UNIVERSITEIT GENT

FACULTEIT BIO-INGENIEURSWETENSCHAPPEN

Sectoral mobility of production factors in agriculture and predictions for the future

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Outline

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2. Why studying structural change?
3. Methodology
4. Case study and data collection
5. Results
    1. Shifts in land use
    2. Shifts in labour use
6. Conclusion and discussion

1. Introduction

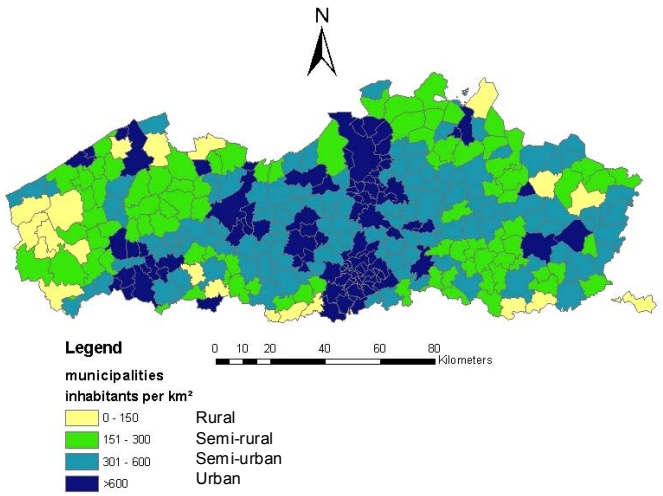
Structural change in agriculture

- General trends
  - Labour leaves agriculture, farms disappear
  - Farm size and specialization increasing
  - Family farming remains important
- Subtle, prolonged and spatially differentiated
- Result: diverse land management community
  - Professionally run farms
  - Multifunctional businesses
  - Farms occupied for other purposes

Structural change in Flemish agriculture

- Case Flanders
  - High pressure from high population density
  - Intensive livestock sector problems complying with EU regulations

- Follows general trends (1980-2008)
  - Number farms halved (30 666)
  - Total agricultural area ± constant (623 699 ha)
  - Average farm size +142% (20.3 ha)
  - People working on farms -51% (60 563)
  - Increasing number of workers per farm (2)
  - Standard gross margin + 83% (€109 535)
  - Mainly family farms



Objective of research

- Objectives:

  1. quantifying + analyzing changes in factors land and labour in Flemish agriculture over last 20 years, taking into account sectoral mobility

  2. projections of future agricultural landscape Flanders

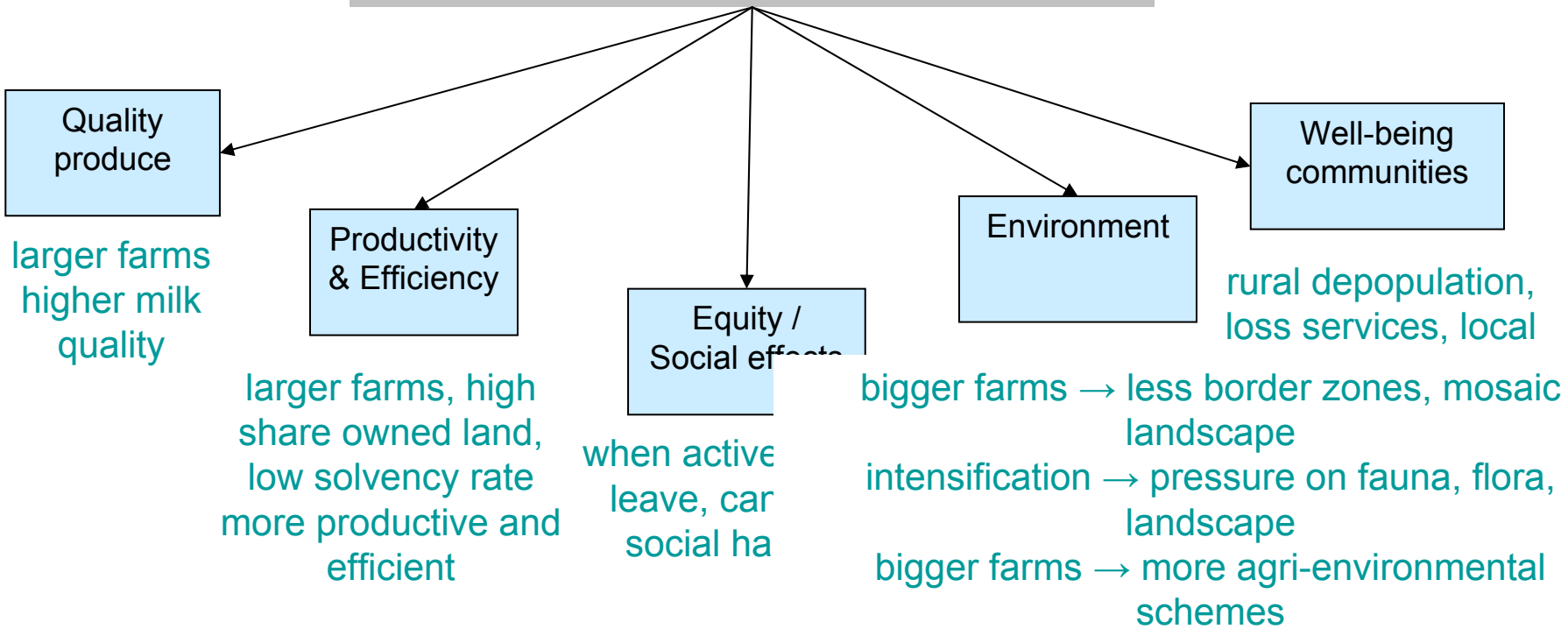
- Through markov analysis and survey

2. Why studying structural change

Structural change

Changes known

→ Policy to stimulate positive and mitigate negative effects



3. Methodology

Markov analysis

- Assumption: future events resemble recent historical trends
- Deterministic, first-order Markov chain
  - Conditional probability of future event only dependent on present state (not on past event)
- Transition probabilities

$$P_{ij} = Pr\,(X_{t+1}=j \mid X_t=i)$$

Unit land/labour belongs to sector j at time t+1

Unit land/labour belongs to sector i at time t

$$\hat{P}_{ij} = N_{ij} / \sum_{j=0}^{k} N_{ij}$$

Number of land/labour units going from sector i to j

Total number of sectors

Markov analysis

- Probability / transition matrix

$$P = \begin{pmatrix} p_{0,0} & \cdots & \cdots & \cdots & \cdots & p_{0,18} \\ \cdots & \cdots & \cdots & \cdots & \cdots & \cdots \\ p_{3,0} & \cdots & p_{3,3} & p_{3,4} & \cdots & p_{3,18} \\ p_{4,0} & \cdots & \cdots & p_{4,4} & \cdots & p_{4,18} \\ \cdots & \cdots & \cdots & \cdots & \cdots & \cdots \\ p_{18,0} & \cdots & \cdots & \cdots & \cdots & p_{18,18} \end{pmatrix}$$

Stop probabilities

New probabilities

Stable probabilities

Shift probabilities

- Sign test: $H_0 = p_{ij} = p_{ik}$

4. Case study & data collection

Markov analysis

- Secondary data 1990-2007 agriculture & horticulture
- Data on land, labour, capital, personal characteristics
- Markov groups: 18 farm sectors
  - Based on EU typology
  - Dependent on distribution standard gross margin over sectors

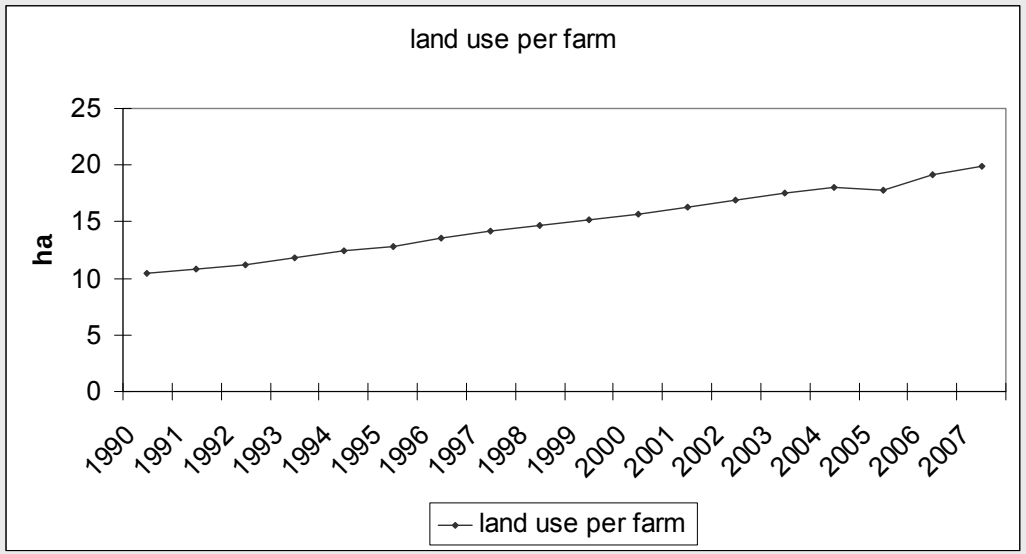
Survey

- To better understand Markov results
- Quota sample (age, type production)
  - 2500 questionnaires, response 14.2%
  - 59% active farmers, 41% farmers who have quit
- Questions:
  - Socio demo, farm, land use, production rights, quota, use infrastructure after quitting agriculture
  - Current farm problems, farm succession
  - Questions on decision to quit, social consequences

5. Results

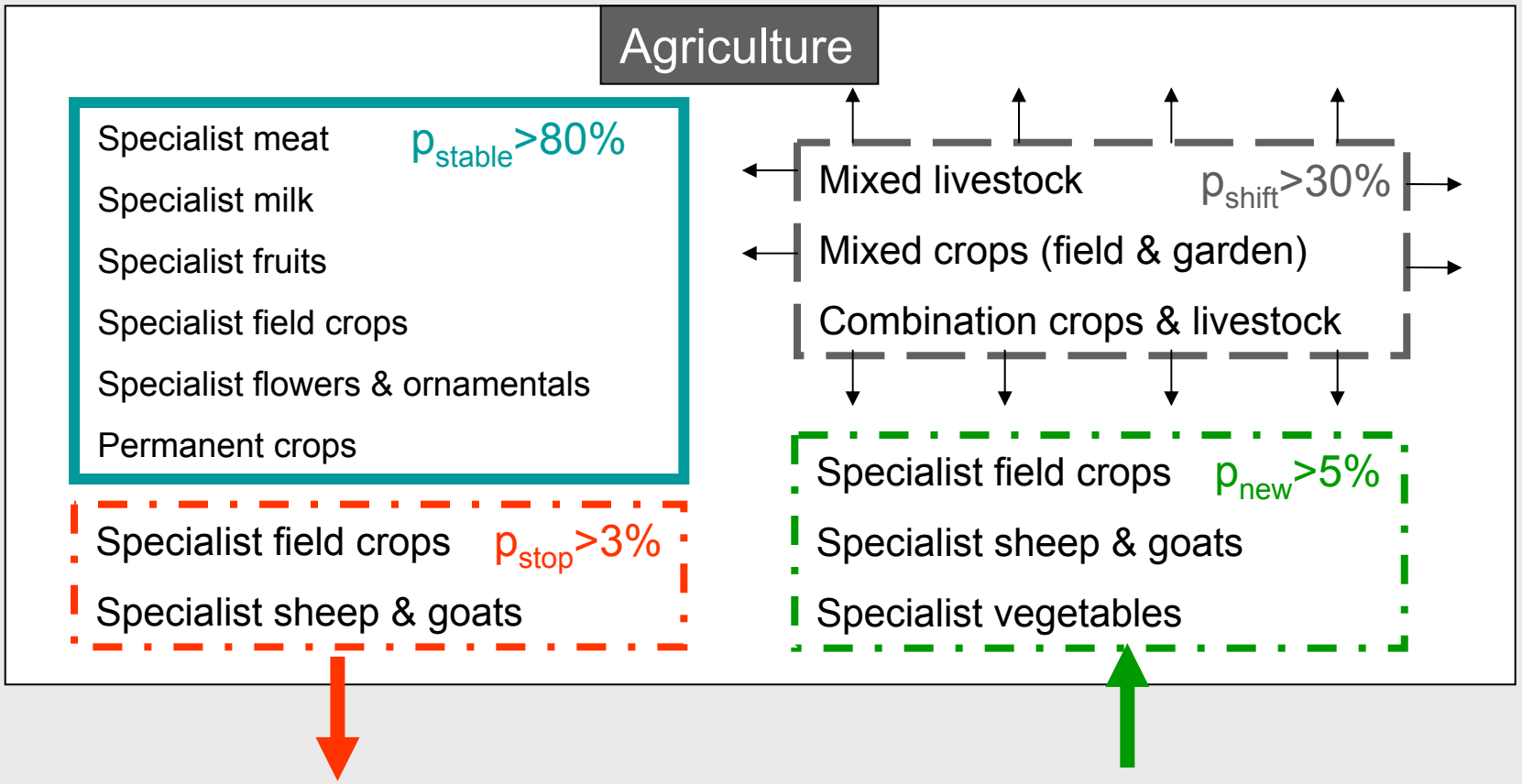
Shifts in land use

- After retirement or quitting most land stays in agriculture
- Sectoral differences
  - Largest farms: combination field crops and dairying
  - Smallest farms: specialist poultry



Shifts in land use

- Sectoral mobility land 1990-2007 (Markov)



Shifts in land use

- Expectations for the future (2017) (Markov)
  - Total land in agriculture -5%

Sector losing most land (20% or more)
- Mixed crops & livestock
- Dairy farms (specialist and mixed with other livestock or crops)

Sectors gaining most land (more than 100%)
- Specialist flowers & ornamentals
- Specialist poultry
- General market garden cropping

Shifts in land use

- Survey results
  - Higher % stoppers for smaller farms with more land in ownership
  - Percentage land leaving agriculture: 2% for owned, 3% for leased land
  - Land scarcity not seen as main limiting factor for farming

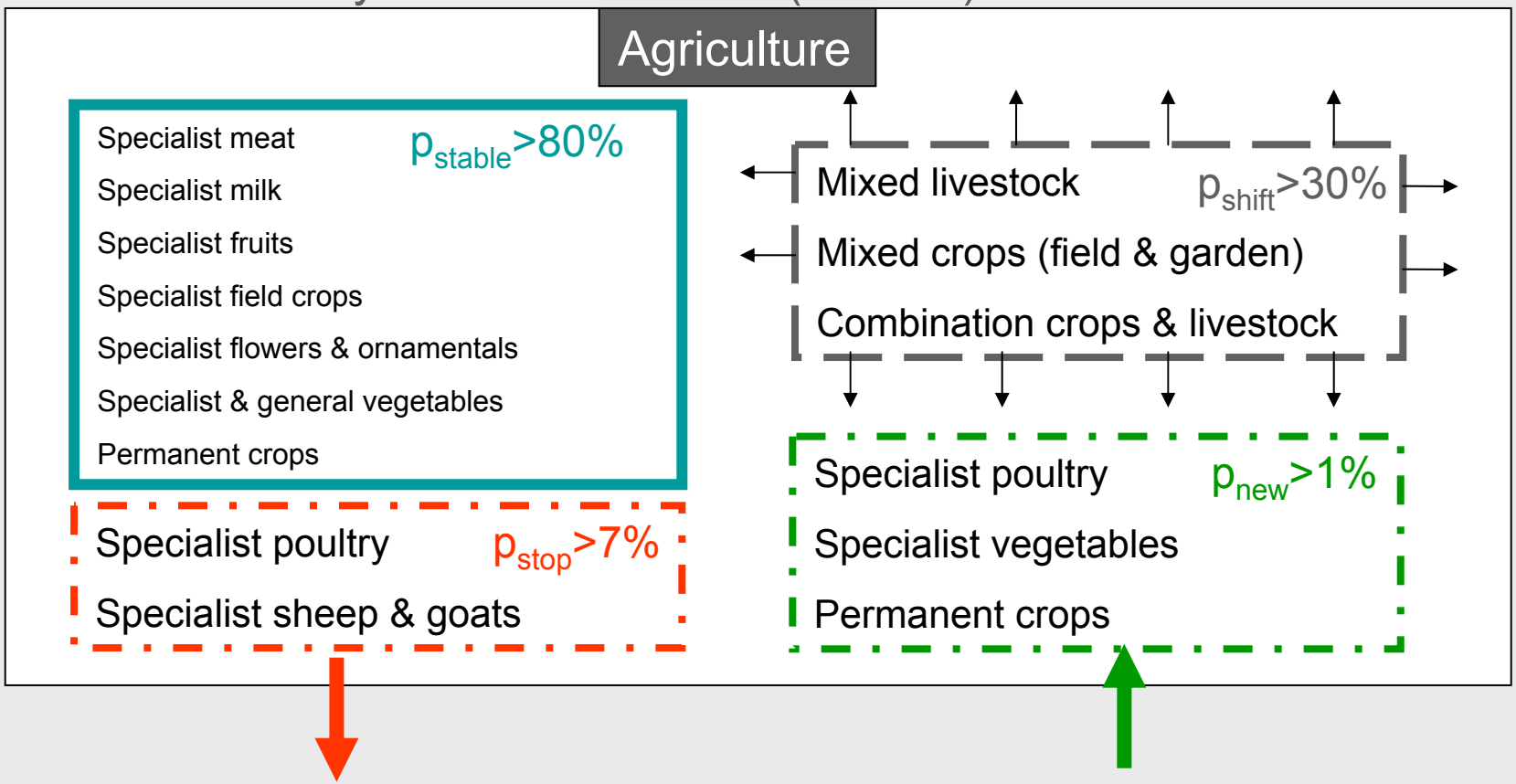
Shifts in labour use

- Age structure
  - 29% older than 65
  - 42% younger than 50
  - Survey: most important reason for stopping: reaching 65

- Sectoral differences
  - Most labour intensive:
    - general and specialist vegetables
    - permanent crops
    - specialist flowers & ornamentals (+>50% FLE)
  - FLE decreased in:
    - specialist field crops
    - specialist sheep & goats

Shifts in labour use

- Sectoral mobility labour 1990-2007 (Markov)



Shifts in labour use

- Expectations for the future (2017) (Markov)
  - Total FLE in agriculture -31%

Sector losing most labour (30% or more)
•Most specialist sectors
•Especially: poultry, pigs, flowers
•General vegetables

Sectors losing least labour (less than 30%)
•Mixed sectors
•Specialist field crops

  - Specialist sectors still most FLEs

Shifts in labour use

- Survey results
  - Stopped farm: fewer labour units, less full-time work
  - After stopping: most labour leaves agriculture
  - 12% farmers over 50 have successor
    - In most cases children or other family members
    - Reasons for no successor: not having children, children not interested in farm, work off farm, not old enough to know, farmer too young to think about it
  - 50% farmers indicate farm stays in family after retirement

6. Discussion and conclusions

Discussion and conclusions

- Trends in Flemish agriculture (1990-2007)
  - 45% farms stopped
  - Specialization of farms
    - Specialist sectors keep land and labour
    - Mixed sectors shift land and labour to other sectors
    - Possible causes:
      - Older farmers disappear (mixed, high share owned land)
      - Fixed costs for specialized investments
      - Transaction costs from administration lower on specialized farms

Discussion and conclusions

- Trends in Flemish agriculture (1990-2007)
  - 35% decrease labour force
    - Loss of labour especially for specialist sheep & goats
    - New labour especially for vegetables, permanent crops
  - Total area agricultural land more or less constant
    - Loss of land and new entry for specialist field crops (?), specialist sheep & goats
      - hobby farmers becoming professional?
    - New entry specialist vegetables
  - Farms get bigger, employ more people, capital intensive, still family-based

Discussion and conclusions

- Predictions for 2017 (Markov)
  - 5% decrease in land
    - Especially for mixed farms & dairy farms (?)
    - Specialist flowers, vegetables, poultry gain land
  - 31% decrease in labour
    - All lose labour, specialist types more than mixed types
    - Specialist flowers, vegetables, poultry & pigs lose most labour
  - Less labour on more land due to technological developments or policies (animal welfare)

Discussion and conclusions

- Weaknesses of static Markov approach / future research
  - No attention to changing policies, prices, etc.
  - Future structural change dependent on:
    - Policy developments (quota, payments, …)
    - Technological developments
    - General economic developments (land shortage, food prices, …)
    - Farm and farmer factors, etc.
  - Decrease in land use by sp. milk sector with abolishment milk quota?
  - Dynamic analysis where transition p= f(policy, technology, …) and adapt p-values according to expectations in future

Discussion and conclusions

- Facilitate specializing, size-increasing farmers by
  - Good farm retirement schemes, so land becomes available
  - Interventions in the land market (consolidation)
- Effects of losing mosaic small-scale landscape, border zones on biodiversity, landscape


Thanks for your attention!