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FACTOR MARKETS

# DETERMINANTS TO LEAVE AGRICULTURE AND CHANGE OCCUPATIONAL SECTOR: EVIDENCE FROM AN ENLARGED EU

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**Factor Markets Project**

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# Motivation



- Large body of literature on the labour allocation decisions of farmers
- Well-functioning labour markets and a competitive multi-sectoral economy are crucial for rural development
- EU Enlargement: heterogeneous farming sectors and diverse labour markets across MS
- Structural change as on ‘ongoing process’ (Eurostat, 2012)

# Objectives and Approach



- Objectives of the study:
  - Examine push/pull factors which allow agricultural labour to enter non-farm economy
  - Compare some NMS and EU-15
    - Hungary, Slovakia, Poland, France and Italy
- Dataset:
  - EU-LFS micro-data
    - expanded with regional indicators
- Empirical approach:
  - 3-step multivariate probit to control for selection bias

# Literature Review



- Relevant studies: off-farm participation, farm exit, reallocation of labour across sectors
- Human capital and life-cycle theories (Huffman, 1980; Rizov and Swinnen, 2004)
- Occupation-residential choice paradigm (Johnson, 1991)
- Geograpical dispersion of agriculture and high costs of information (Huffman, 1977)
- State dependence and rigidity in off-farm labour adjustment (Corsi and Findeis, 2000)

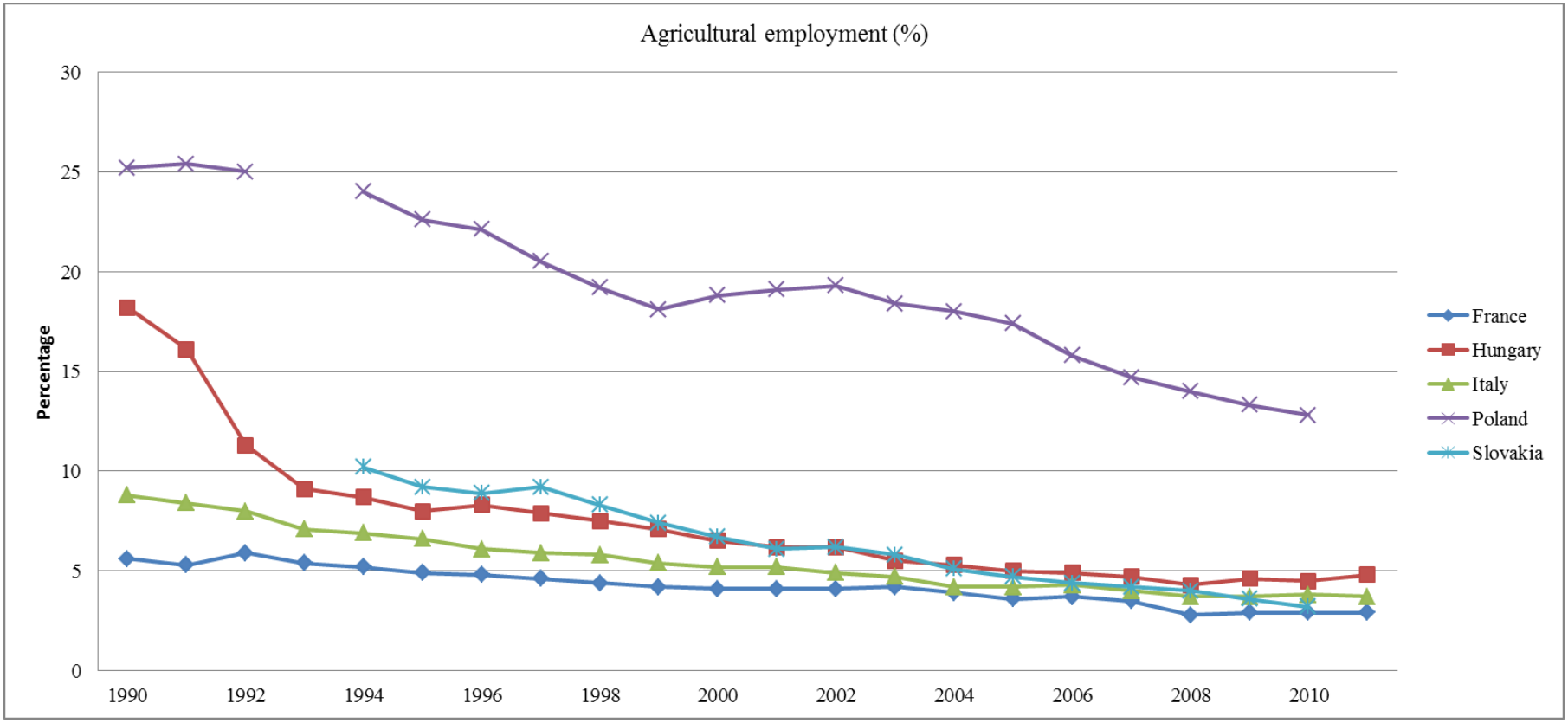
→ 'trapped' in agriculture?

- Selection bias: non-random sample and unobservable characteristics (Heckman, 1979)
  - Establish a first occupational match in agriculture and then exit the sector

# Trends in Agricultural Employment



- Fast decline in the share of agricultural employment:

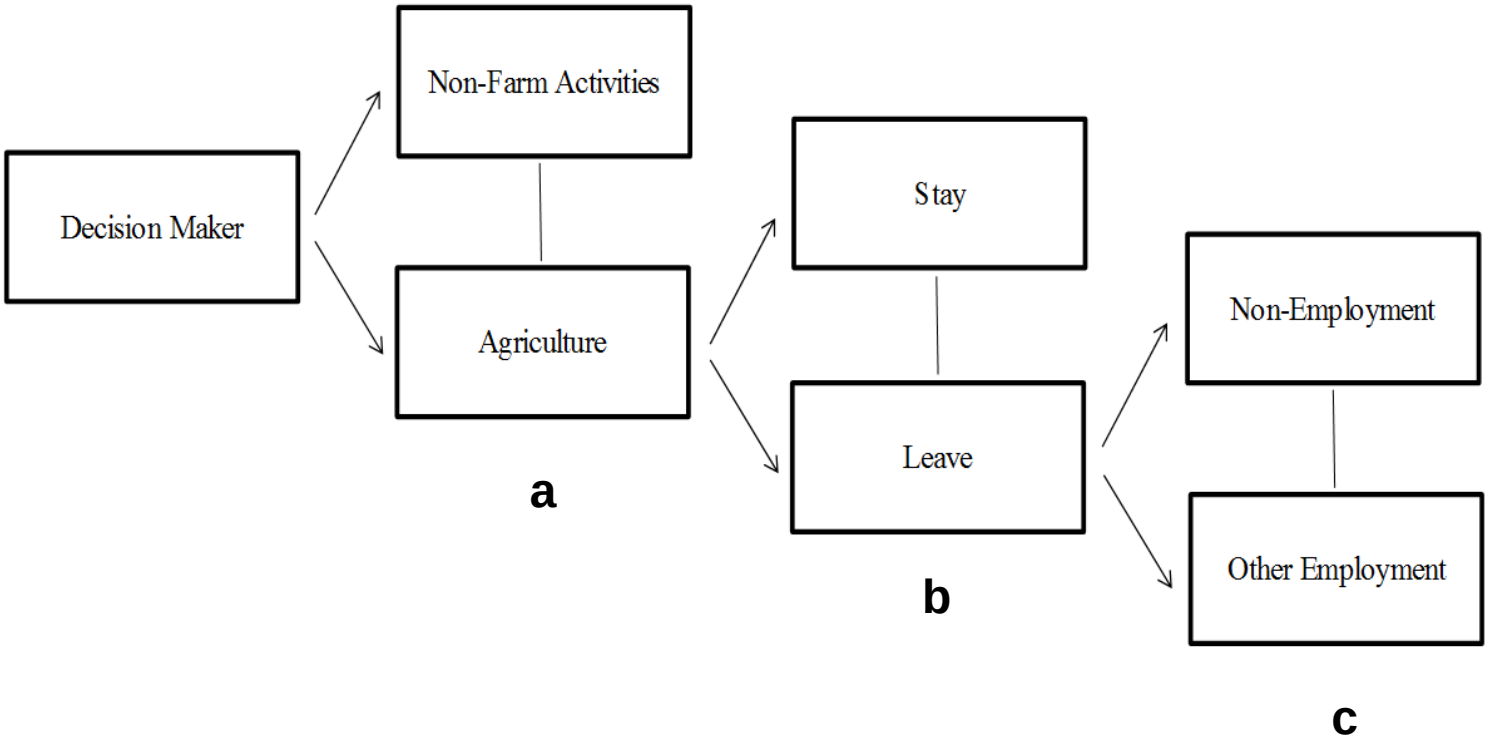



***Source:*** Own figure based on ILO data, KILM database.

# Decision Tree and Sample Frequencies



- Individuals are faced with the following labour decisions:




- Three sequential probits: a) working in agriculture; b) leaving agriculture; c) switching occupational sector (other employment)

# Decision Tree and Sample Frequencies



Table 1. Sample frequencies and shares of labour outcomes

| Country | Total employment | | Agricultural employment | | Exit agriculture | |
|---|---|---|---|---|---|---|
| | Non-farm | Agriculture | Stay | Leave | Non-employment | Other employment |
| France | 47,188 | 1,587 | 1,389 | 198 | 102 | 96 |
| | (96.7) | (3.3) | (87.5) | (12.5) | (51.5) | (48.5) |
| Hungary | 225,651 | 15,099 | 13,394 | 1,705 | 997 | 708 |
| | (93.7) | (6.3) | (88.7) | (11.3) | (58.5) | (41.5) |
| Italy | 499,394 | 24,536 | 21,585 | 2,951 | 1,653 | 1,298 |
| | (95.3) | (4.7) | (88.0) | (12.0) | (56.0) | (44.0) |
| Poland | 124,492 | 27,150 | 25,622 | 1,528 | 812 | 716 |
| | (82.1) | (17.9) | (94.4) | (5.6) | (53.1) | (46.9) |
| Slovakia | 92,486 | 4,565 | 4,149 | 416 | 275 | 141 |
| | (95.3) | (4.7) | (90.9) | (9.1) | (66.1) | (33.9) |

***Note:*** Numbers in brackets indicate shares of each sub-sample.

***Source:*** EU-LFS.

# Decision Tree and Sample Frequencies



Table 2. Sample transitions from the agricultural sector

| | France | | Hungary | | Italy | | Poland | | Slovakia | |
|---|---|---|---|---|---|---|---|---|---|---|
| Transitions | Freq. | % | Freq. | % | Freq. | % | Freq. | % | Freq. | % |
| **Stays in agriculture** | **1,389** | **87.52** | **13,394** | **88.71** | **21,585** | **87.97** | **25,622** | **94.37** | **4,149** | **90.89** |
| **To other sectors** | **96** | **6.05** | **708** | **4.69** | **1,298** | **5.29** | **716** | **2.64** | **141** | **3.09** |
| Industry | 24 | 1.51 | 368 | 2.44 | 511 | 2.08 | 427 | 1.57 | 84 | 1.84 |
| Services | 72 | 4.54 | 340 | 2.25 | 787 | 3.21 | 289 | 1.06 | 57 | 1.25 |
| **To non-employment** | **102** | **6.43** | **997** | **6.60** | **1,653** | **6.74** | **812** | **2.99** | **275** | **6.02** |
| Unemployment | 46 | 2.90 | 350 | 2.32 | 308 | 1.26 | 143 | 0.53 | 136 | 2.98 |
| Inactivity | 56 | 3.53 | 647 | 4.29 | 1,345 | 5.48 | 669 | 2.46 | 139 | 3.04 |
| Total | 1,587 | 100 | 15,099 | 100 | 24,536 | 100 | 27,150 | 100 | 4,565 | 100 |

***Note:*** Frequencies and percentages refer to transitions based on the agricultural sample.

***Source:*** EU-LFS.

# Empirical Methodology



- Approach: 3-step multivariate probit with selection
- Observed binary outcomes:

$$y_j^{agriempl} = (x_j\beta + u_{1j} > 0) \quad \text{selection into agricultural employment} \quad (1)$$

$$y_j^{leave} = (w_j\Upsilon + u_{2j} > 0) \quad \text{selection into leaving agriculture} \quad (2)$$

$$y_j^{otherempl} = (z_j\delta + u_{3j} > 0) \quad \text{outcome for switching occupational sector} \quad (3)$$

where $y_j^{leave} > 0$ if $y_j^{agriempl} = 1$ and missing otherwise; and $y_j^{otherempl} > 0$ if $y_j^{leave} = 1$ (and thus $y_j^{agriempl} = 1$) and missing otherwise.

# Data and Samples



- Dataset:
  - EU-LFS micro-data, expanded with:
    - Eurostat New Cronos Database - NUTS2 regions
    - Farm Structure Survey (FSS) - NUTS2 regions
- Pooled-cross section of consecutive years: 2003-08
  - Two consecutive periods: t and t-1
  - Pooled LFS: 2004, 2006, 2008
- 3 Sub-samples (3 dependent variables):
  - People in total employment (agri employment=1)
  - People in agricultural employment (leave=1)
  - People who exit agriculture (other employment=1)

# Variables for Empirical Estimation

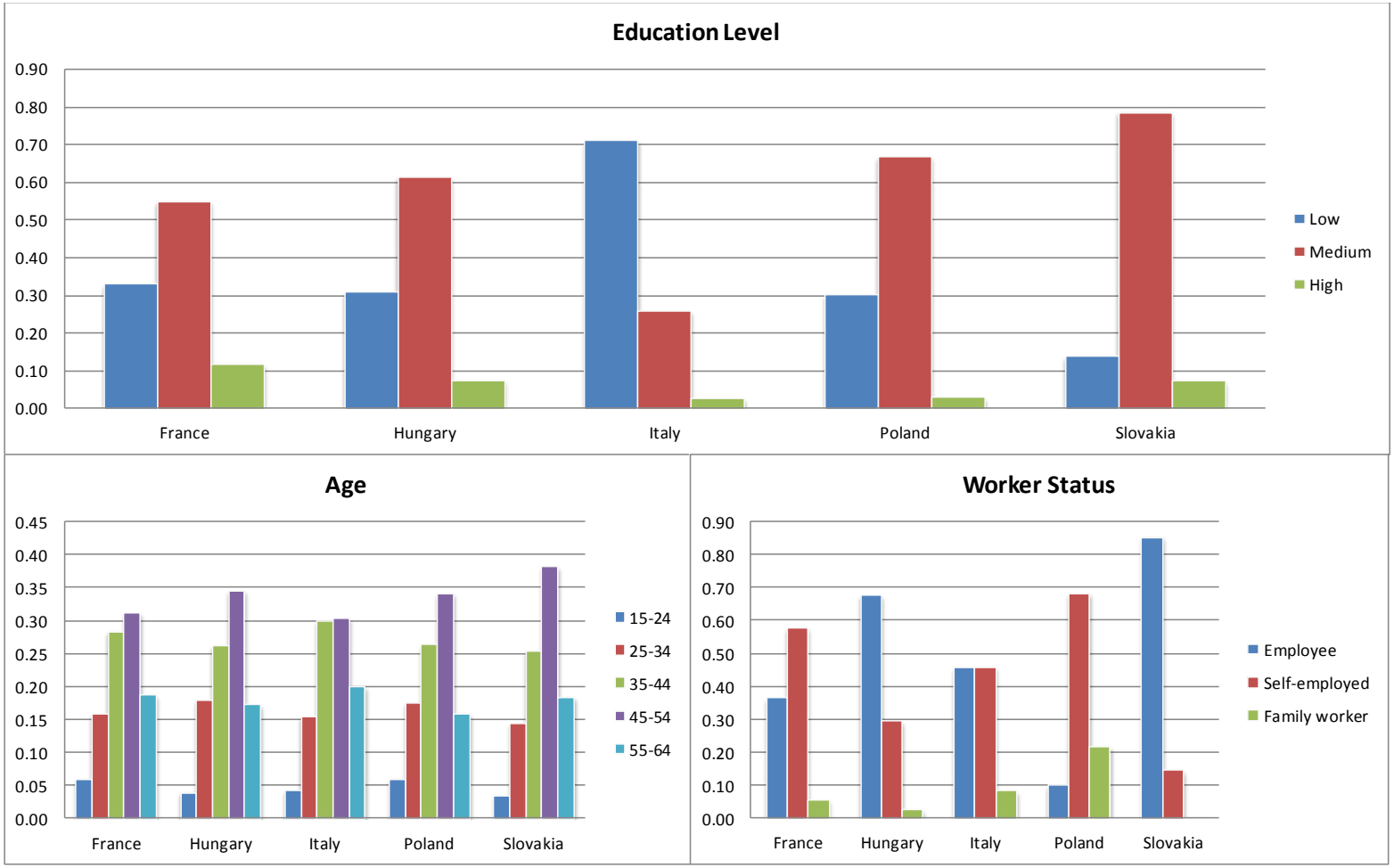


- Covariates:
  - gender, age, educational level, field of education, marital status, children, professional status (EU-LFS)
  - population density, unemployment rate, wage ratio, labour ratio (NUTS2 regions, Eurostat New Cronos)
  - full-time agricultural labour, agricultural area, farm size, production structure (NUTS2 regions, FSS)

- Exclusion restrictions:
  - Prob (agri employment) → field of education
  - Prob (leave) → regional farm indicators (farm size, production system, full-time agricultural labour)

# Some Descriptive Statistics

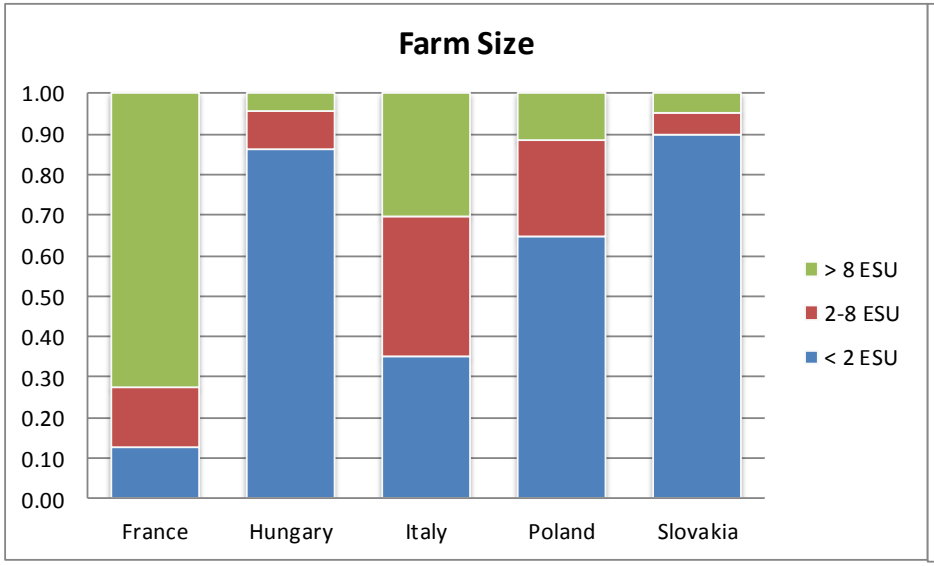


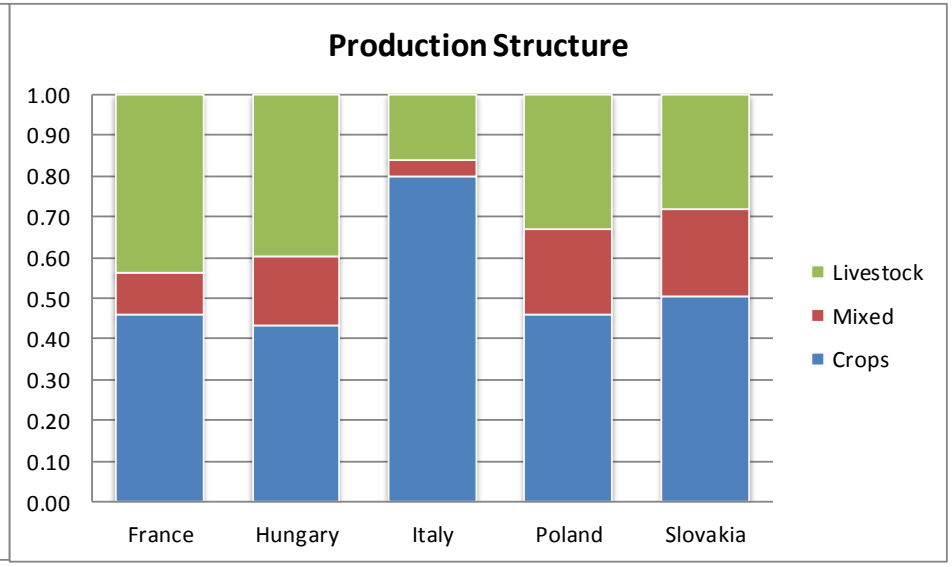



***Source:*** Own figure based on the EU-LFS.

# Some Descriptive Statistics






***Source:*** Own figure based on the EU-LFS.

# Estimation Results



- The estimation results in the next tables provide an answer to the following research questions:
  - What is the ‘best bundle’ of characteristics to establish a first occupational match and work in agriculture?
  - What are the determinants to dissolve the match and thus leave the agricultural sector?
  - What are the differences of those who switch occupational sector from those who retire or become unemployed?

Table 3. Determinants of agricultural employment

| Variable | France | Hungary | Italy | Poland | Slovakia |
|---|---|---|---|---|---|
| **Male** | 0.102** | 0.425*** | -0.003 | 0.026 | 0.368*** |
| **Married** | 0.002 | 0.008 | 0.026*** | -0.133*** | -0.015 |
| **Age 15-24** | 0.181*** | -0.268*** | -0.053*** | -0.027 | -0.480*** |
| **Age 25-34** | 0.068 | -0.206*** | -0.086*** | -0.056*** | -0.405*** |
| **Age 35-44** | 0.063 | -0.063*** | -0.039*** | -0.041*** | -0.181*** |
| **Age 55-64** | -0.020 | 0.054*** | 0.070*** | 0.048** | 0.035 |
| **Low education** | 0.443*** | 0.332 | 0.408*** | 0.528*** | 0.522*** |
| **High education** | -0.325*** | -0.350*** | -0.488*** | -0.811*** | -0.353*** |
| **General** | 0.168 | -0.237 | -0.244*** | -0.857*** | -0.300 |
| **Teacher training & education science** | 0.171 | -0.713** | -0.370*** | -0.673*** | -0.982*** |
| **Humanities, languages & arts** | -0.159* | -0.797** | -0.196*** | -1.110*** | -0.755*** |
| **Social sciences, business & law** | 0.051 | -0.302 | -0.212*** | -0.697*** | -0.191 |
| **Sciences, maths & computer** | 0.029 | -0.499 | -0.165*** | -0.580*** | -0.409* |
| **Engineer, manufacturing & construction** | | -0.236 | -0.142*** | -0.417*** | -0.217 |
| **Agriculture & veterinary** | 1.794*** | 0.951*** | 1.100*** | 0.586*** | 0.982*** |
| **Health & welfare** | -0.455*** | -0.795** | -0.388*** | -1.371*** | -1.136*** |
| **Services** | -0.146 | -0.531* | -0.236*** | -0.432*** | -0.380* |
| **Children** | -0.143*** | -0.032** | -0.034*** | -0.007 | 0.047** |
| **Female with children** | 0.103 | 0.063*** | 0.095*** | 0.265*** | -0.019 |
| **Self-employed** | 1.296*** | 0.704*** | 0.573*** | 2.091*** | 0.108*** |
| **Family worker** | 1.874*** | 1.548*** | 1.083*** | 3.036*** | 0.363 |
| **Population density** | 0.001* | -0.001 | -0.000*** | -0.002*** | 0.005 |
| **Unemployment** | -0.020* | 0.027*** | 0.024*** | -0.015*** | 0.034 |
| **Wage ratio** | -0.030** | -0.212*** | -0.016*** | 0.028*** | -0.268 |
| **Labour ratio** | -0.007*** | -0.005* | -0.005*** | -0.009** | -0.016 |
| **Farm size <2 ESU** | 0.571 | 1.556 | -0.585*** | -0.589*** | -5.294 |
| **Farm size >8 ESU** | 2.605*** | 10.995** | 0.247*** | -0.192 | -11.506 |
| **Agricultural area** | -1.091* | 0.914*** | 0.188*** | 2.008*** | -0.301 |
| **Full-time agricultural labour** | -1.155** | -0.011 | -1.119*** | -1.784*** | -13.299 |
| **Livestock production** | 0.474*** | 1.690*** | 0.478*** | 0.616*** | -0.423 |
| **Mixed production** | -1.764*** | 1.318** | 0.741*** | -0.072 | 0.094 |
| **Year 2005-6** | | -0.077* | 0.007 | -0.190*** | -0.175 |
| **Year 2007-8** | -0.064* | -0.202*** | 0.009 | -0.405*** | |
| **Constant** | -2.500*** | -4.575*** | -1.861*** | -2.231*** | 4.131 |
| **Number of observations** | **48.775** | **240.750** | **523.930** | **151.642** | **97.051** |

Table 4. Determinants of leaving agriculture

| Variable | France | Hungary | Italy | Poland | Slovakia |
|---|---|---|---|---|---|
| **Male** | -0.182 | -0.032 | -0.399*** | -0.021 | -0.131 |
| **Married** | 0.229** | -0.108*** | -0.083*** | -0.167*** | -0.202*** |
| **Age 15-24** | 0.628*** | 0.268*** | 0.257*** | 0.512*** | 0.193 |
| **Age 25-34** | 0.342** | 0.263*** | 0.076** | 0.305*** | 0.454*** |
| **Age 35-44** | 0.152 | 0.084** | -0.011 | 0.060 | 0.248*** |
| **Age 55-64** | 0.760*** | 0.482*** | 0.365*** | 0.677*** | 0.687*** |
| **Low education** | 0.177* | 0.288*** | -0.017 | 0.015 | 0.305*** |
| **High education** | -0.051 | 0.057 | 0.314*** | -0.061 | -0.314*** |
| **Children** | -0.205 | -0.020 | 0.019 | 0.029 | -0.047 |
| **Female with children** | 0.197 | 0.084 | -0.051 | 0.017 | 0.368*** |
| **Self-employed** | -0.558*** | -0.457*** | -0.538*** | -0.404*** | -0.381*** |
| **Family worker** | | -0.142 | -0.515*** | -0.206* | |
| **Population density** | 0.002 | 0.001 | -0.000*** | -0.000 | -0.002 |
| **Unemployment** | 0.004 | 0.065*** | 0.008 | 0.025*** | 0.036 |
| **Wage ratio** | -0.016 | -0.204 | -0.008 | 0.002 | -0.771 |
| **Labour ratio** | -0.007 | -0.002 | 0.001 | 0.004 | 0.053 |
| **Farm size <2 ESU** | -1.208 | 10.506** | -0.616** | -1.107** | -15.379 |
| **Farm size >8 ESU** | -1.143 | 19.224 | -0.299 | -1.687*** | -4.044 |
| **Agricultural area** | -0.178 | 1.935*** | 0.218** | 0.688 | -0.868 |
| **Full-time agricultural labour** | -0.324 | 13.351** | -1.061*** | -0.731 | 32.310 |
| **Livestock production** | -0.045 | -1.376** | 0.583*** | -0.083 | -3.143 |
| **Mixed production** | 0.661 | 3.107* | 0.831 | -0.656 | 15.626 |
| **Year 2005-6** | | -0.017 | 0.152*** | -0.039 | -0.298 |
| **Year 2007-8** | 0.240** | 0.014 | 0.143*** | 0.155 | |
| **Constant** | -0.567 | -13.782*** | -1.394*** | -1.423* | 9.165 |
| **Lambda** | 0.301*** | 0.304*** | 0.398*** | 0.235*** | 0.200*** |
| **Number of observations** | **1.496** | **15.099** | **24.536** | **27.150** | **4.562** |

Table 5. Determinants of switching occupational sector

| Variable | France | Hungary | Italy | Poland | Slovakia |
|---|---|---|---|---|---|
| **Male** | -0.208 | 0.152 | 0.877*** | 0.567*** | 0.270 |
| **Married** | 0.002 | 0.191** | 0.077 | 0.463*** | 0.354 |
| **Age 15-24** | 0.237 | -0.138 | -0.451*** | -0.647*** | 0.212 |
| **Age 25-34** | -1.049** | 0.179 | -0.122 | -0.046 | 0.157 |
| **Age 35-44** | -0.249 | 0.099 | 0.014 | 0.407*** | 0.173 |
| **Age 55-64** | -1.403** | -1.322*** | -1.113*** | -2.913*** | -1.400*** |
| **Low education** | -0.349 | -0.629*** | -0.532*** | -0.237** | -0.166 |
| **High education** | -0.342 | 0.009 | 0.103 | 0.212 | 0.591 |
| **Children** | 0.021 | 0.109 | 0.152* | 0.006 | 0.423* |
| **Female with children** | 0.004 | -0.828*** | -0.347*** | 0.004 | -0.808* |
| **Self-employed** | -0.095 | 0.687*** | 0.674*** | 1.776*** | -1.333*** |
| **Family worker** | | 0.547* | 0.791** | 1.805*** | |
| **Population density** | 0.002 | -0.001 | 0.000 | 0.004*** | -0.016 |
| **Unemployment** | -0.137** | -0.094*** | -0.067*** | -0.019 | -0.147 |
| **Wage ratio** | 0.019 | 0.502* | 0.051** | -0.019 | 1.332** |
| **Labour ratio** | -0.005 | -0.010 | 0.008** | -0.075*** | 0.030 |
| **Agricultural area** | -0.226 | -1.320** | 0.086 | -1.071 | 0.318 |
| **Year 2005-6** | | -0.179 | 0.388*** | 0.022 | 0.101 |
| **Year 2007-8** | -0.271 | -0.286* | 0.133 | 0.620* | -0.515 |
| **Constant** | 1.702 | 2.934*** | 1.101** | 3.715* | 0.674 |
| **Lambda 2** | 0.394 | -1.061*** | -0.892** | -2.122*** | 0.120 |
| **Number of observations** | **198** | **1,705** | **2,951** | **1,528** | **416** |

# Conclusions



- Overall, the largest labour outflows from agriculture are associated with the retirement of people
- Self-employed and family workers are generally less likely to leave agriculture
- Low levels of education represent important constraints for entering non-farm employment
- Higher population density, lower unemployment, higher non-farm wages and higher non-farm employment are all positively associated with movements to other occupational sectors
- Farm characteristics, captured by the diverse organisational and production structures, are found to have mixed results on explaining outflows of agricultural labour across MS

# Some Policy Implications



- Investments in human capital
  - Broaden agricultural education to improve transferable skills
- Creation of accessible jobs in rural areas

→ Improve factor mobility for better functioning of labour markets

## *Table A.1. Definitions of variables*

| Variable | Definition | Source |
|---|---|---|
| Male | 1 = male; 0 = female | EU-LFS |
| Married | 1 = married; 0 = otherwise | EU-LFS |
| Age | Five dummies for different age bands: 15-24, 25-34, 35-44, 45-54, 55-64 | EU-LFS |
| Education level | Three dummies (ISCED classification): low (lower secondary), medium (upper secondary), high (tertiary) | EU-LFS |
| Education field | Dummies for highest field of education or training successfully completed: a)general programmes; b)teacher training and education science; c)humanities, languages and arts, foreign languages; d) social sciences, business and law; e) sciences (life science and physical science), mathematics and statistics, computing (computer science and computer use); f) engineering, manufacturing and construction; g) agriculture and veterinary; h) health and welfare; i) services; j) other fields; k) only lower secondary | EU-LFS |
| Children | 1 = Presence of children <15 years; 0 otherwise | EU-LFS |
| Female with children | Interaction of: Female*Children | EU-LFS |
| Professional status | Three dummies: employee, self-employed, family worker | EU-LFS |
| Population density | Inhabitants per km2 (NUTS2 region) | Eurostat New Cronos |
| Unemployment | Unemployment rate (%) (NUTS2 region) | Eurostat New Cronos |
| Wage ratio | Average compensation per employee in non-agriculture relative to the average compensation per employee in agriculture (NUTS2 region) | Eurostat New Cronos |
| Labour ratio | Number of people employed in non-agriculture relative to the number in agriculture (NUTS2 region) | Eurostat New Cronos |
| Farm size | Three dummies for the economic size of farms (standard gross margin) as a share of total holdings (NUTS2 region): <2 ESU, 2-8 ESU, >8 ESU | FSS- Eurostat |
| Agricultural area | Utilised agricultural area (UUA) over total area (hectares) (NUTS2 region) | FSS- Eurostat |
| Full-time agricultural labour | Share of total family labour force full-time employed in agriculture over total family labour force in agriculture (NUTS2 region) | FSS- Eurostat |
| Production structure | Three dummies for typology of farming system (based on standard gross margin) as a share of total holdings (NUTS2 region): crop production, livestock production, mixed production | FSS- Eurostat |
| Years | Three dummies for years of analysis: 2003-04, 2005-06, 2007-08 | EU-LFS |

*Table A.2. Descriptive statistics of the total sample*

| | France (N = 48,775) | | Hungary (N = 240,750) | | Italy (N = 523,930) | | Poland (N= 151,642) | | Slovakia (N = 97,051) | |
|---|---|---|---|---|---|---|---|---|---|---|
| Variable | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Dependent = agricultural employment | 0.03 | 0.18 | 0.06 | 0.24 | 0.05 | 0.21 | 0.18 | 0.38 | 0.05 | 0.21 |
| Male | 0.53 | 0.50 | 0.54 | 0.50 | 0.60 | 0.49 | 0.54 | 0.50 | 0.56 | 0.50 |
| Married | 0.52 | 0.50 | 0.61 | 0.49 | 0.65 | 0.48 | 0.74 | 0.44 | 0.69 | 0.46 |
| Age 15-24 | 0.07 | 0.25 | 0.06 | 0.24 | 0.05 | 0.22 | 0.07 | 0.26 | 0.07 | 0.26 |
| Age 25-34 | 0.24 | 0.43 | 0.25 | 0.43 | 0.21 | 0.41 | 0.26 | 0.44 | 0.25 | 0.43 |
| Age 35-44 | 0.28 | 0.45 | 0.26 | 0.44 | 0.32 | 0.47 | 0.27 | 0.44 | 0.27 | 0.44 |
| Age 45-54 | 0.28 | 0.45 | 0.30 | 0.46 | 0.29 | 0.45 | 0.30 | 0.46 | 0.30 | 0.46 |
| Age 55-64 | 0.13 | 0.34 | 0.13 | 0.33 | 0.13 | 0.34 | 0.10 | 0.30 | 0.11 | 0.32 |
| Low education | 0.26 | 0.44 | 0.15 | 0.36 | 0.40 | 0.49 | 0.11 | 0.31 | 0.05 | 0.21 |
| Middle education | 0.45 | 0.50 | 0.66 | 0.47 | 0.45 | 0.50 | 0.68 | 0.46 | 0.79 | 0.41 |
| High education | 0.30 | 0.46 | 0.18 | 0.39 | 0.15 | 0.36 | 0.21 | 0.40 | 0.16 | 0.37 |
| General | 0.01 | 0.09 | 0.08 | 0.27 | 0.04 | 0.19 | 0.07 | 0.26 | 0.04 | 0.20 |
| Teacher training & education science | 0.01 | 0.08 | 0.06 | 0.23 | 0.03 | 0.18 | 0.04 | 0.20 | 0.04 | 0.21 |
| Humanities, languages & arts | 0.06 | 0.24 | 0.01 | 0.11 | 0.05 | 0.21 | 0.02 | 0.15 | 0.01 | 0.12 |
| Social sciences, business & law | 0.24 | 0.43 | 0.15 | 0.36 | 0.18 | 0.38 | 0.13 | 0.34 | 0.15 | 0.36 |
| Sciences, maths & computer | 0.06 | 0.23 | 0.02 | 0.12 | 0.04 | 0.19 | 0.04 | 0.19 | 0.02 | 0.13 |
| Engineer, manufacturing & construction | 0.22 | 0.42 | 0.39 | 0.49 | 0.15 | 0.35 | 0.35 | 0.48 | 0.49 | 0.50 |
| Agriculture & veterinary | 0.03 | 0.17 | 0.04 | 0.19 | 0.02 | 0.13 | 0.08 | 0.27 | 0.06 | 0.24 |
| Health & welfare | 0.07 | 0.26 | 0.05 | 0.21 | 0.03 | 0.18 | 0.04 | 0.19 | 0.05 | 0.21 |
| Services | 0.04 | 0.19 | 0.06 | 0.24 | 0.03 | 0.16 | 0.11 | 0.31 | 0.08 | 0.28 |
| Other | 0.00 | 0.00 | 0.00 | 0.01 | 0.05 | 0.22 | 0.00 | 0.04 | 0.00 | 0.04 |
| None | 0.26 | 0.44 | 0.15 | 0.36 | 0.40 | 0.49 | 0.11 | 0.31 | 0.05 | 0.21 |
| Children | 0.40 | 0.49 | 0.33 | 0.47 | 0.38 | 0.49 | 0.45 | 0.50 | 0.36 | 0.48 |
| Female with children | 0.19 | 0.39 | 0.14 | 0.34 | 0.15 | 0.35 | 0.20 | 0.40 | 0.15 | 0.36 |
| Employee | 0.90 | 0.30 | 0.88 | 0.32 | 0.75 | 0.43 | 0.74 | 0.44 | 0.88 | 0.32 |
| Self-employed | 0.10 | 0.30 | 0.11 | 0.32 | 0.23 | 0.42 | 0.21 | 0.41 | 0.12 | 0.32 |
| Family worker | 0.01 | 0.07 | 0.00 | 0.06 | 0.02 | 0.13 | 0.04 | 0.21 | 0.00 | 0.02 |
| Population density | 271.53 | 328.99 | 157.71 | 136.12 | 222.22 | 120.31 | 138.59 | 80.22 | 128.29 | 64.57 |
| Unemployment | 8.46 | 1.77 | 7.39 | 2.46 | 7.01 | 4.58 | 13.86 | 4.57 | 14.21 | 5.78 |
| Wage ratio | 4.32 | 1.65 | 1.86 | 0.38 | 3.71 | 1.82 | 10.58 | 6.36 | 1.44 | 0.31 |
| Labour ratio | 67.17 | 85.01 | 30.21 | 26.64 | 28.06 | 16.37 | 7.24 | 6.20 | 25.71 | 18.30 |
| Farm size <2 ESU | 0.12 | 0.06 | 0.88 | 0.04 | 0.34 | 0.09 | 0.67 | 0.13 | 0.90 | 0.02 |
| Farm size 2-8 ESU | 0.14 | 0.05 | 0.08 | 0.03 | 0.33 | 0.07 | 0.22 | 0.07 | 0.06 | 0.01 |
| Farm size >8 ESU | 0.74 | 0.09 | 0.04 | 0.01 | 0.33 | 0.12 | 0.12 | 0.08 | 0.05 | 0.01 |
| Agricultural area | 0.95 | 0.05 | 0.68 | 0.09 | 0.70 | 0.14 | 0.85 | 0.04 | 0.77 | 0.27 |
| Full-time agricultural labour | 0.43 | 0.07 | 0.04 | 0.02 | 0.20 | 0.12 | 0.15 | 0.06 | 0.03 | 0.01 |
| Crop production | 0.55 | 0.26 | 0.42 | 0.05 | 0.77 | 0.15 | 0.46 | 0.08 | 0.54 | 0.18 |
| Livestock production | 0.34 | 0.24 | 0.41 | 0.07 | 0.18 | 0.14 | 0.33 | 0.09 | 0.26 | 0.13 |
| Mixed production | 0.11 | 0.06 | 0.16 | 0.02 | 0.05 | 0.02 | 0.20 | 0.03 | 0.20 | 0.06 |
| Year 2003-4 | | | 0.12 | 0.33 | 0.11 | 0.32 | 0.02 | 0.14 | 0.11 | 0.31 |
| Year 2005-6 | 0.44 | 0.50 | 0.46 | 0.50 | 0.45 | 0.50 | 0.48 | 0.50 | 0.44 | 0.50 |
| Year 2007-8 | 0.56 | 0.50 | 0.42 | 0.49 | 0.44 | 0.50 | 0.50 | 0.50 | 0.45 | 0.50 |

# Model Prediction and Validity of Restrictions



- ✓ Likelihood-ratio and Wald Test provide support for the model
- ✓ Predicted probabilities close to sample frequencies
- ✓ Joint significance of exclusion restrictions
  - Exception: France for farm indicators
- ✓ Statistical significance of lambda in favour of selection mechanism
  - Exceptions: France and Slovakia in last outcome equation (Table 5)
  - Weak identification variables in this case