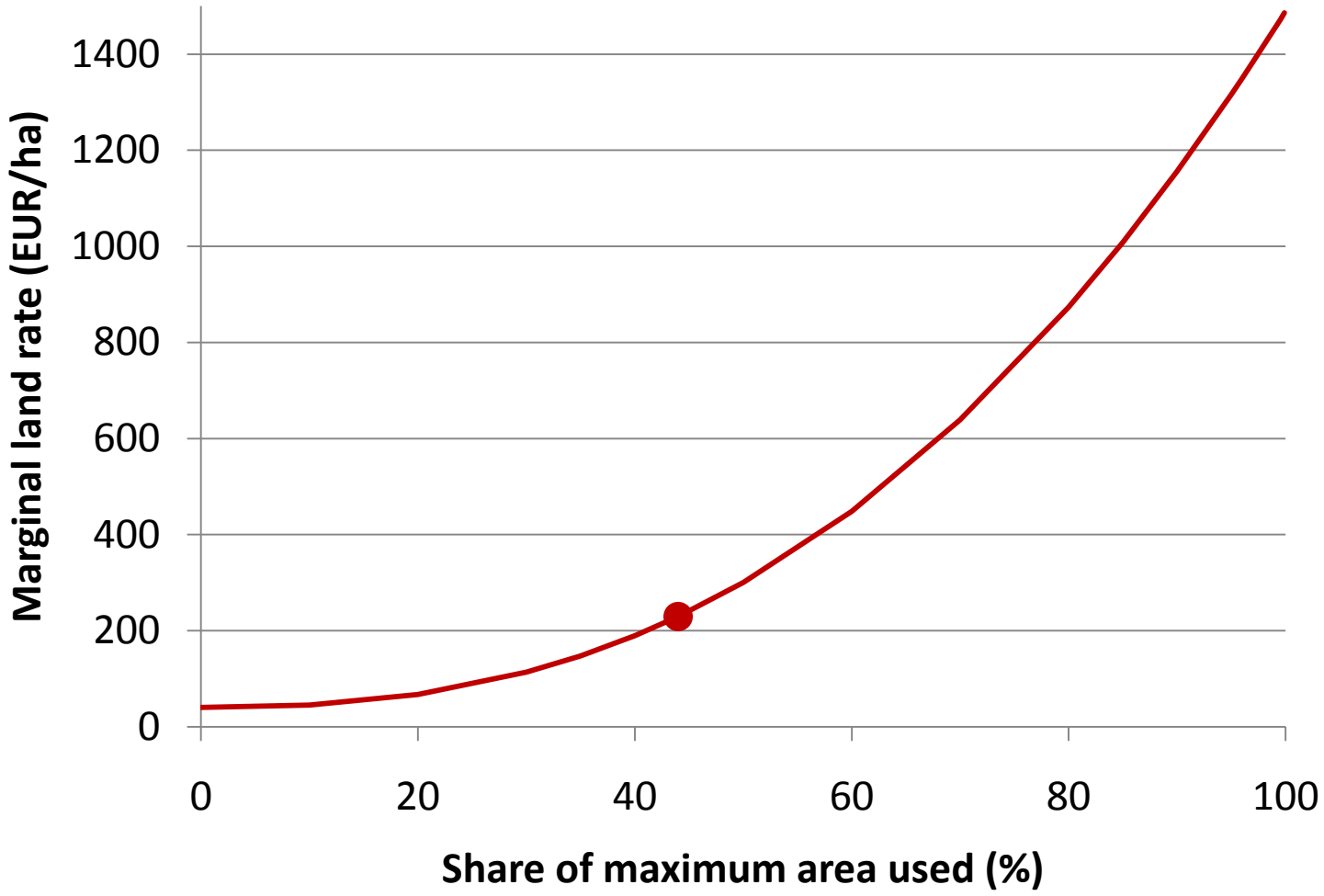
# Land supply function Germany



# Land supply function UK



# Land supply function Sweden



# Regional land supply elasticities


- Simulations with Dyna-CLUE
- MS-effect plus alternative LU
- Forest-rich MS less elastic

# Direct subsidies in Germany (MEUR)

- Payments reduced by 4.8 billion EUR annually in 2020
- Pillar II only contains
  - LFA
  - Natura 2000
  - Agri-Environment

| | Base | NoPil1 |
|---|---|---|
| Pillar I | 4814 | 0 |
| Pillar II | 1040 | 1041 |
| State aid | 0 | 0 |
| Total | 5853 | 1041 |

Table 1: Total CAP payments in Germany in different simulations for 2020 (million EUR). (simulation results)

# Land rents and land use in Germany

- Payments capitalize on land (in our model)
- Payments removed
- Land rents drop

| | Base | NoPil1 | % diff |
|---|---|---|---|
| **Land rent** | 229 | 114 | -50% |
| **Land use (1000 ha)** | 17504 | 15718 | -10% |

Table 2: Land rents (EUR/ha) in Germany in different simulations for 2020. (simulation results)

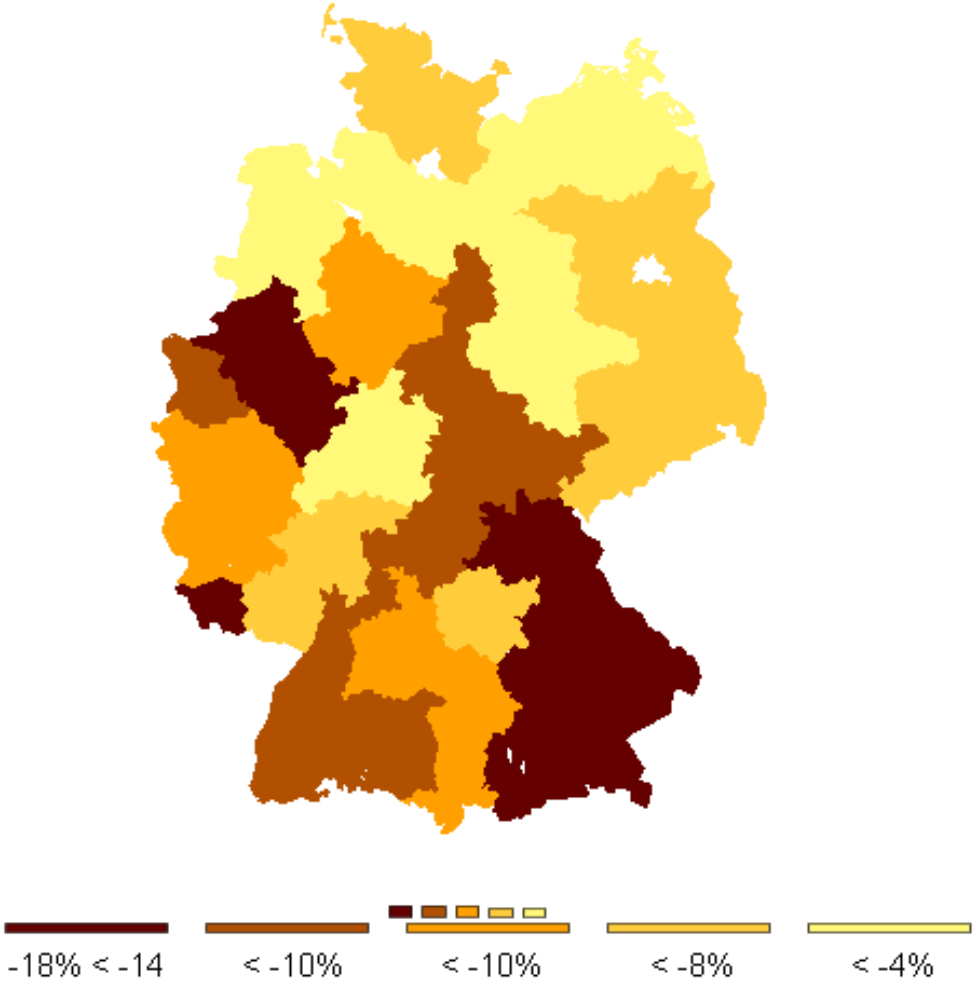
# Producer prices (similar in all EU countries)

- Less supply, higher prices
- In particular: Arable crops
- Meat prices affected via feeding costs

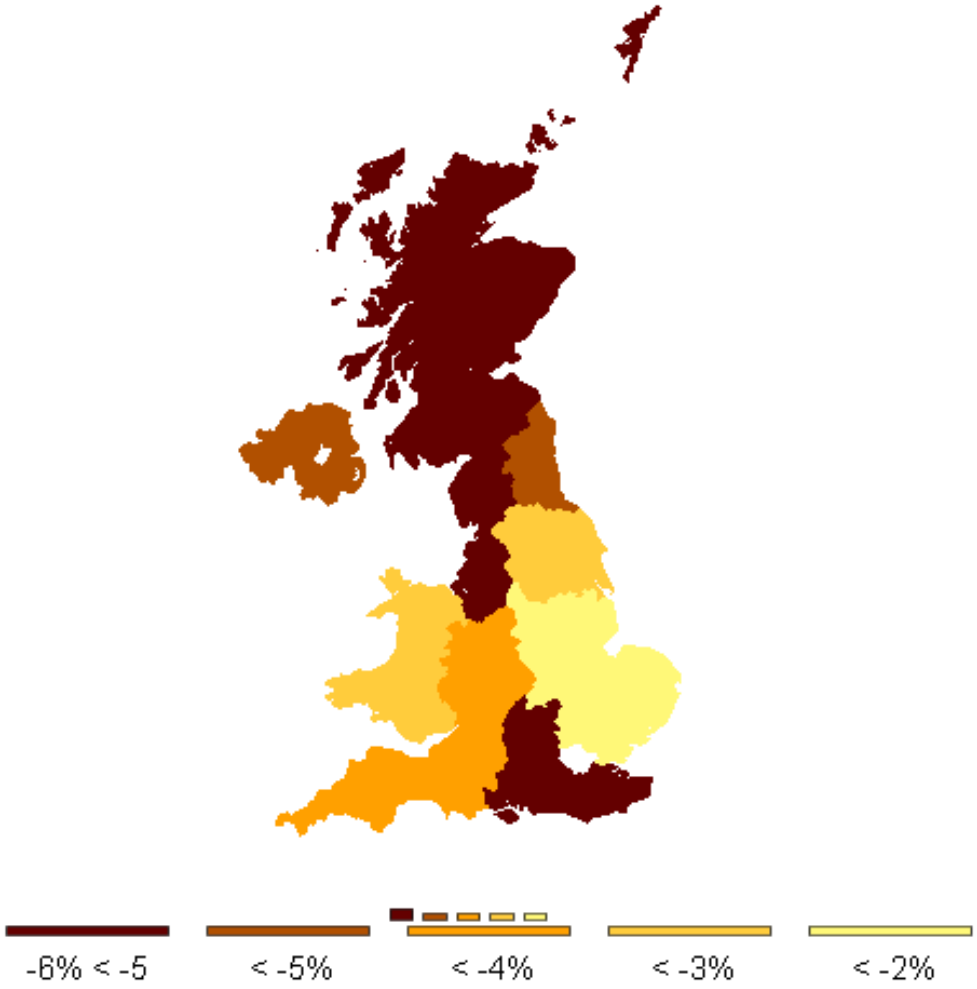
| | Base | NoPil1 |
|---|---|---|
| Cereals | 132 | 7.6% |
| Oilseeds | 229 | 8.1% |
| Other arable field crops | 44 | 10.1% |
| Veg. and Permanent crops | 739 | 0.6% |
| All other crops | 1454 | 0.0% |
| Fodder | 17 | -0.1% |
| Beef | 1806 | 4.9% |
| Sheep and goat meat | 4494 | 2.3% |
| Poultry meat | 1436 | 3.0% |
| Other Animal products | 563 | 0.8% |
| Young animals | 76 | 6.3% |

Table 3: Producer prices (EUR/t) in simulations for 2020 in different scenarios. (Simulation results)

# Regional land use change in Germany



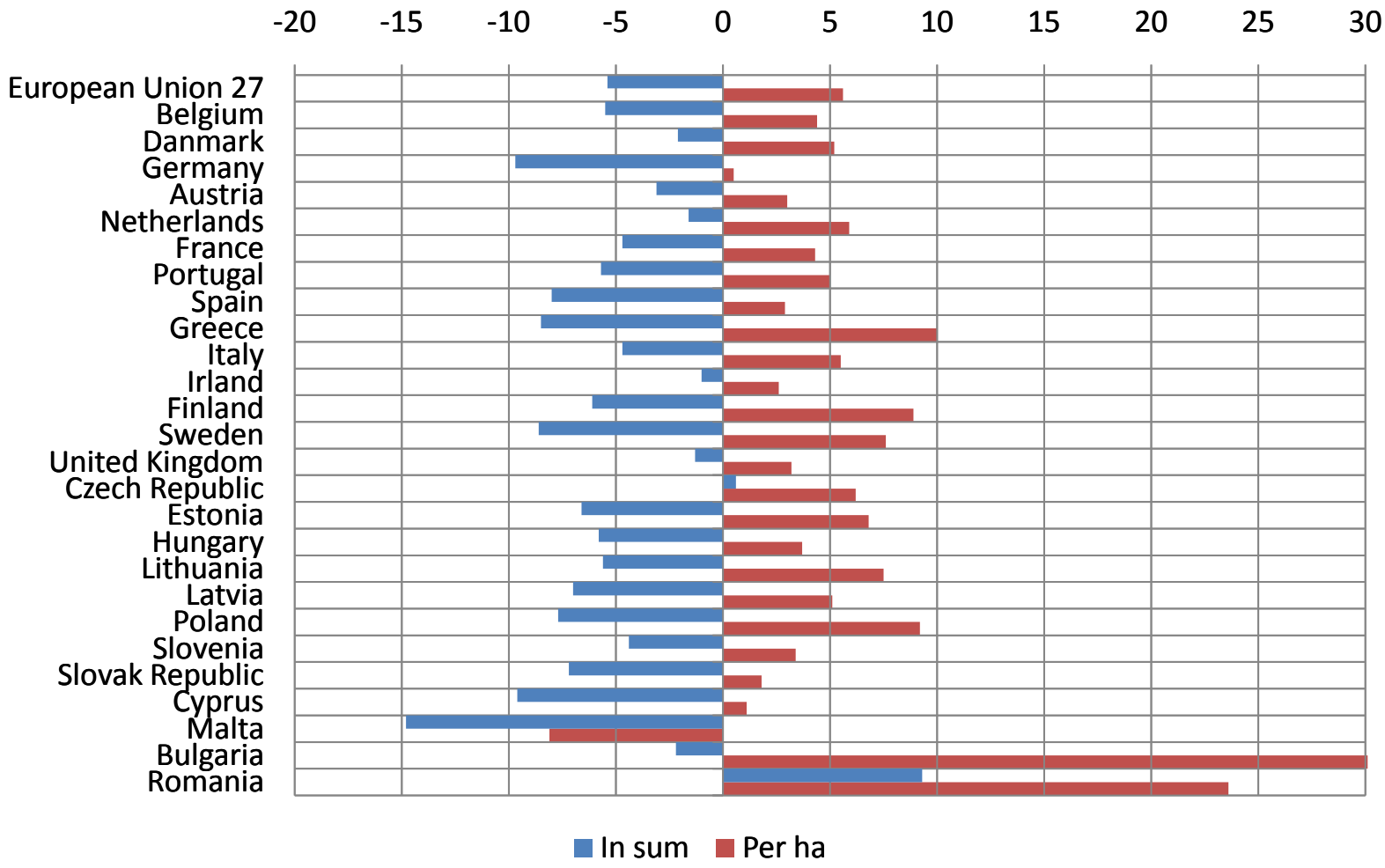
# Regional land use change in the UK



# Agricultural abandonment and the environment

- Different new land use options:
  - nature
  - recreation/hobby farming
  - urban surrounding
- Environmental impact unclear

# Nitrate surplus at soil level (% change vs. base)



# Agricultural income following EAA (% change vs. base)

| | Germany |
|---|---|
| **Crop production** | -3% |
| **Animal production** | 2% |
| **Inputs** | -3% |
| **Premiums** | -82% |
| **GVA plus premiums** | **-9%** |

(Preliminary results)

# Further results (to compute?)

- Consumer welfare decreases (higher prices)
- Alternative land user benefits
- Countries exporting to the EU benefit
- Many environmental effects:
  - Greenhouse gas emissions from agriculture
  - Biodiversity (undetermined sign)
  - Landscapes (undetermined sign)
  - Flooding risk
  - Forest fire risk
  - Farmland bird habitates (intensity related?)
  - …
- To do: Combine with WTO scenario
- To do: Combine with increased second pillar