Market Analysis
in the Agri-food Sector

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Structure of the presentation

1. The agri-food sector

2. Subdisciplines of agricultural economics

3. Agricultural market analysis: Selected research topics

4. Teaching agricultural market analysis (overview)

5. Understanding market models

6. Imperfect competition

7. Consumer demand for food

8. References

The agri-food sector

| Upstream industries | → | Agriculture | → | Downstream industries |
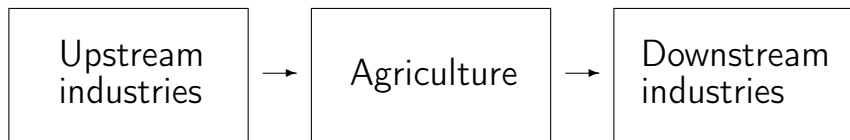
Examples:

– Feed
– Agricultural machinery
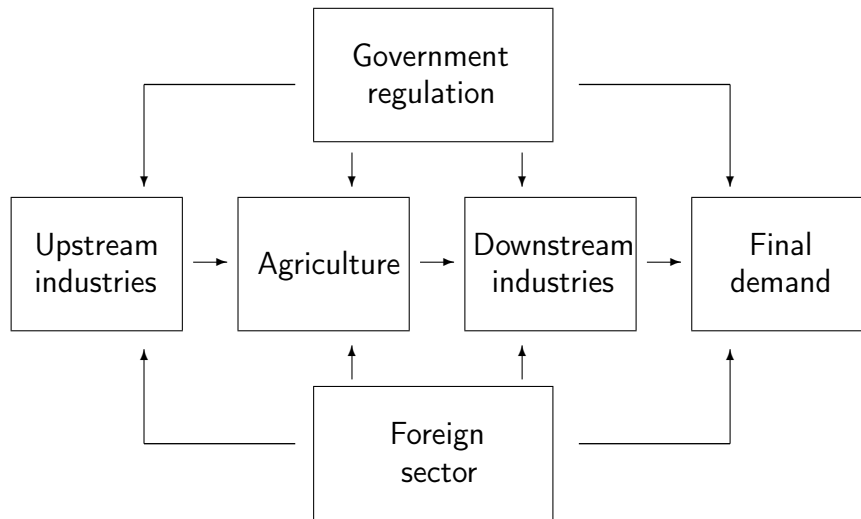– Fertilizer
– Plant protection
– Seed
– Energy

Other markets:

– Labour market
– Land market

Examples:

– Procurement
  of raw products
– Semiprocessed foods
  (e.g. flour mills)
– Consumer food
  products (e.g. food
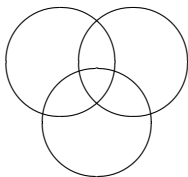 processing, bakeries)
– Grocery wholesalers
  and retailers

The agri-food sector in a broader context

Subdisciplines of Agricultural Economics
with different views on agricultural markets

Farm
Management
Analysis

Agricultural
Policy
Analysis

Agricultural
Market
Analysis

The view of agricultural policy analysis on markets

Among other aspects:

Focus on government regulation of agricultural product and factor markets

Effect on allocation and distribution of policy intervention on markets

For an overview of research in this area cf. SUMNER et al. (2010).

The farm management view on markets

Product supply and factor demand of the individual farm

Optimal response of the farm to predetermined market data,

in particular: predetermined prices

For an overview of research in this area cf. CHAVAS et al. (2010) and KING et al. (2010).

Agricultural market analysis: Selected research topics

- ▶ Price determination
- ▶ Market structure and competition
- ▶ Vertical and horizontal relationships between markets
- ▶ Spatial and intertemporal market relationships
- ▶ Market information
- ▶ Trade flows on world agricultural markets
- ▶ Variability of prices on world agricultural markets

For an overview of research in this area cf. MYERS et al. (2010) and JOSLING et al. (2010).

Teaching agricultural market analysis (overview)

Focus on price determination, selected topics:

- ▶ The model of perfect competition
- ▶ Product supply and factor demand of a single farm
- ▶ Equilibrium on a single market
- ▶ Product supply and factor demand on the market level
- ▶ Equilibrium on horizontally and vertically related markets
- ▶ The impact of government regulation
- ▶ Models of imperfect competition
- ▶ Consumer demand

The model of perfect competition (Bachelor)

- ▶ Polypoly
- ▶ Perfect market transparency
- ▶ Homogeneity of products
- ▶ Unimportance of transportation and storage costs
- ▶ Unimportance of personal relationships

Consequence:
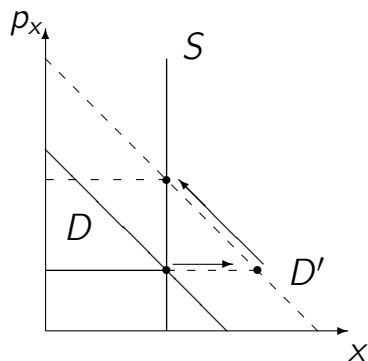No single market participant has an influence on price.

The main task of prices (Bachelor)

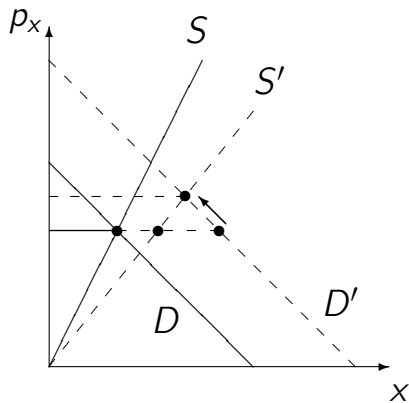The main task of market prices consists in equilibrating demand (D) and supply (S).
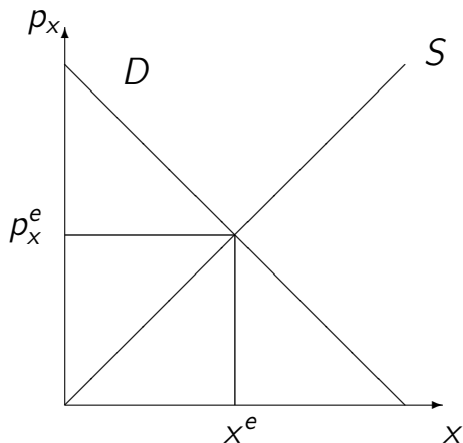
Four functions of prices (Bachelor)

1. Signaling function
2. Guiding function
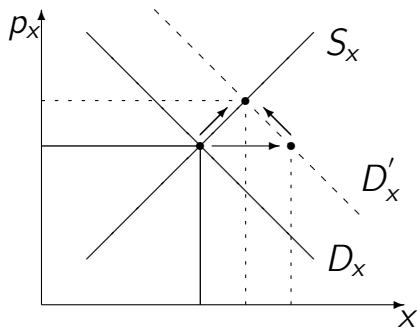3. Rationing and distribution function
4. Compensation function

Understanding market adjustment (Bachelor)

"If demand grows faster than supply, there will be excess demand on the market." True or false?

Equilibrium displacement (Master, PhD)

Symbols:

ε_{xx}^{D}: own-price elasticity of demand,

etc.

$$\frac{\Delta p_x}{p_x} = \frac{1}{\varepsilon_{xx}^{S} - \varepsilon_{xx}^{D}} \cdot \varepsilon_{xY}^{D} \, \frac{\Delta Y}{Y}$$

$$\frac{\Delta x}{x} = \varepsilon_{xx}^{S} \cdot \frac{1}{\varepsilon_{xx}^{S} - \varepsilon_{xx}^{D}} \cdot \varepsilon_{xY}^{D} \, \frac{\Delta Y}{Y}$$

Relationships between markets (Master, PhD)

Horizontal and vertical price transmission

- ► Regional and international market integration (horizontal price transmission)
- ► Marketing margins (vertical price transmission)
- ► Derived product supply (vertical price transmission)
- ► Derived factor demand (vertical price transmission)

Welfare effects of government intervention on related markets (Master)

Distributional consequences of government interventions on agricultural product and factor markets

- ▶ on consumers
- ▶ on farmers
- ▶ on owners of production factors
- ▶ on suppliers of intermediate inputs
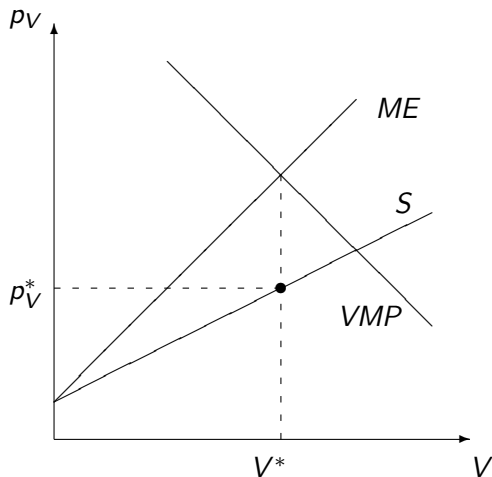
Models of imperfect competition: Monopoly (Bachelor)
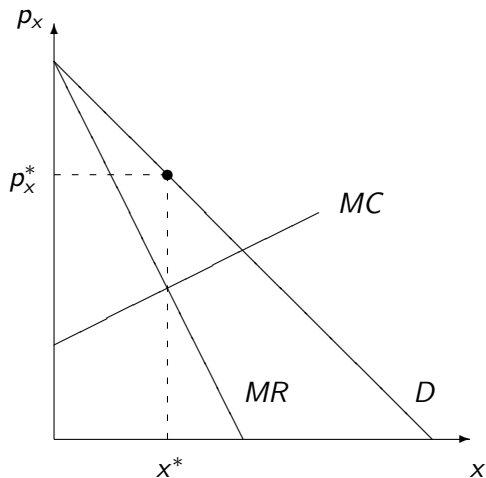
Lerner index
of market power:

$$L = \frac{p_x - MC}{p_x}$$

Symbols:

MC: marginal cost
MR: marginal revenue

Models of imperfect competition: Monopsony (Bachelor)

Lerner index
of market power:

$$L = \frac{VMP - p_V}{p_V}$$

Symbols:

ME: marginal
        expenditure
VMP: value marginal
        product

Basic models of oligopoly and oligopsony (Master)

Strategic behaviour of market participants

Several models of price determination:

- ▶ Strategic variable price (e.g. Bertrand model):
  Explaining "price wars"
- ▶ Strategic variable quantity (e.g. Cournot model):
  The number of market participants is decisive.

Models of markets with differentiated products (Master)

Models in the tradition of Chamberlin (1933):
Excess capacities on the supply side

Models in the tradion of Hotelling (1929):
Market instability (frequently new product varieties, price
instability)

Models of markets with differentiated products (Master)

Price discrimination

Price discrimination of first, second and third degree
(Pigou): Large variety of manifestations

Point of departure: Product characteristics or other market
characteristics like transport and storage costs.

For example on spatial markets (in the agricultural sector
transport costs matter!) price discrimination can be seen as
a natural market phenomenon.

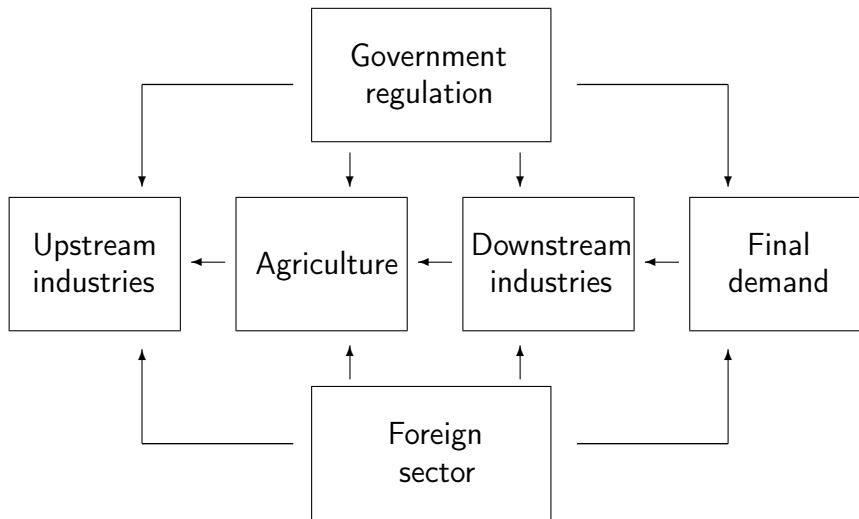# Analysis of consumer demand for food (Bachelor)

... is an interesting subject for research and teaching in itself,

... is indispensable for explaining the long-run development of the agri-food sector.

The agri-food sector in a broader context
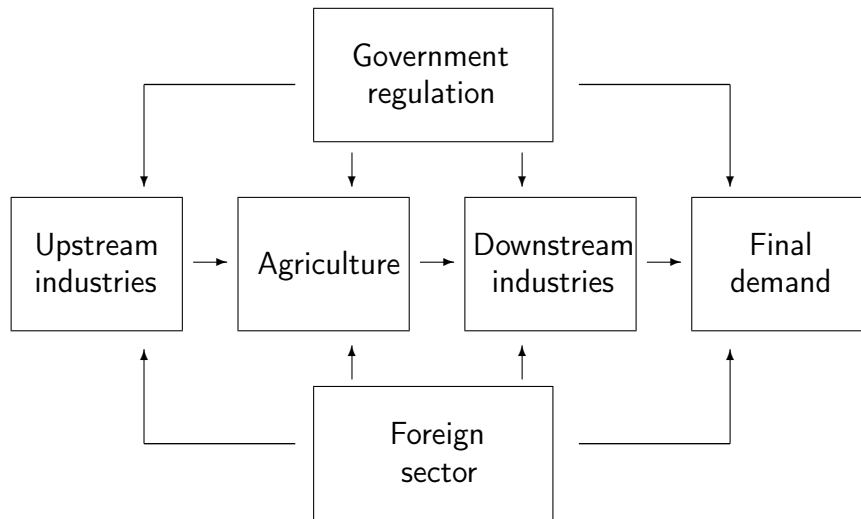
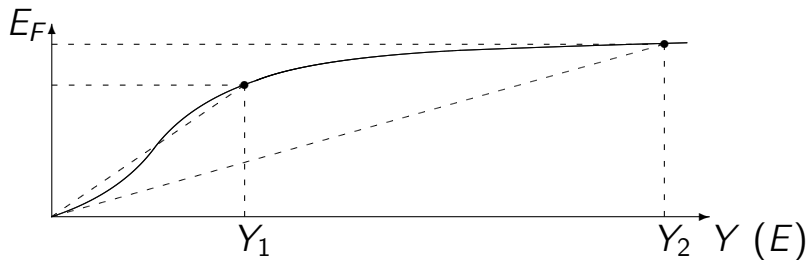# Explaining the long-run development of the agri-food sector

The share of food expenditure (E_F) in total consumption expenditure (E) declines with rising income (Y).

Engel curve and income elasticity (Bachelor)

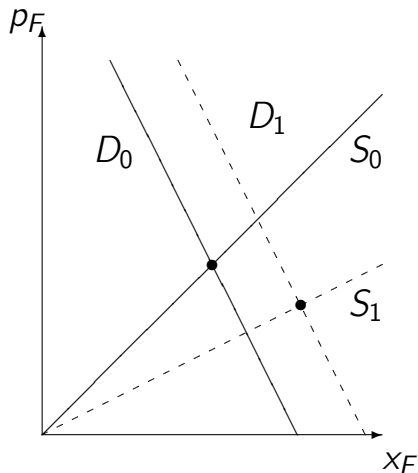An increase in income Y (or total expenditure E) leads to a less than proportionate increase in food expenditure (E_F). The income elasticity of food demand (η_F) is less than 1.

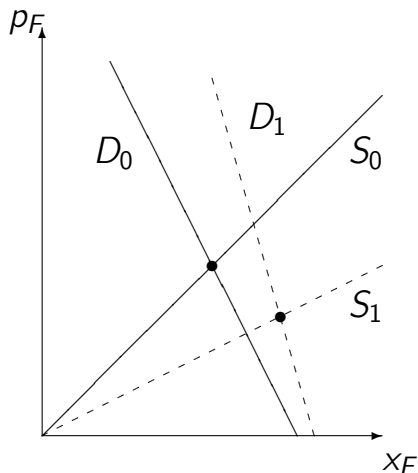$$s_F = E_F/E \quad \text{declines, because} \quad \eta_F < 1.$$

Shifts of the demand curve for food (1) (Bachelor)

Influence of rising income: Only small shift of the demand curve relative to the supply curve due to $\eta_F < 1$

p_F declines.

Shifts of the demand curve for food (2) (Master)

Influence of rising income: The demand curve shifts and, as explained by the Slutsky equation, becomes steeper.

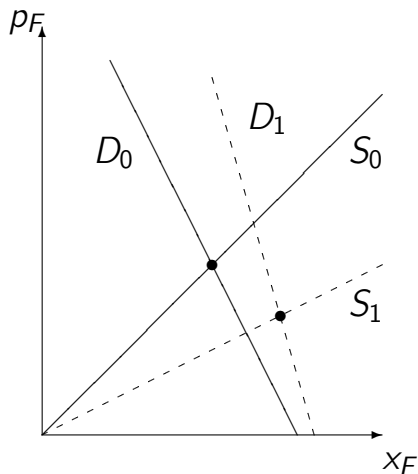$$\varepsilon_{FF}^M = \varepsilon_{FF}^H - s_F \cdot \eta_F$$

where ε_{FF}^M and ε_{FF}^H:

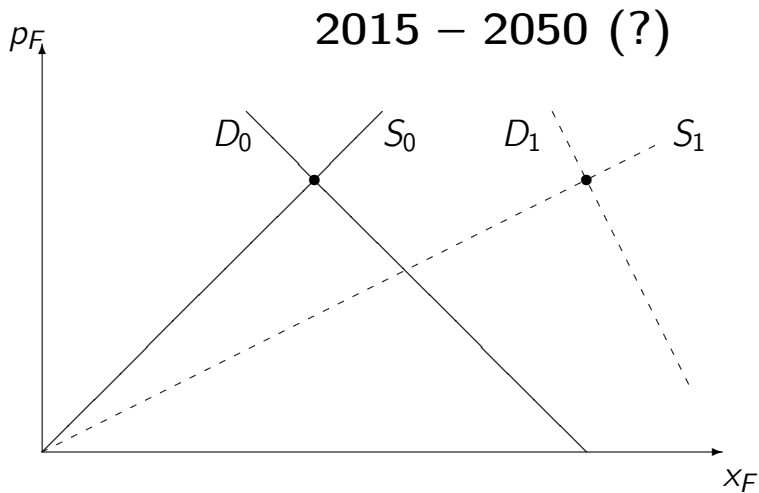Marshallian and Hicksian own-price elasticities of food demand

p_F declines even more.

Long-run price trends on world agricultural markets

Major driving forces 1950 - 2000: Technical progress (supply) and rising income (demand)

Which changes in world market prices can be expected?

$2015 - 2050 \ (?)$

p_F

D_0 S_0 D_1 S_1

x_F

References

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Josling, T., K. Anderson, A. Schmitz, and S. Tangermann (2010): "Understanding International Trade in Agricultural Products: One Hundred Years of Contributions by Agricultural Economists", *American Journal of Agricultural Economics*, 92(2), 424-46.

King, R.P., M. Boehlje, M.L. Cook, and S.T. Sonka (2010): "Agribusiness Economics and Management", *American Journal of Agricultural Economics*, 92(2), 554-70.

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