The Evolution of the Italian Agro-Industry using the Dynamic General Equilibrium Ismea MegD Model

Antonella Finizia (Ismea)

Riccardo Magnani (Cepii, Paris)

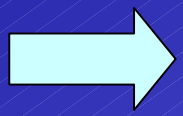
Federico Perali (Università di Verona)

Pavia – General Equilibrium Approaches to Development
22th October 2007

OBJECTIVE

We use the MegD ISMEA Model to analyze the evolution of the agricultural and agri-food sectors, by considering the future national and international environment

- increase in the price of raw materials
- international market liberalization
- climate change
- ageing of rural population



- evolution of the international environment: **European and RoW prices**

- evolution of the national environment: **growth of factor productivity**

The MegD Ismea model

- A dynamic and multi-sector CGE model focused on the Italian agricultural and agri-food sectors

- Benchmark: situation post CAP reform simulated with the Meg2003 Model

- 45 sectors:
- 23 in the primary sector
- 13 in the agro-food sector
- 7 in the industrial sector
- 2 in the service sector

- 2 trade areas: EU and RoW

- households (11 categories)

- government

The MegD Ismea model

Agricultural sectors (23 sectors)

CEREALS

1 Soft Wheat
2 Durum wheat
3 Rice
4 Corn and other cereals
5 Fodder (mais silage)
6 Not irrigated Fodder

VEGETABLES

7 Potatoes
8 Tomatoes
9 Other vegetables

INDUSTRIAL CROPS

10 Sugar beet
11 Soy-bean
12 Other industrial crops
13 Crude tobaccos

14 Viticulture
15 Olive
16 Fruit
17 Floriculture
18 Milk
19 Beef
20 Forestry
21 Sheep and goats
22 Other livestock
23 Fish

The MegD Ismea model

Agro-food sectors (13 sectors)

24 Fresh and stored bovine meat

25 Milk and milk products

26 Cereal products, bread products and sweets, pasta products

27 Bread products and sweets

28 Pasta products

29 Fruit and vegetables

30 Olive oil

31 Oil and fats

32 Feed

33 Tobacco

34 Sugar beet

35 Wine

36 Other products

The MegD Ismea model

Other industrial sectors (7 sectors)

37 Gasoline

38 Electric energy

39 Water

40 Fertilizers

41 Pesticides

42 Other chemical and pharmaceutical products

43 Other industries

The MegD Ismea model

- **Two-level production functions** with imperfect substitution between primary factors and intermediate inputs

- **Primary production factors:**

  - **Agricultural sectors**
    - dependent labor
    - farm independent labor
    - agricultural capital
    - land (three types)
    - animals (four types)

  - **Non agricultural sectors**
    - dependent labor
    - capital

The MegD Ismea model

Composition of the 11 households classes

Farm-households

(1) Limited resources

(2) Retired

(3) Residential

(4) Professional farms with low labor remuneration

(5) Professional farms with high labor remuneration

(6) Large

(7) Very large

Rural

(8) rural

Urban

(9) high income

(10) mid income

(11) low income

The MegD Ismea model

Farm-Household Typologies

Limited Resources	Very small farm-households with very low gross returns, farm assets and global income.
Retired	Farms with retired heads of households.
Residential	Farms whose heads of households are prevalently employed in non agricultural activities.
Small farm-households	Farms with gross returns less then the first quartile of the distribution.
Medium Farm-households	Farms with gross returns between the first and third quartile of the distribution.
Large Farm-households	Farms with gross returns greater then the third quartile of the distribution.
Very Large Farm-households	Farms with gross returns greater then the third quartile of the distribution.

The MegD Ismea model

- **Household preferences: two-stage CES utility function**

First stage: utility depends
- aggregate consumption
- leisure

Second stage: each class decides:
- demand of goods produced by the 45 sectors
- allocation of labor supply between dependent labor and farm independent labor

The MegD Ismea model

Modeling of the Common Agricultural Policy

- Decoupling
- Intervention price mechanism
- Import tariffs
- Production quotas
- Set-aside

The MegD Ismea model

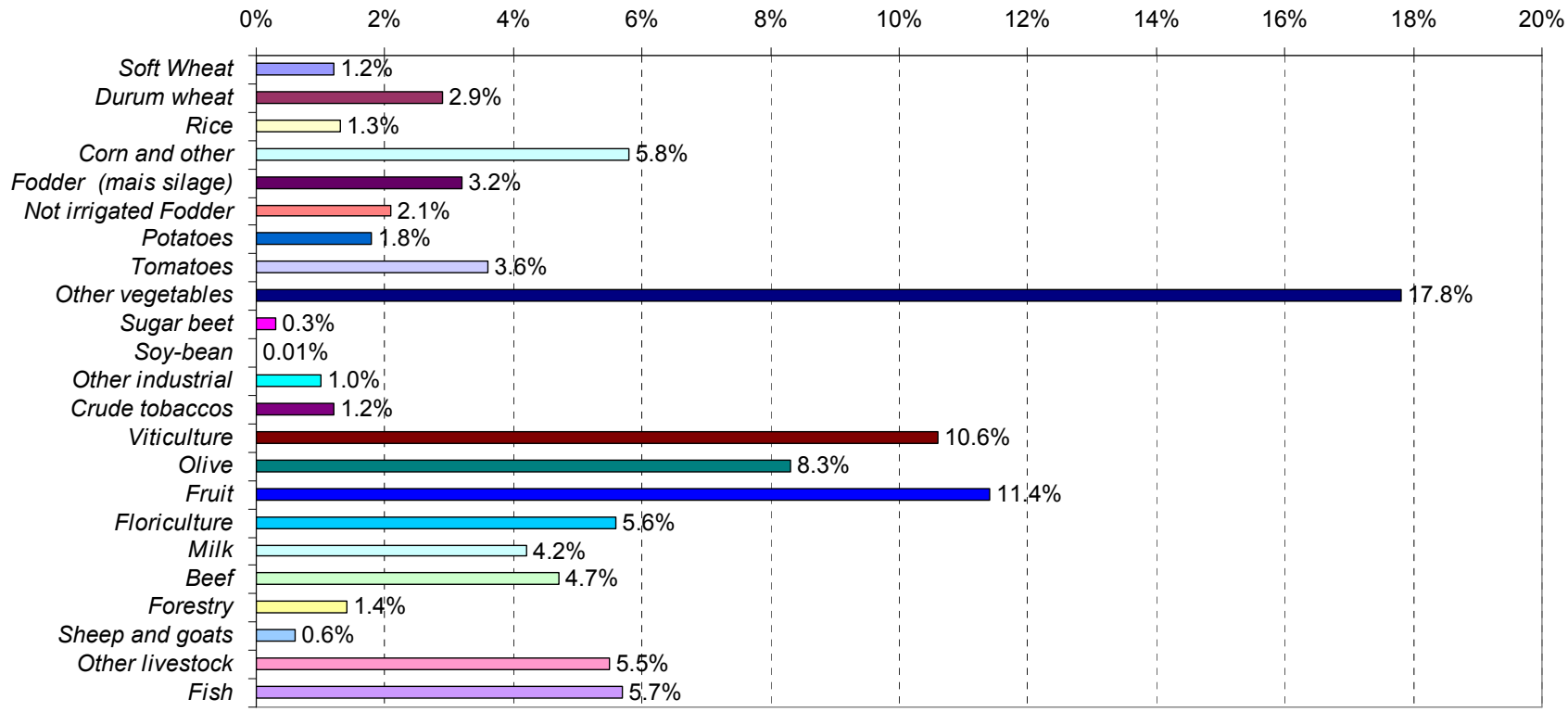
Dynamic of the model

- Evolution of the agricultural capital stock
- Evolution of the non-agricultural capital stock
- Evolution of the productivity growth rate by sector

The active population is assumed fixed

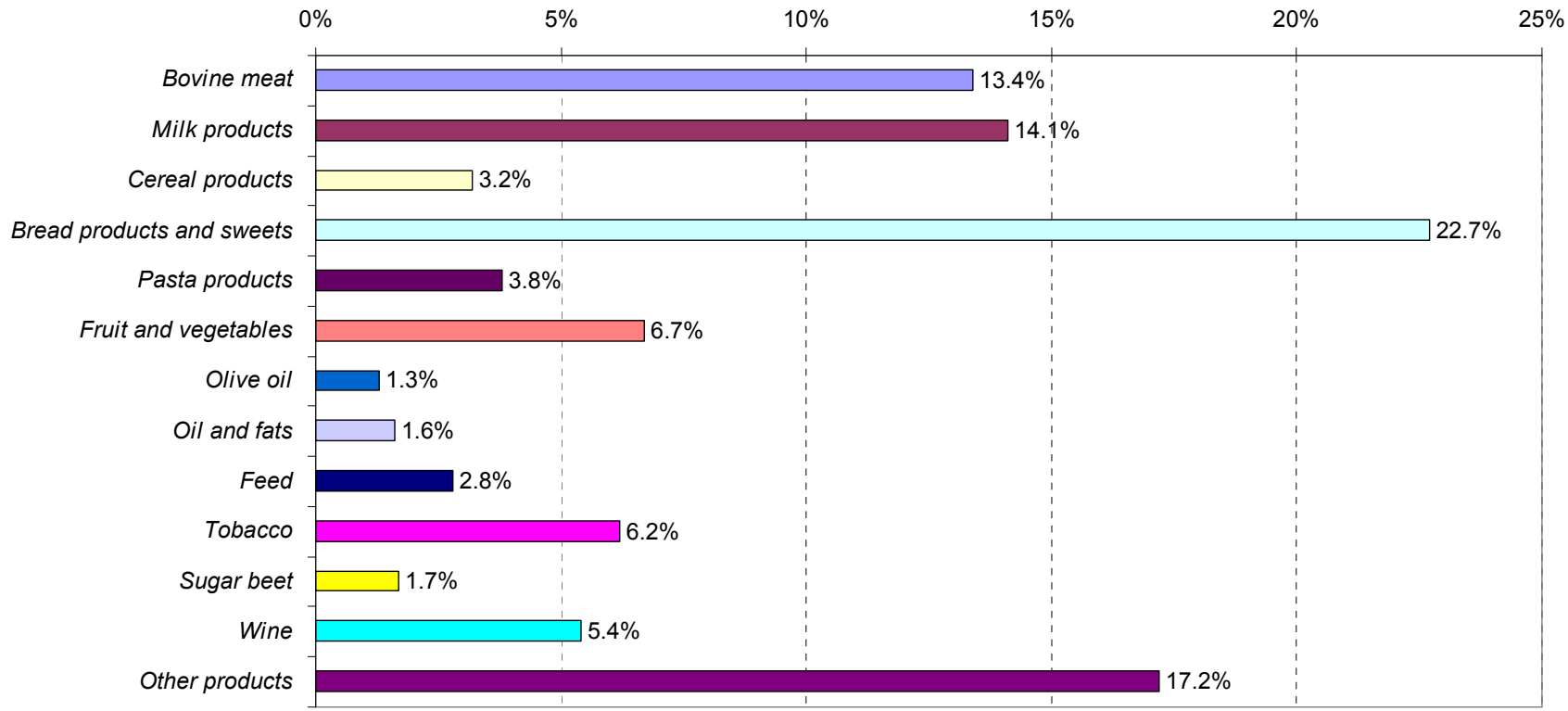
Benchmark

Value added composition in Agriculture



Benchmark

Value added composition in Agro-food



Shock simulated

The period analyzed is 2003-2015

International (deflated) prices

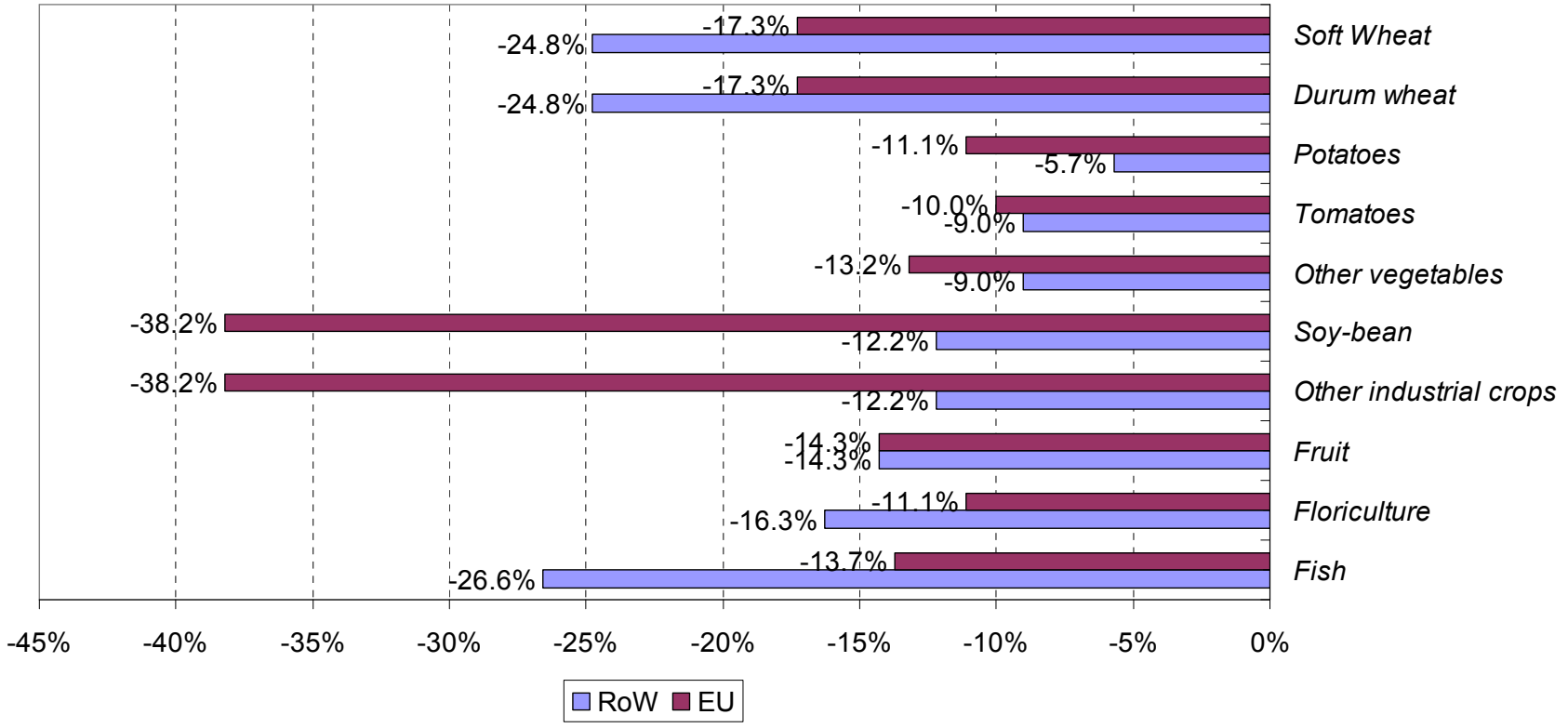
- OECD and FAO forecasts (for RoW products)
- ISMEA forecasts (for EU products)

Productivity

- ISMEA forecasts

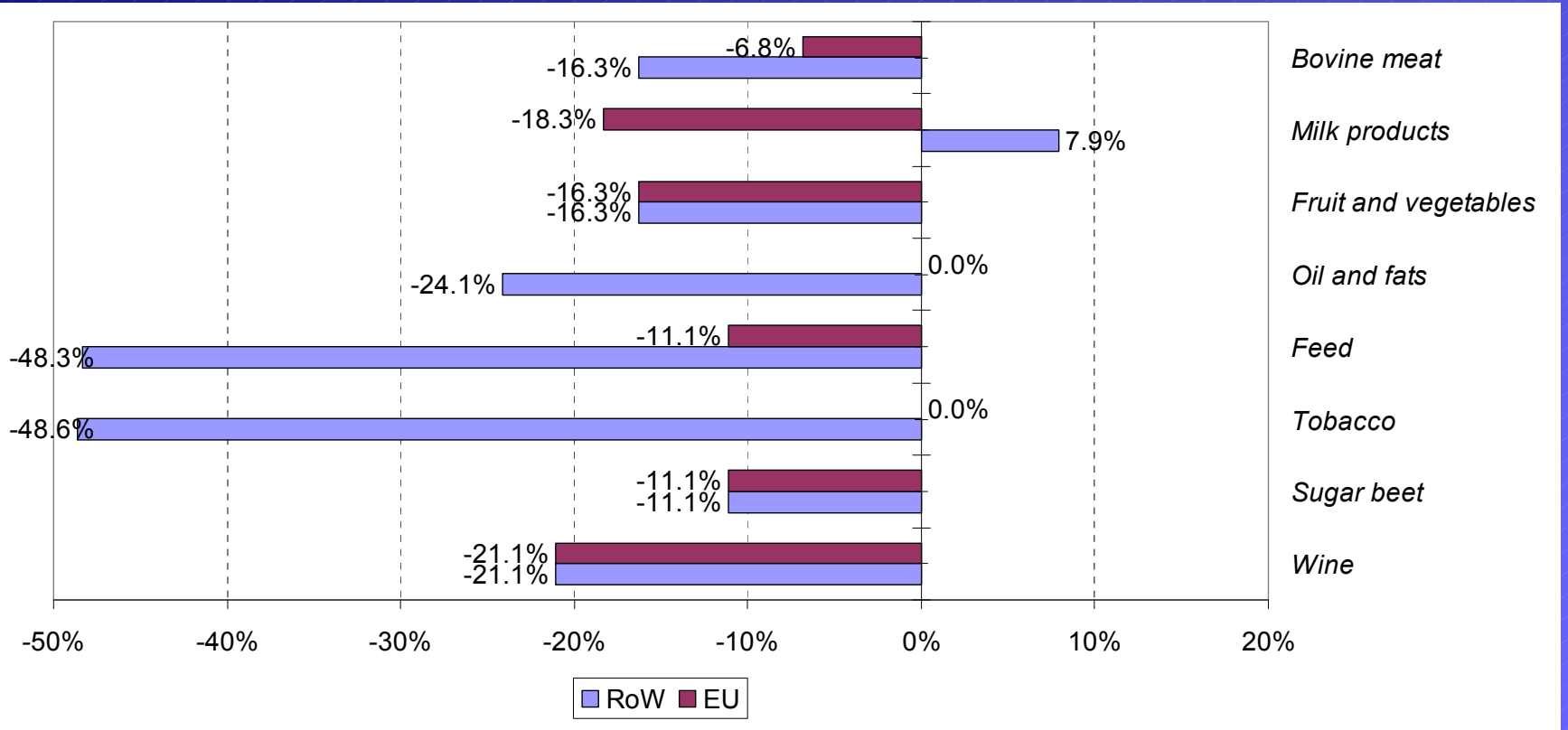
Shock simulated

International prices for agricultural sectors



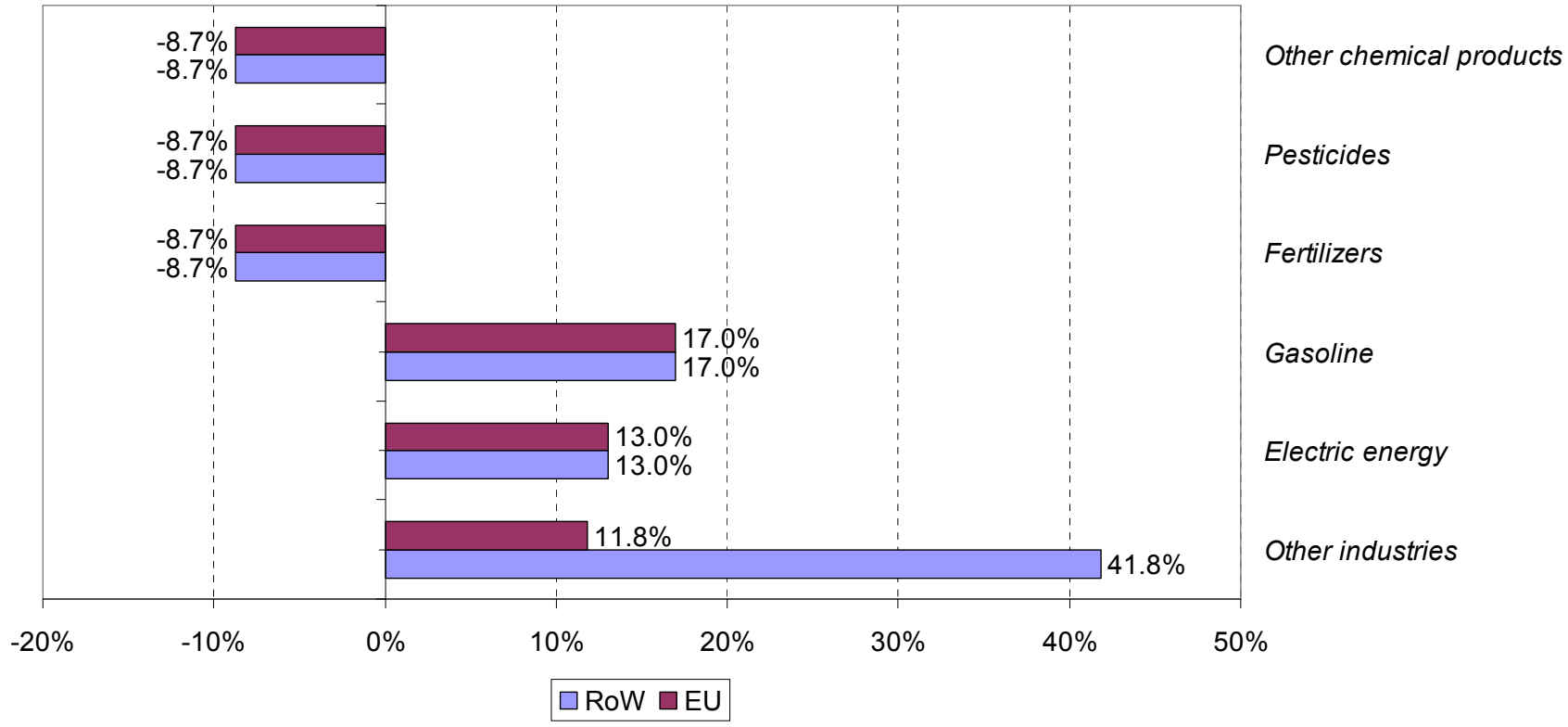
Shock simulated

International prices for agro-industry sectors



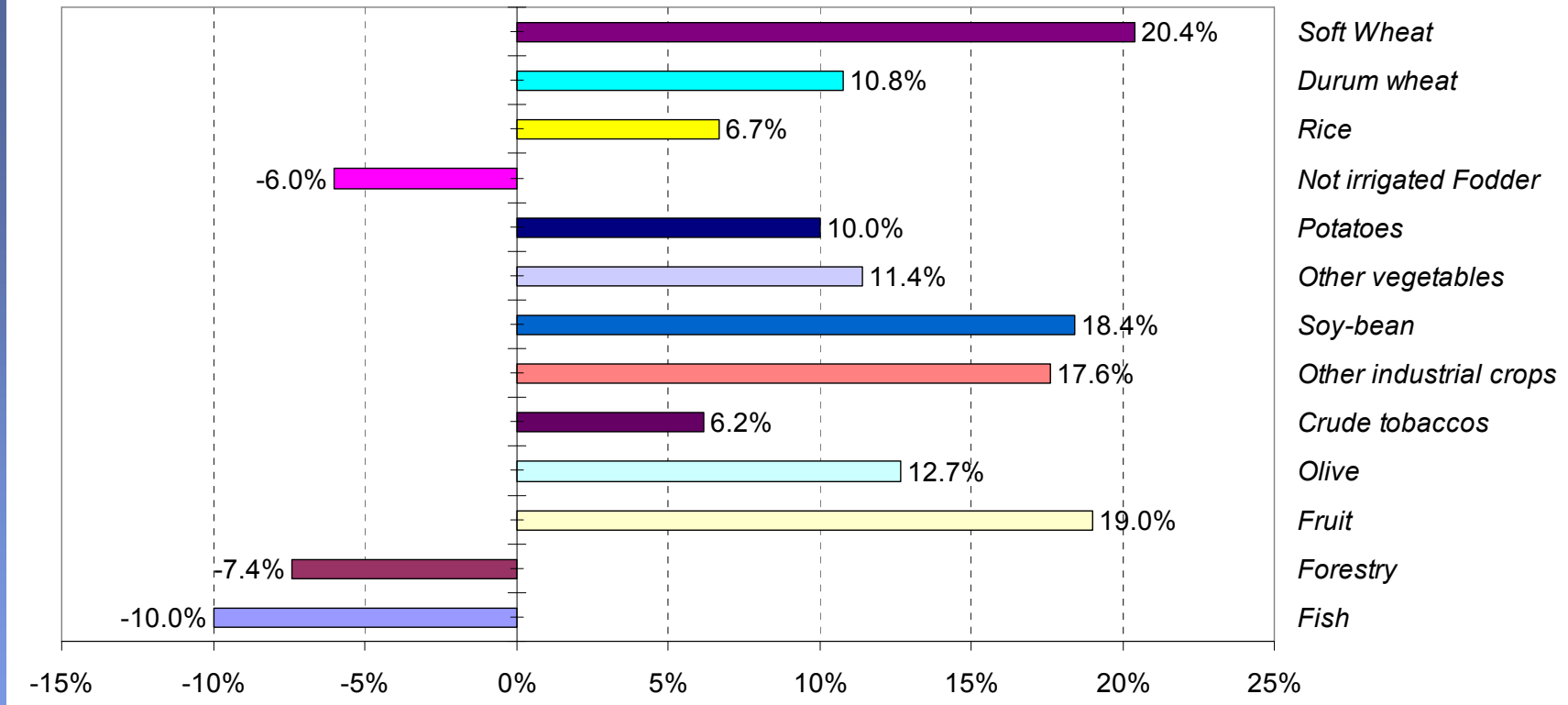
Shock simulated

International prices for other industrial sectors



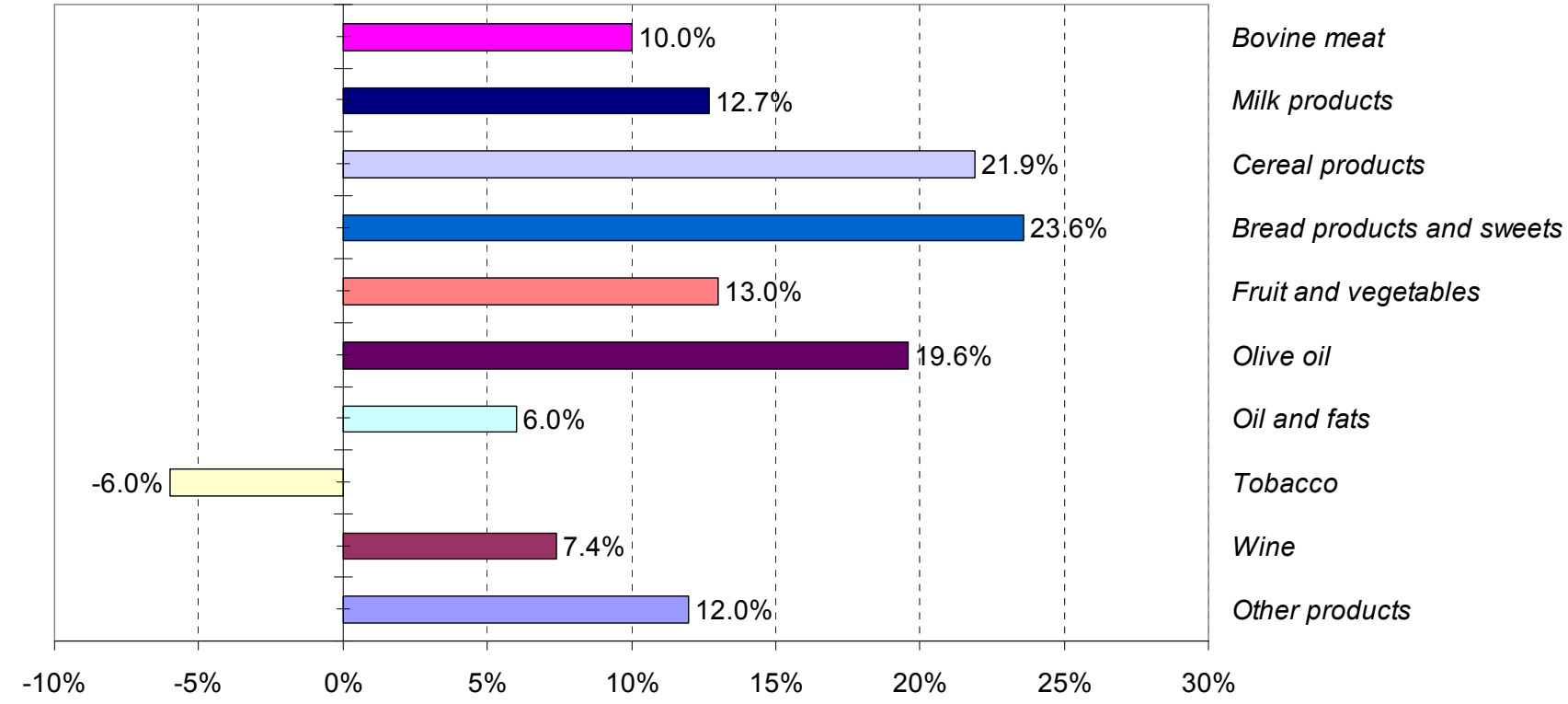
Shock simulated

Productivity in agricultural sectors



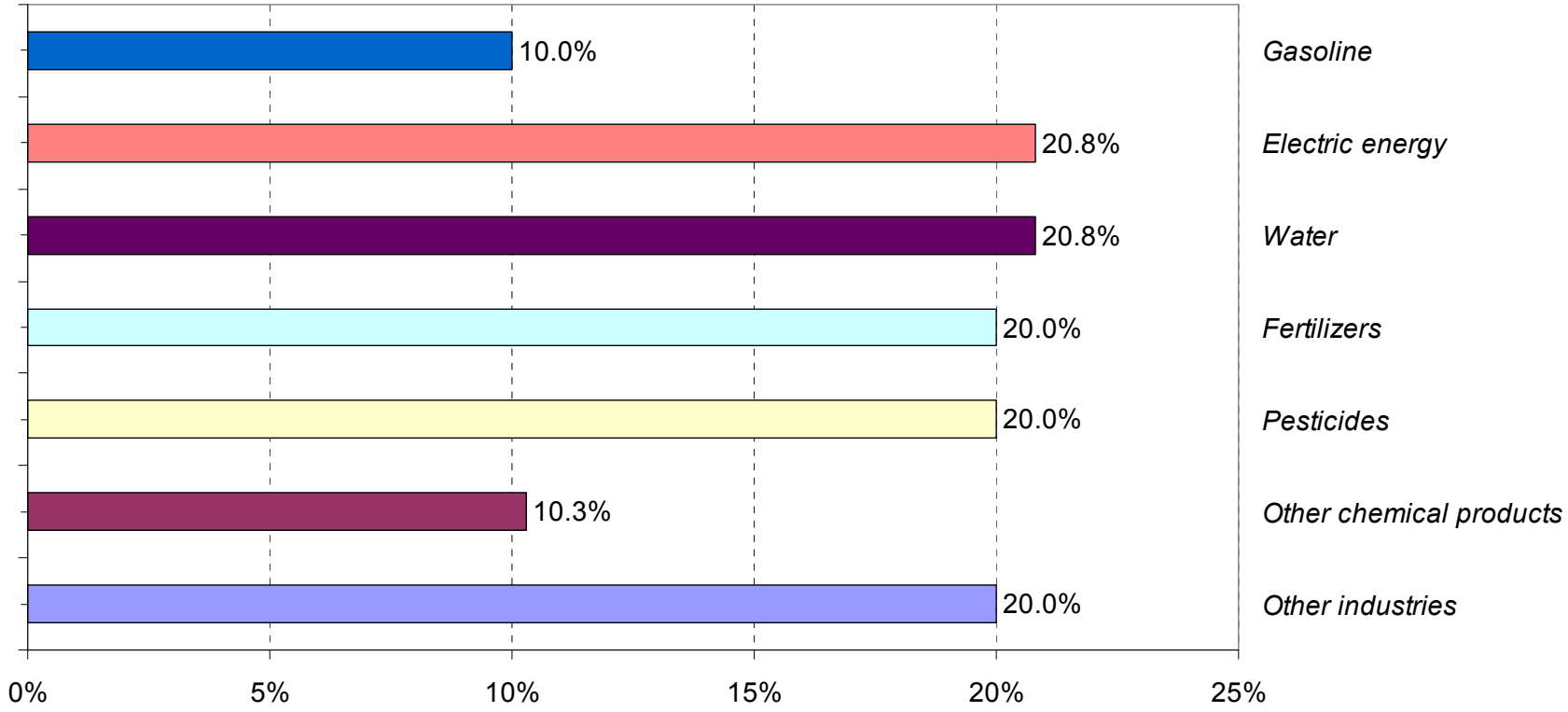
Shock simulated

Productivity in agro-food sectors



Shock simulated

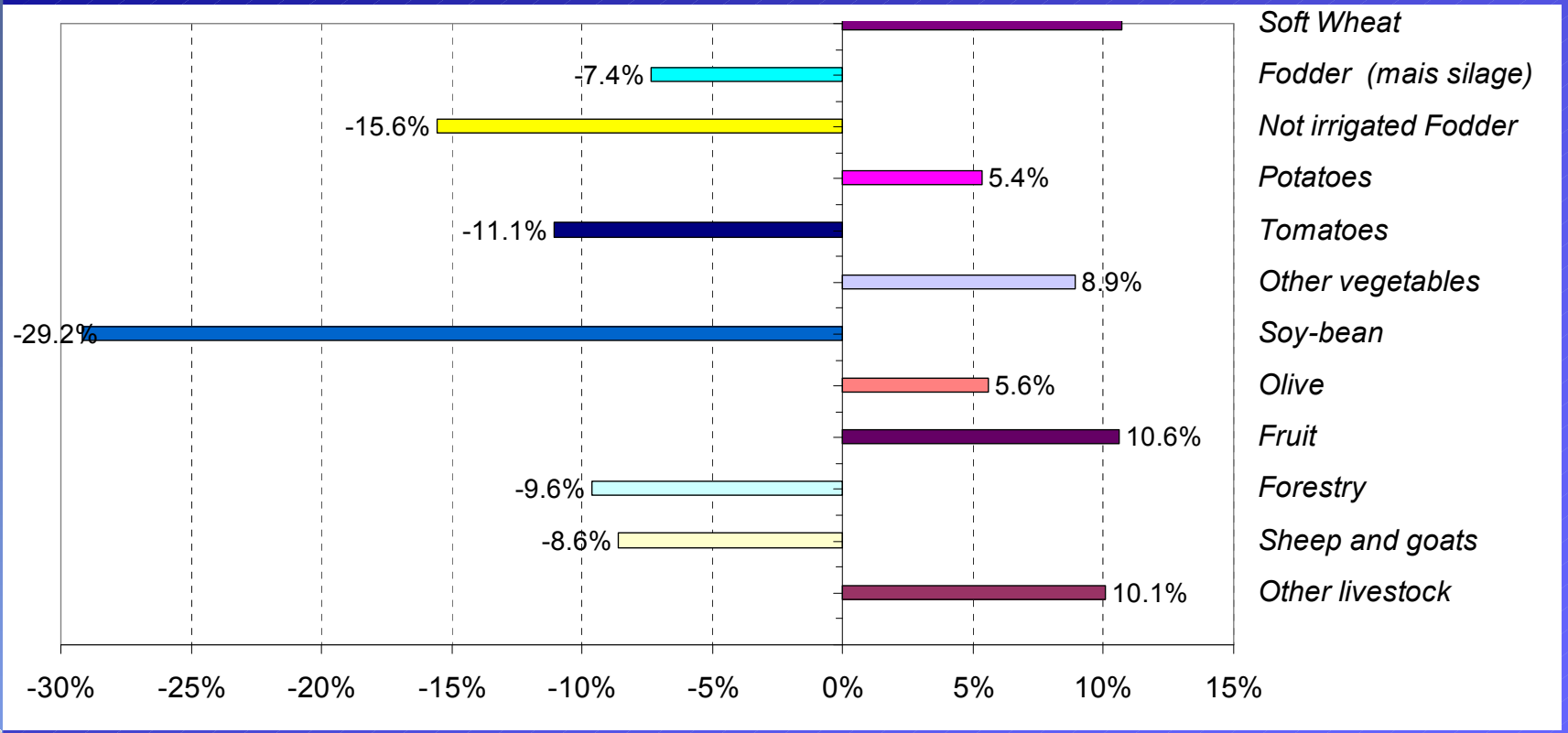
Productivity in other industrial sectors



The simulation results

Impacts on production

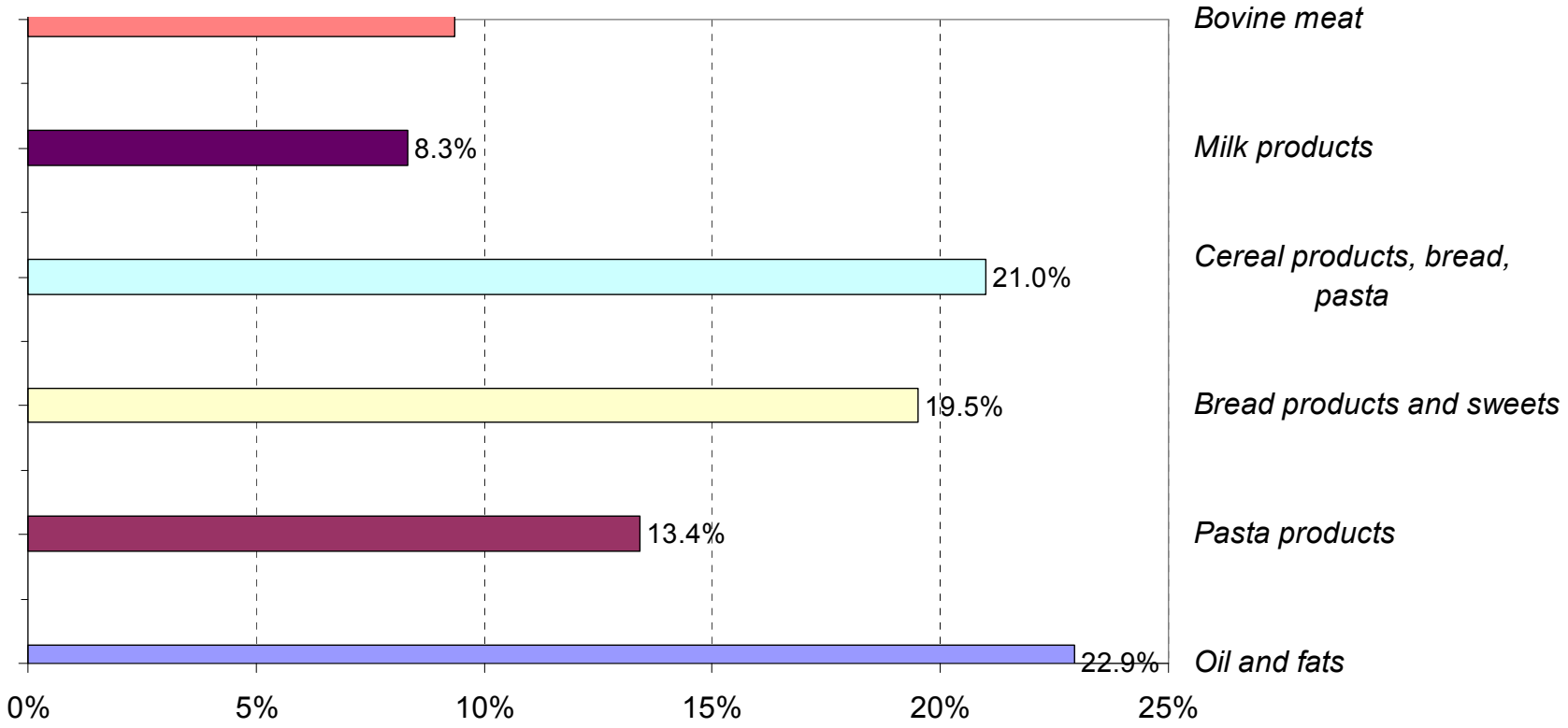
Agricultural sector



The simulation results

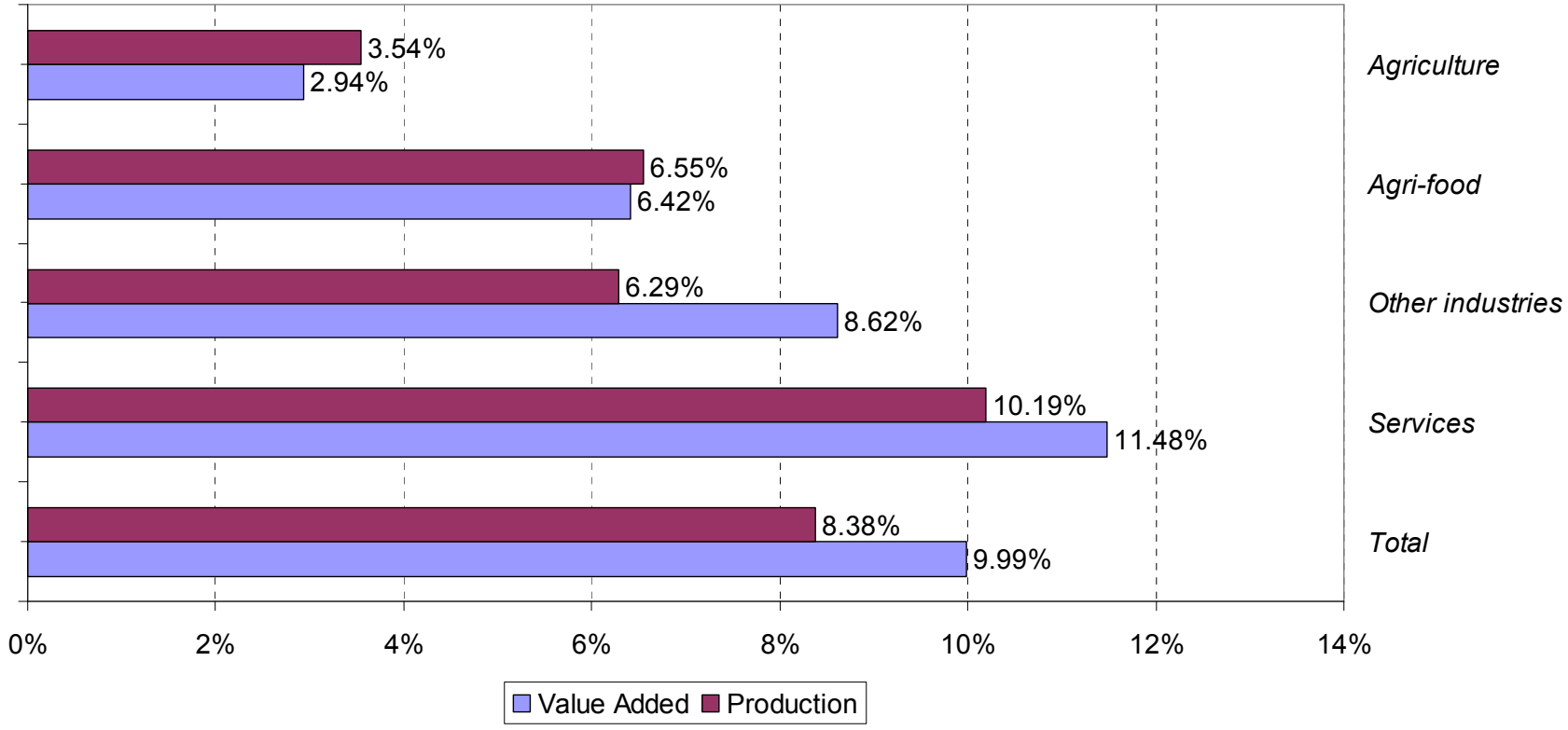
Impacts on production

Agro-food sectors



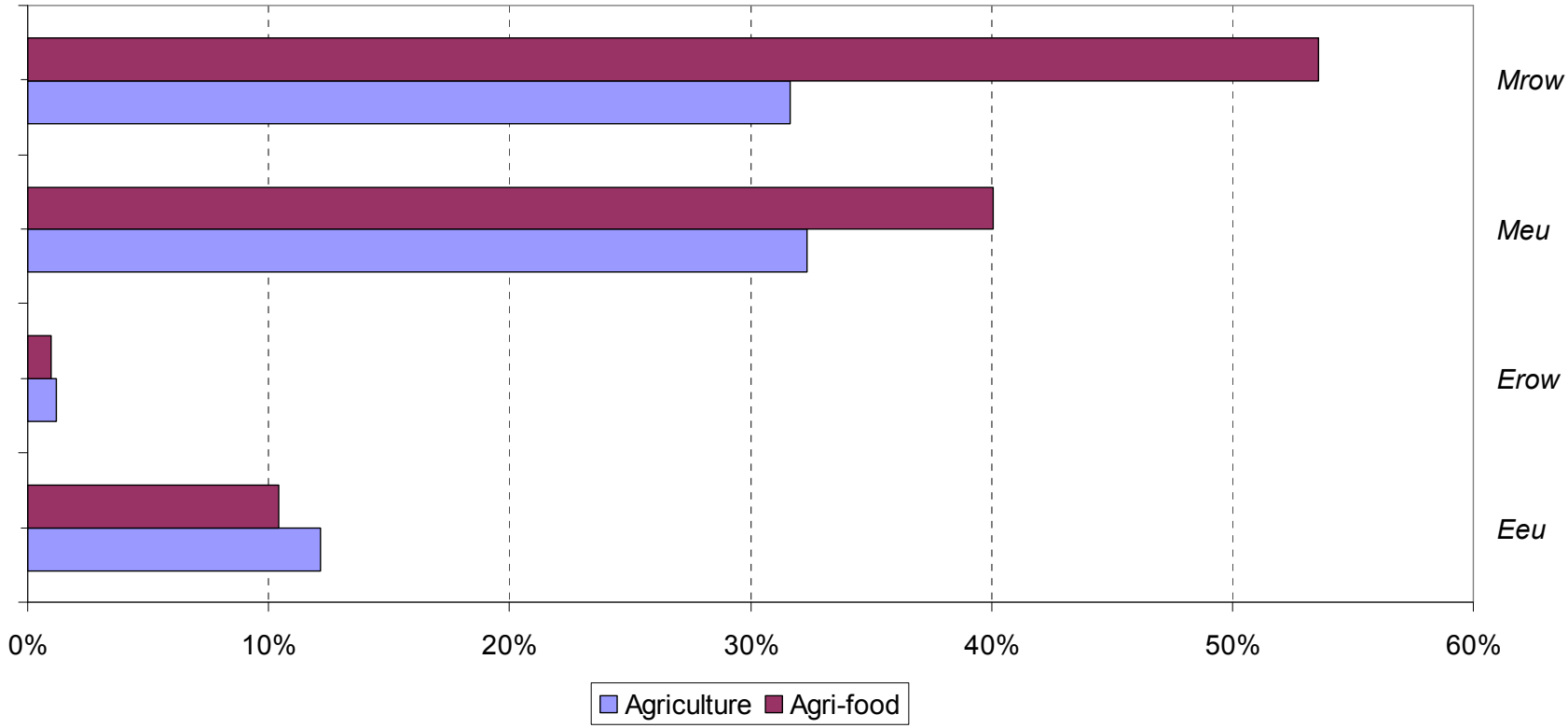
The simulation results

Impacts on production and value added



The simulation results

Impacts on trade flows



Conclusions

- The productivity growth rates in the agricultural and agro-food sectors are lower than the rest of the economy

- So, the evolution of production in these sectors is modest

- The international market liberalization will determine an increase in trade flows