



GMOs, Endogenous knowledge spillovers and CAP policy

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by

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LEI

Aim of paper

- Study the impact of adopting or rejecting genetically modified organisms (GMOs) in EU, with or without the Common agricultural policy (CAP)
- Main idea: GMO's increase productivity in maize and soybean sectors. A ban excludes EU from these productivity gains. Spillovers dependent on social acceptance and knowledge abilities. Therefore, spillovers not perfect
- Contributions:
 - development of endogenous knowledge spillovers, including social acceptance of a technology
 - better CAP representation (EU market insulated from world market)



Endogenous knowledge spillovers

- HYPOTHESES
- H1: knowledge embodied in traded commodities
 - amount of knowledge
- H2: effectiveness of imported knowledge:
 - absorption capacity (H)
 - structural similarity (D)
 - social acceptance (S)



Spillover equation

$$a_s \cdot ? \cdot ? (E_{rs}, H_{rs}, D_{rs}, S_s) \cdot a_r$$
$$= E_{rs}^{(1-H_{rs} \cdot D_{rs} \cdot S_s)} \cdot a_r$$



GTAP implementation of price insulation

Price insulation for grains

- Imports: insulate domestic economy from world price changes
 - variable import tariff
- Exports:
 - variable export subsidies (swap tx with intervention price)
- Intervention price:
 - price transmission mechanism between intervention and market price, dependent on net-export position (extra-EU trade position).

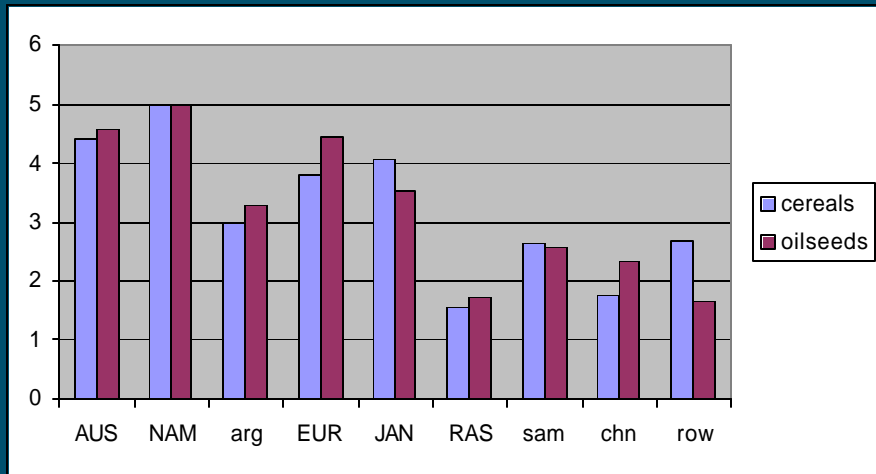


Experiments

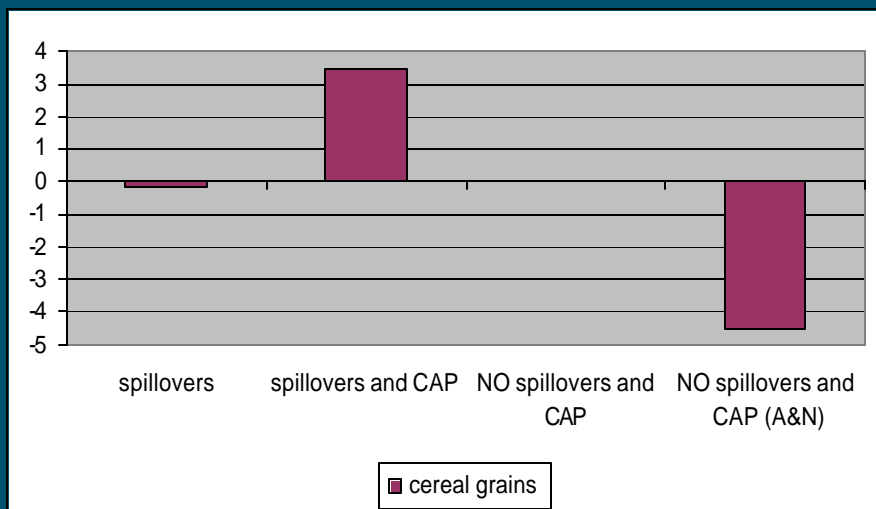
- Spillovers (I)
 - Hicks neutral productivity shock of 5% in cereal grains and oilseed, innovation originating in NAM, with endogenous spillover mechanism (without social acceptance)
- Spillovers and CAP (II)
 - (I) with CAP implementation
- No spillovers and CAP (III)
 - as II, however GMO production is not socially accepted in EU
- Compare results with Nielsen and Anderson (2000) paper: GMO's, trade policy, and welfare in rich and poor countries



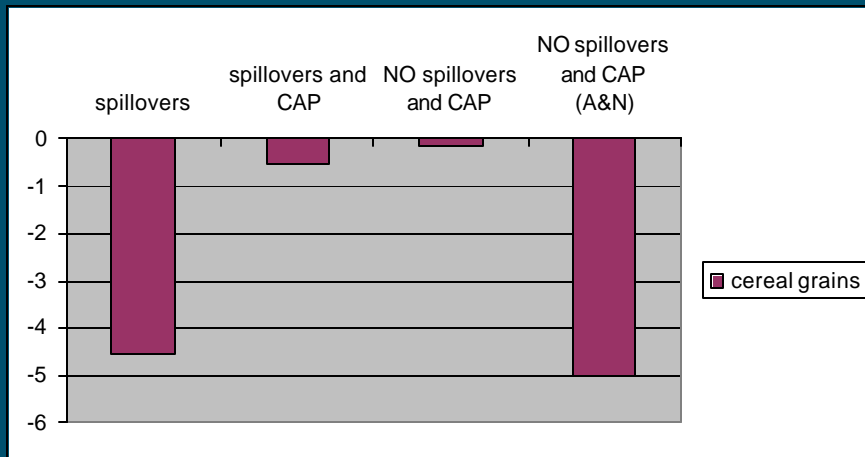
Received spillover, 5% Hicks neutral TC in NAM in Oilseeds and cereal grains



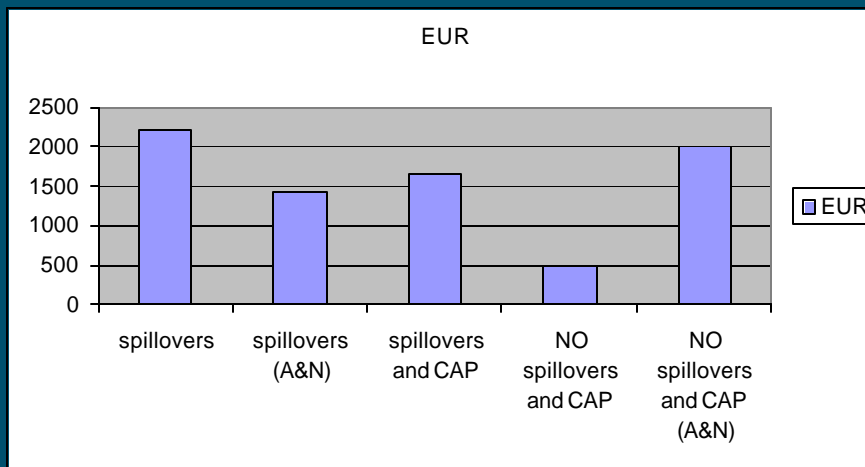
Impact on production



Impact on farmers income



Impact on welfare



Conclusions

- Including the main mechanism's of the CAP matters in analysis of world market impacts on the EU.
- Knowledge spillovers are not perfect. The endogenous spillover mechanism takes absorption capacity, structural similarity, social acceptance and trade flows into account.
- The spillover effect is very important. Because its size is driving the results with regard to production and especially welfare
- Incorporating empirical estimates for productivity effects



GMOs in International Trade – *Nielsen Anderson*

Current analysis:

Regions

1. Australia & New Zealand
2. Japan
3. Other high-income Asia
4. China
5. Rest of E. Asia
6. India
7. Rest of S. Asia
8. North America
9. Mexico
10. Southern Cone
11. Rest of Latin America
12. Western Europe
13. Central Europe & FSU
14. South Africa
15. Sub-Saharan Africa
16. Middle East & North Africa

Sectors

1. Paddy rice
2. Wheat
3. Cereal grains
4. Vegetables, fruits & nuts
5. Oilseeds
6. Plant-based fibres
7. Other crops
8. Livestock
9. Forestry & fishing
10. Energy & minerals
11. Meat & dairy
12. Vegetable oils & fats
13. Processed rice
14. Other processed food
15. Textiles & clothing
16. Other manufactures
17. Services



GMOs in International Trade - *Framework*

International Agreements

- Biosafety Protocol
- World Trade Organisation (WTO)
 - Agreement on Sanitary and Phytosanitary measures (SPS)
 - Agreement on Technical Barriers to Trade (TBT)
- Issues
 - regulation: protection of environment vs human health
 - SPS requirement on scientific evidence
 - WTO product/process distinction
 - Mandatory labelling

