



Researchcentrum voor Onderwijs
en Arbeidsmarkt

Research Centre for Education
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Trends in stocks of those acquiring qualifications: Multilogit models based on LFS data

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Medium-term forecast of skills supply in
Europe: interim results

SKILLSNET TECHNICAL WORKSHOP

2-3 June 2008, Thessaloniki, Greece

WARWICK INSTITUTE *for*
EMPLOYMENT RESEARCH



Educational attainment: some theoretical considerations

- **Individual level:** Human Capital Theory, Screening, Credentialism
- **Aggregate level:** GDP growth, Returns to education etc.
- **Supply side variables:** gender, age, ethnic group, parents' education, family income, parent's occupation, social status

Classification of educational level: ISCED

- **Level 0:** Pre-Primary Education;
- **Level 1:** Primary Education or First Stage of Basic Education;
- **Level 2:** Lower Secondary or Second Stage of Basic Education;
- **Level 3:** Upper Secondary Education;
- **Level 4:** Post – Secondary, Non-Tertiary Education;
- **Level 5:** First Stage of Tertiary Education (not leading directly to research qualification);
- **Level 6:** Second Stage of Tertiary Education (leading to research qualification)

Data used: EU LFS micro data

- **General characteristics (age-group, gender)**
- **Labour market activity**
- **Information on first job**
- **Information on flexible working patterns**
- **Information on second job**
- **Information on previous employment**
- **Methods of looking for a job**
- **Education**

Level of education in EU LFS micro-data

- **ISCED 1D: aggregate level:**
 - (high, medium, and low)
- **ISCED 2D: detailed level**
 - (19 levels of education)

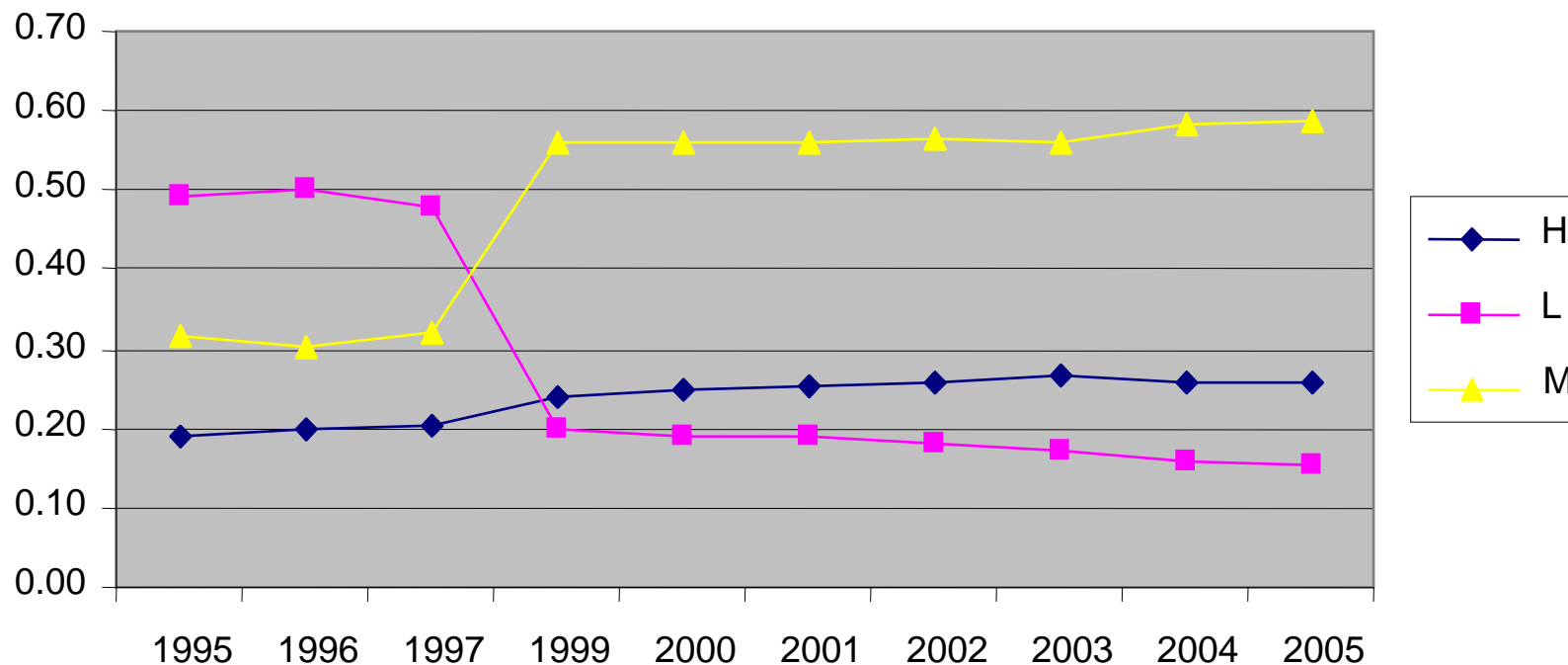
Level of education in EU LFS micro-data

ISCED2D

- No formal education or below ISCED 1
- ISCED 0-1
- ISCED 1
- ISCED 2
- ISCED2D
- ISCED 3c (shorter than 3 years)
- ISCED 3 (without distinction a,b or c possible, 3 y+)
- ISCED 3c (3 years or more)
- ISCED 3a,b
- ISCED 3c (3 years or more) or ISCED 4c
- ISCED 3b or ISCED 4b
- ISCED 3a or ISCED 4a
- ISCED 3 or 4 (without distinction a,b or c possible)
- ISCED 4a ,b
- ISCED 4c
- ISCED 4 (without distinction a, b or c possible)
- ISCED 5b
- ISCED 5a
- ISCED 6

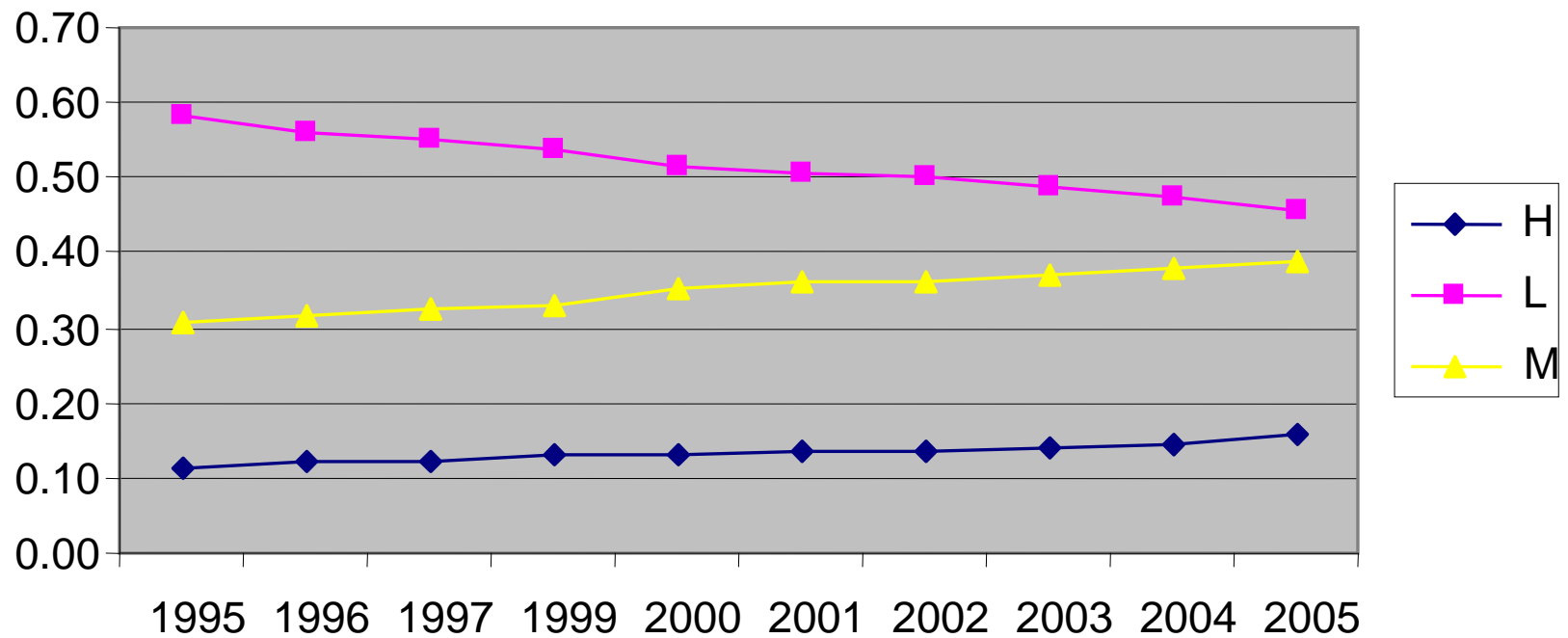
Exploring the data: Broad level, UK

Highest level of qualification in working age population, 1995-2005, UK



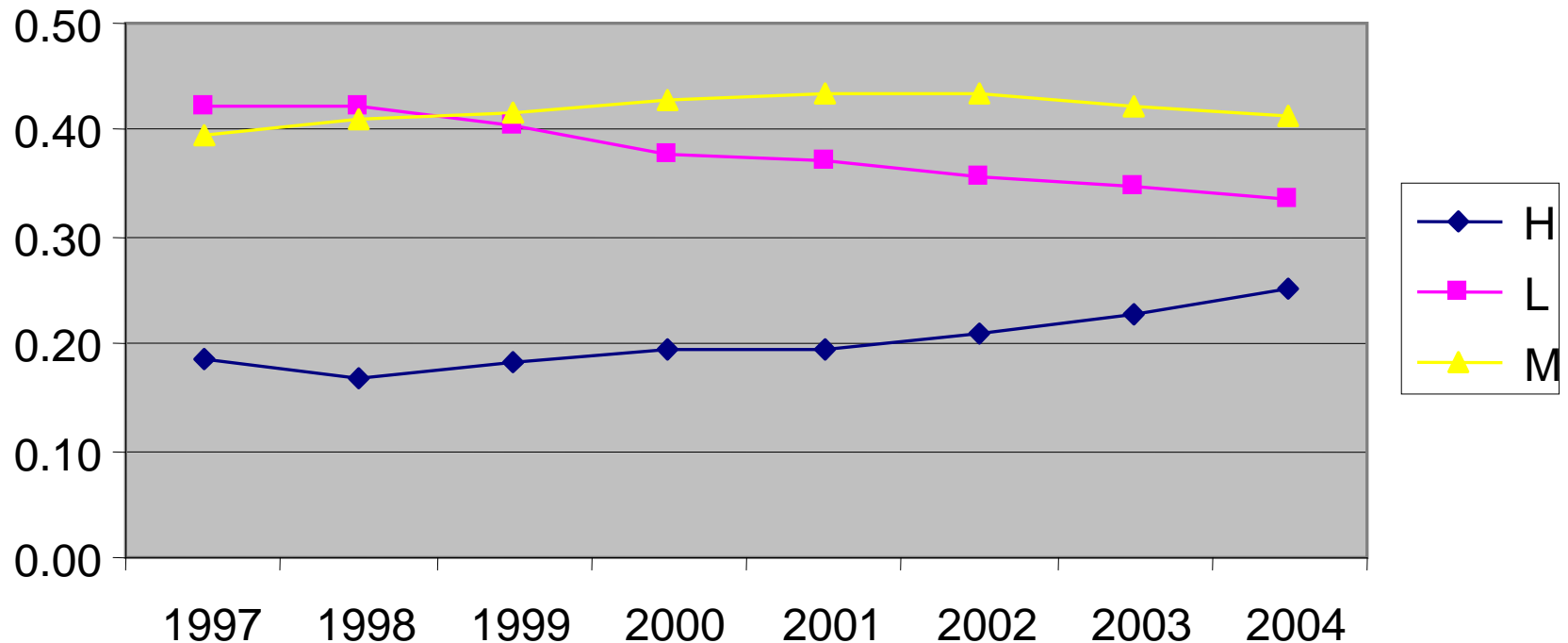
Exploring the data: Broad level, Greece

Highest level of qualification in working age population, 1995-2005, GREECE



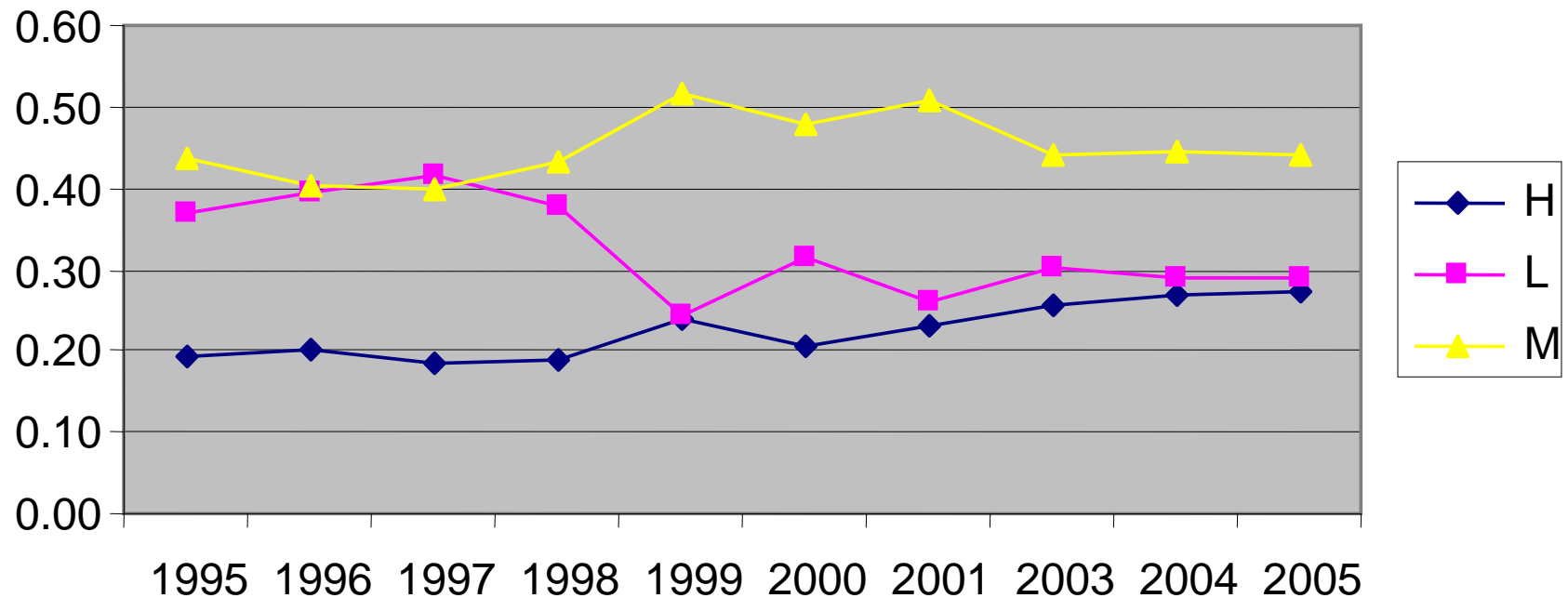
Exploring the data: Broad level, Netherlands

Highest level of qualification in working age population, 1995-2005, NETHERLANDS



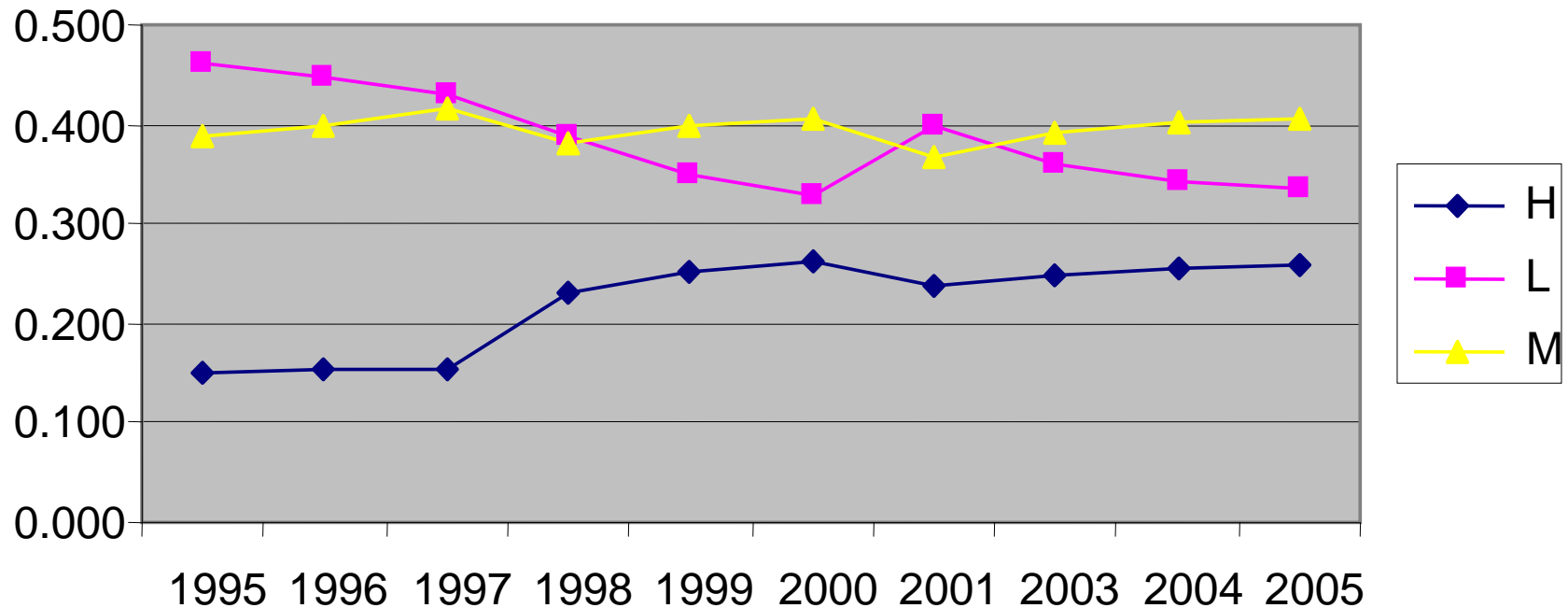
Exploring the data: Broad level, Denmark

Highest level of qualification 1995-2005, Denmark



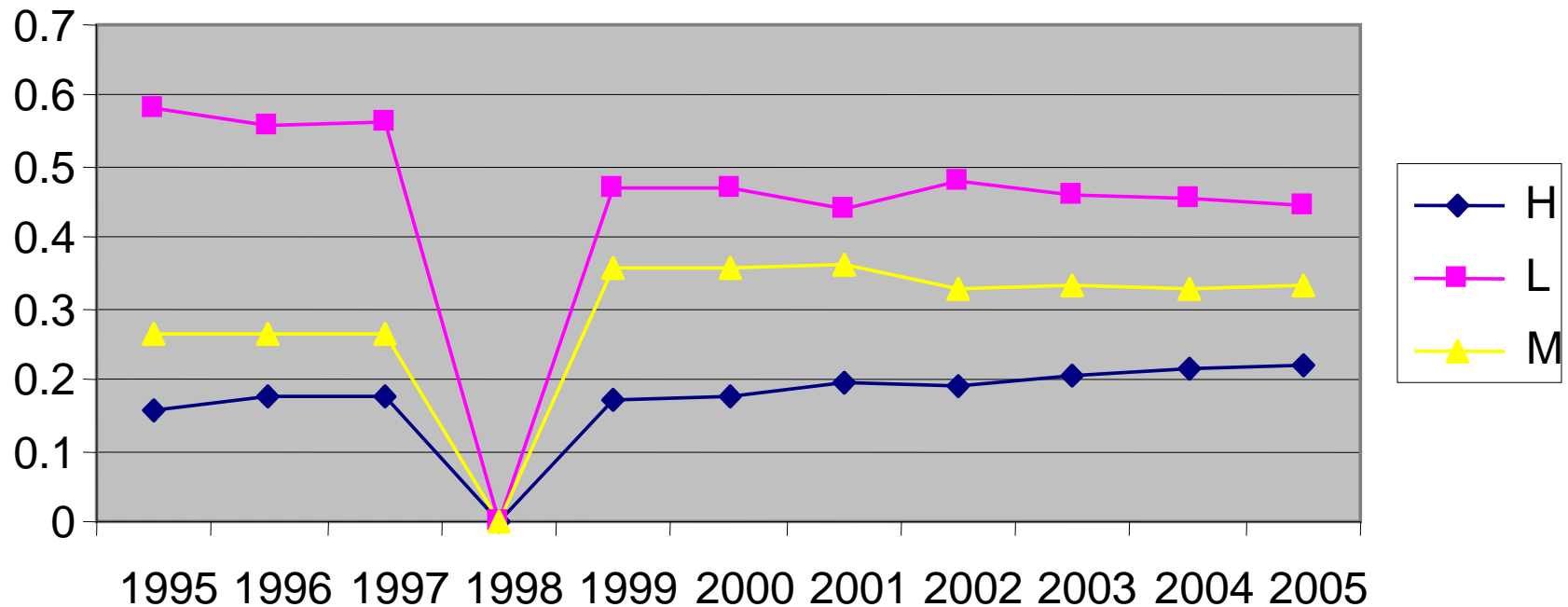
Exploring the data: Broad level, Finland

Highest level of qualification 1995-2005, Finland



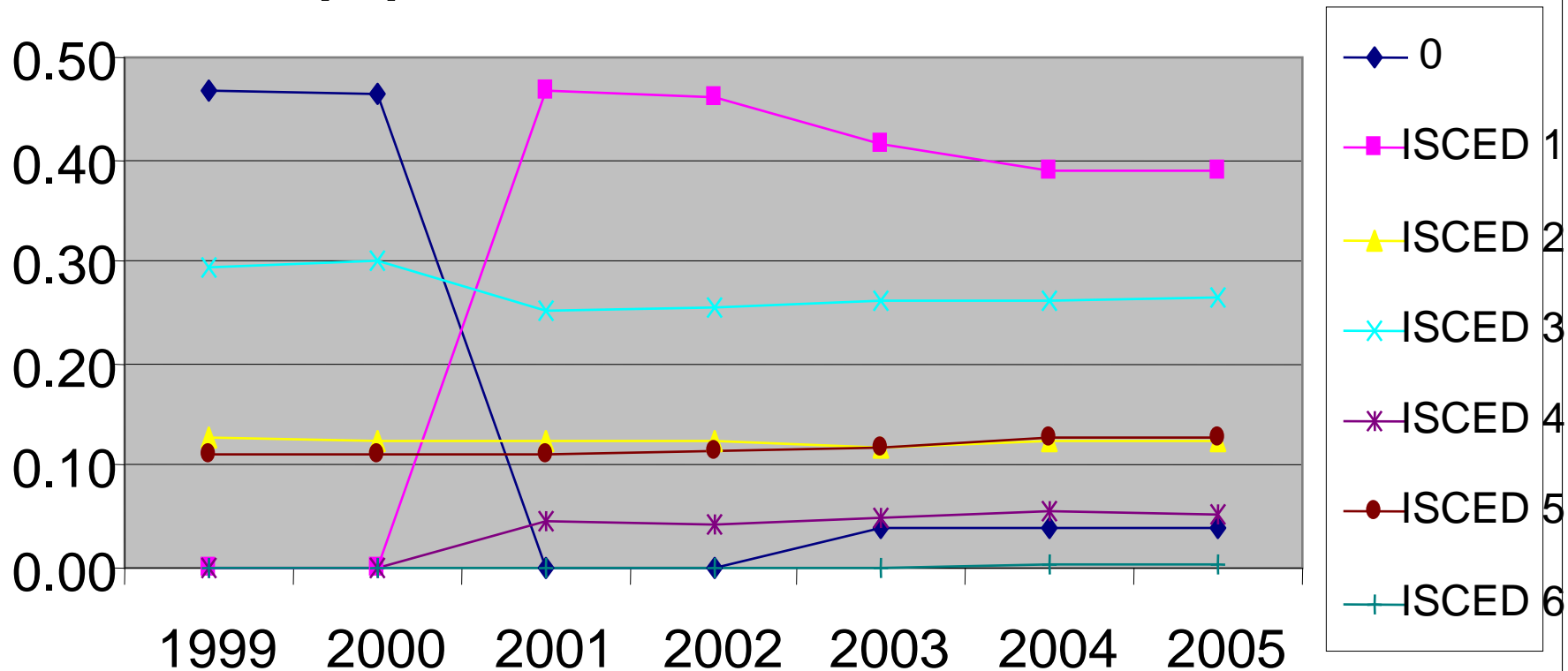
Exploring the data: Broad level, Ireland

Highest level of qualification 1995-2005, Ireland



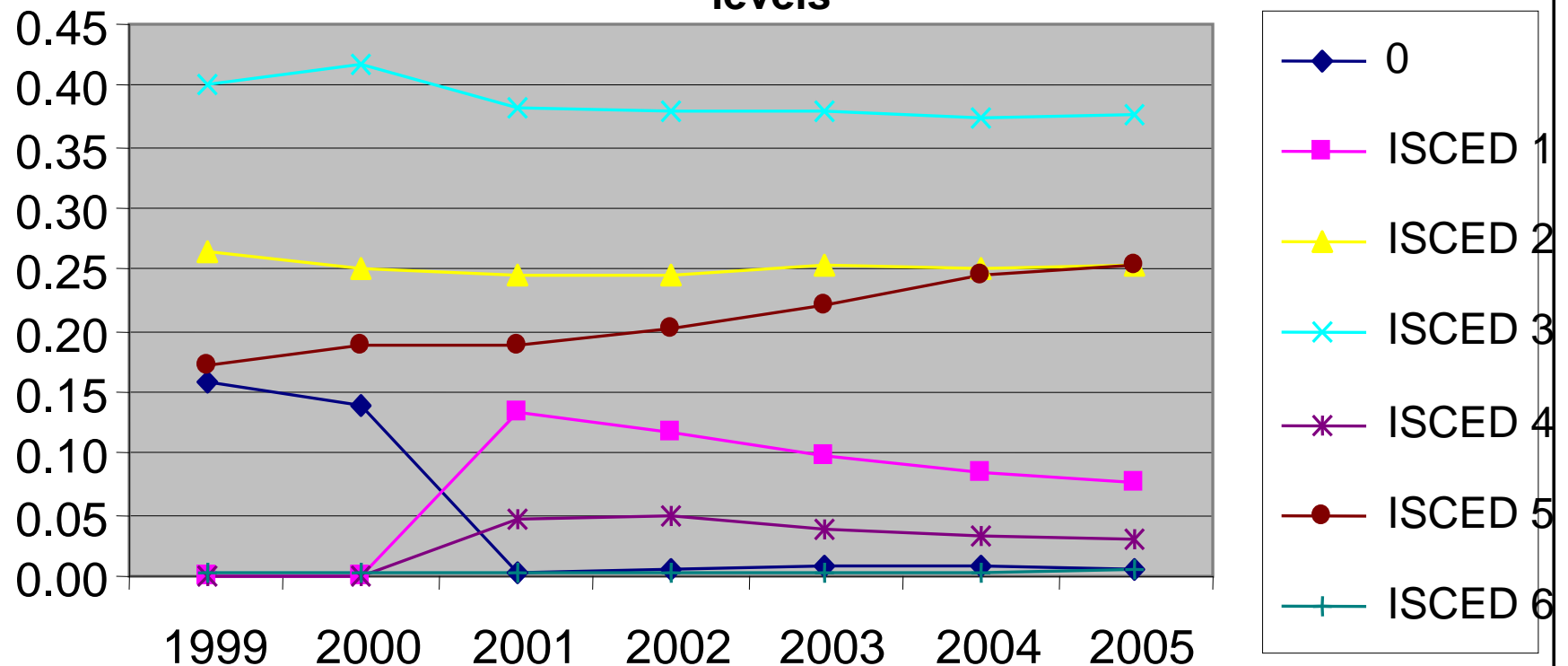
Looking at greater level of detail: Greece

GREECE Highest level of qualification in working age population, 1999-2005, detailed level



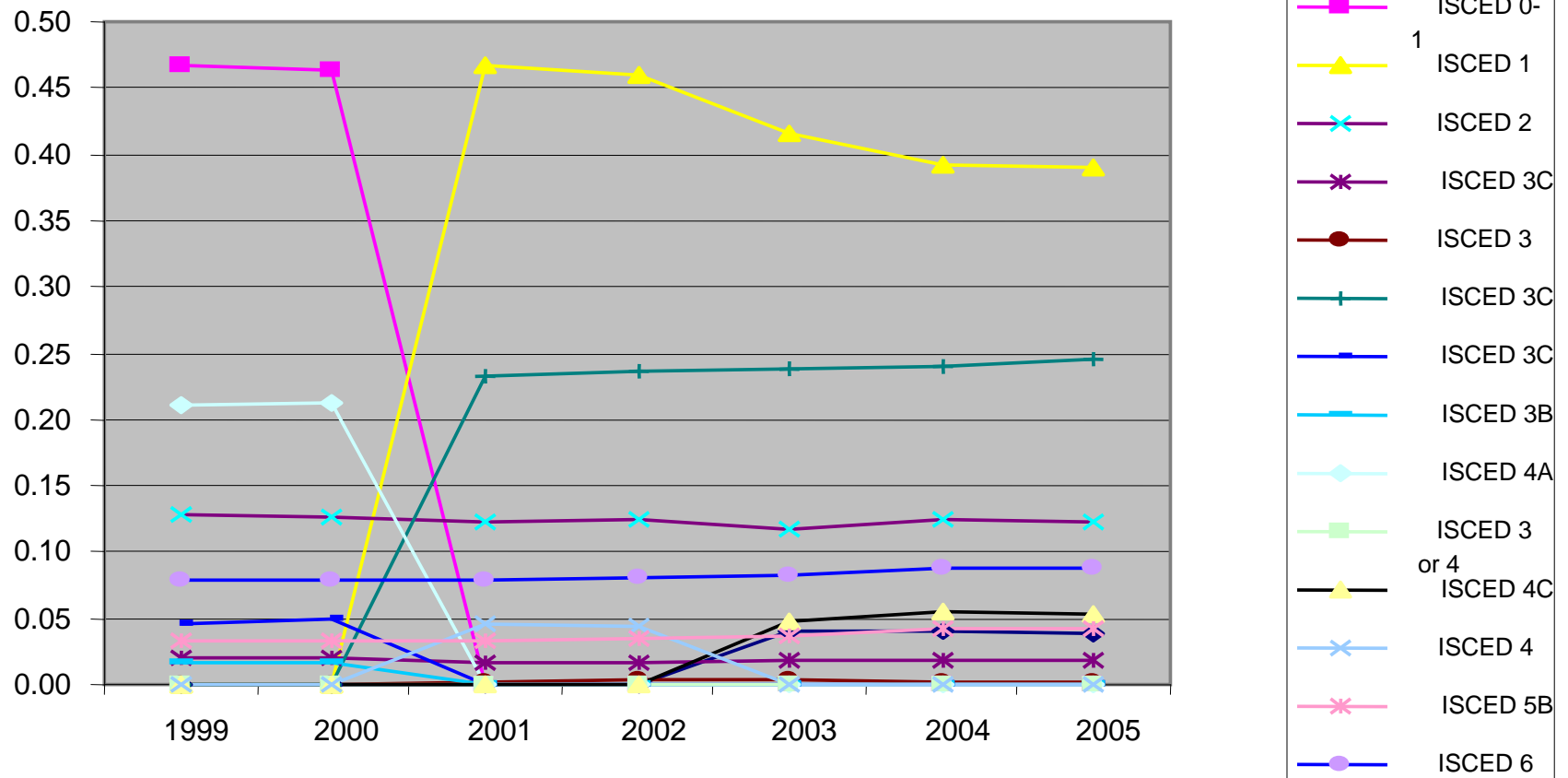
Looking at greater level of detail: Netherlands

NETHERLANDS Highest level of qualification in working age population, 1999-2005, detailed levels



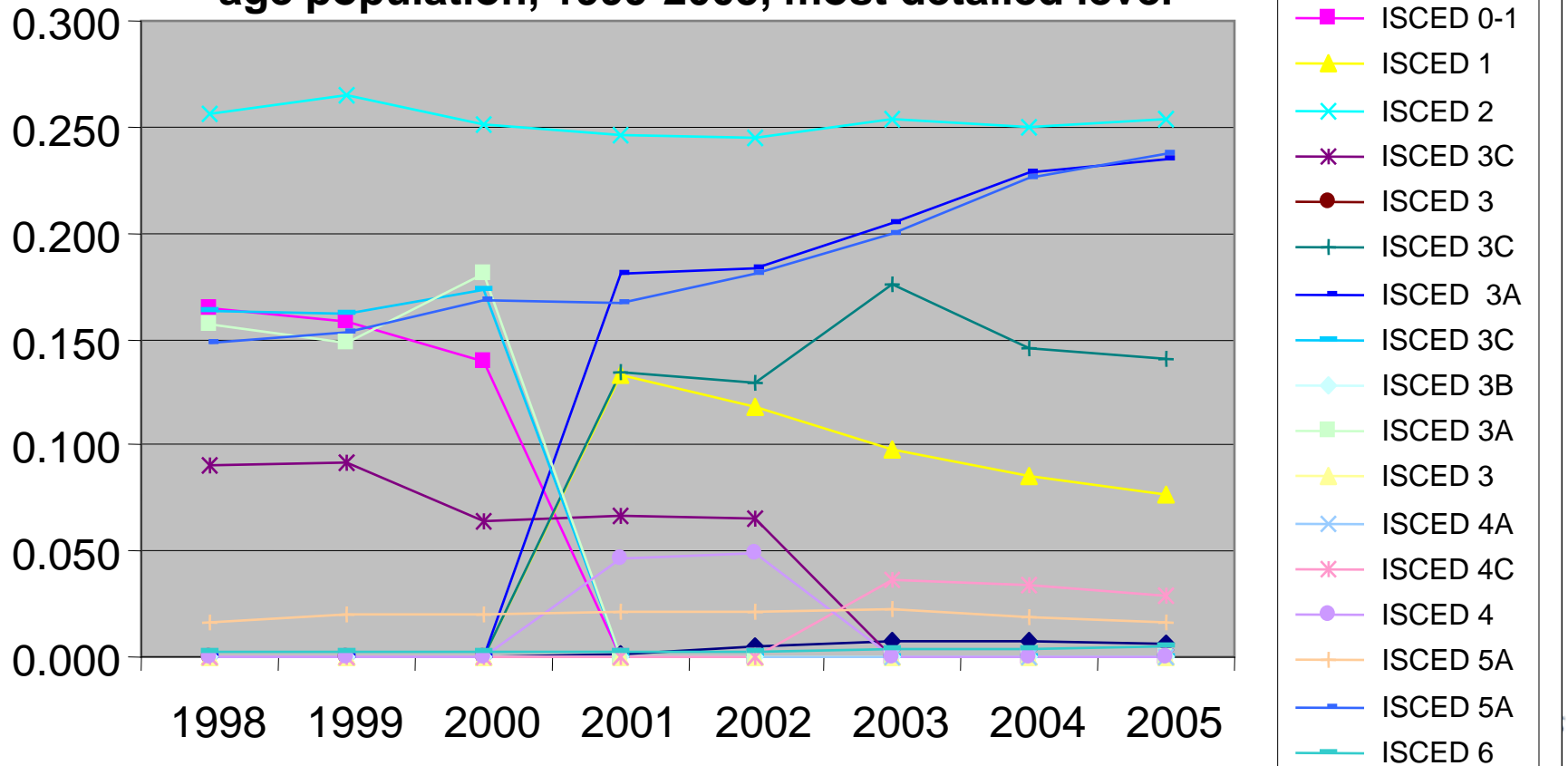
Looking at the greatest level of detail: Greece

GREECE Highest level of qualification in working age population, most detailed level



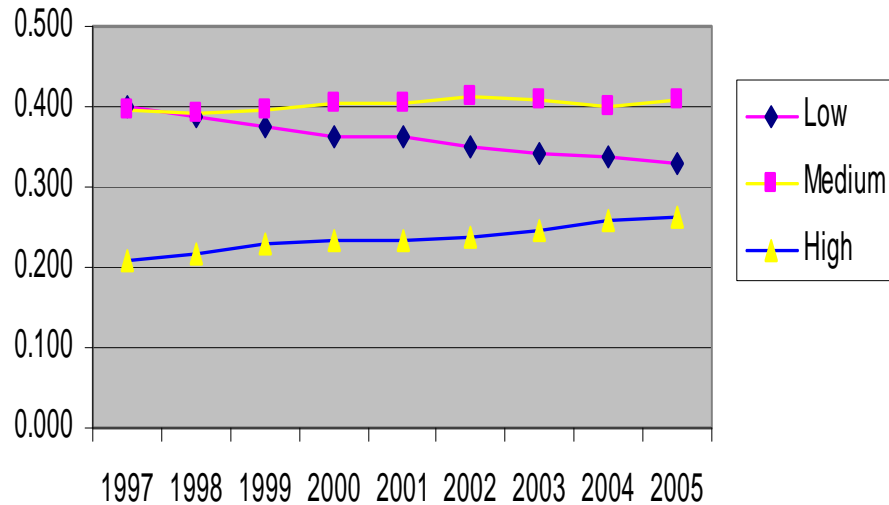
Looking at the greatest level of detail: Netherlands

Netherlands Highest level of qualification in working age population, 1999-2005, most detailed level

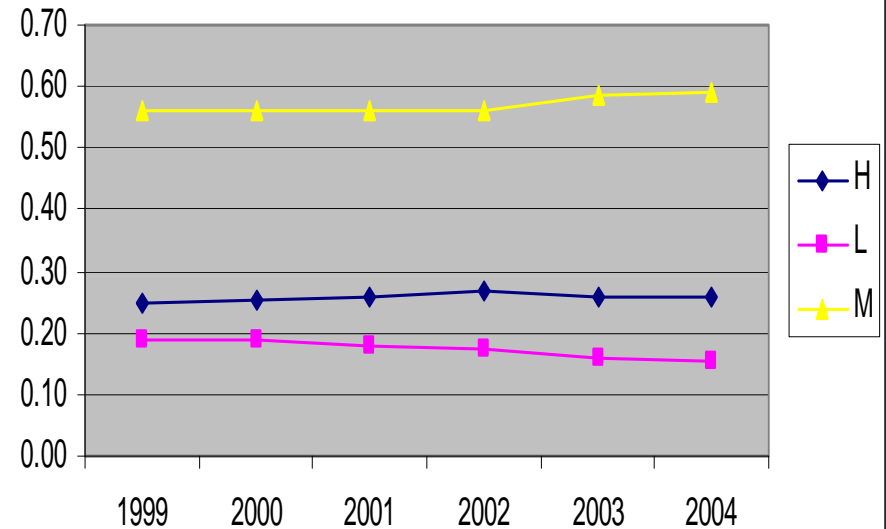


EU LFS vs NATIONAL LFS DATA: UK

Highest level of qualification in working age population,
1999-2005, UK LFS



Highest level of qualification 1995-2005, EU UK LFS



The mlogit model

$$\Pr(Q = j | T = t) = \frac{\exp(e^{(j)} X)}{1 + \sum_{i=1}^N \exp(e^{(i)} X)}$$

The equations state that the probability of the representative individual holding a qualification j at time t can be expressed as a function of explanatory variables, normalised by the sum of probabilities for all categories

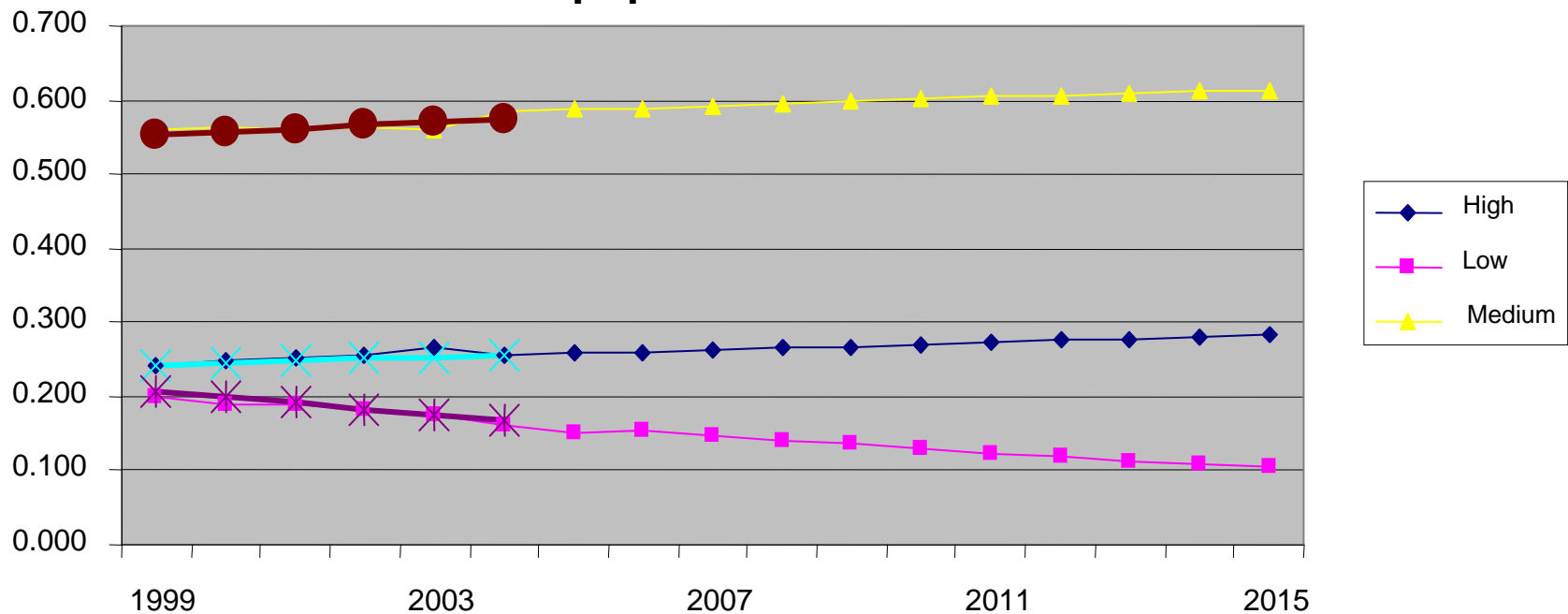
The explanatory variables can include: age, gender, time*age, time*gender, nationality.

Preliminary results: UK

Table 4 Typical results for the UK, working age population			
	(1)	(2)	
COEFFICIENTS	HIGH QUAL.	LOW QUAL.	MEAN
FEMALE	-16.75*** (5.858)	108.3*** (6.793)	51.7
TIME*FEMALE	0.00836*** (0.00293)	-0.0539*** (0.00339)	18.2
14-24 AGEGROUP	34.22*** (11.20)	-52.67*** (10.09)	21.4
25-34 AGEGROUP	-85.49*** (7.193)	-27.02** (10.82)	
45-54 AGEGROUP	47.87*** (7.566)	123.3*** (8.497)	20.7
55-64 AGEGROUP	41.07*** (9.529)	163.6*** (8.828)	16.7
TIME * 14-24 AGEGROUP	-0.0177*** (0.00559)	0.0262*** (0.00504)	
TIME * 25-34 AGEGROUP	0.0428*** (0.00359)	0.0133** (0.00541)	
TIME * 45-54 AGEGROUP	-0.0239*** (0.00378)	-0.0613*** (0.00424)	
TIME * 55-64 AGEGROUP	-0.0205*** (0.00476)	-0.0812*** (0.00441)	
Constant		-0.670*** (0.00717)	-1.601*** (0.00943)
Observations	526,776		
R-squared	0.0365		
Standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1 Medium qualification is reference category			

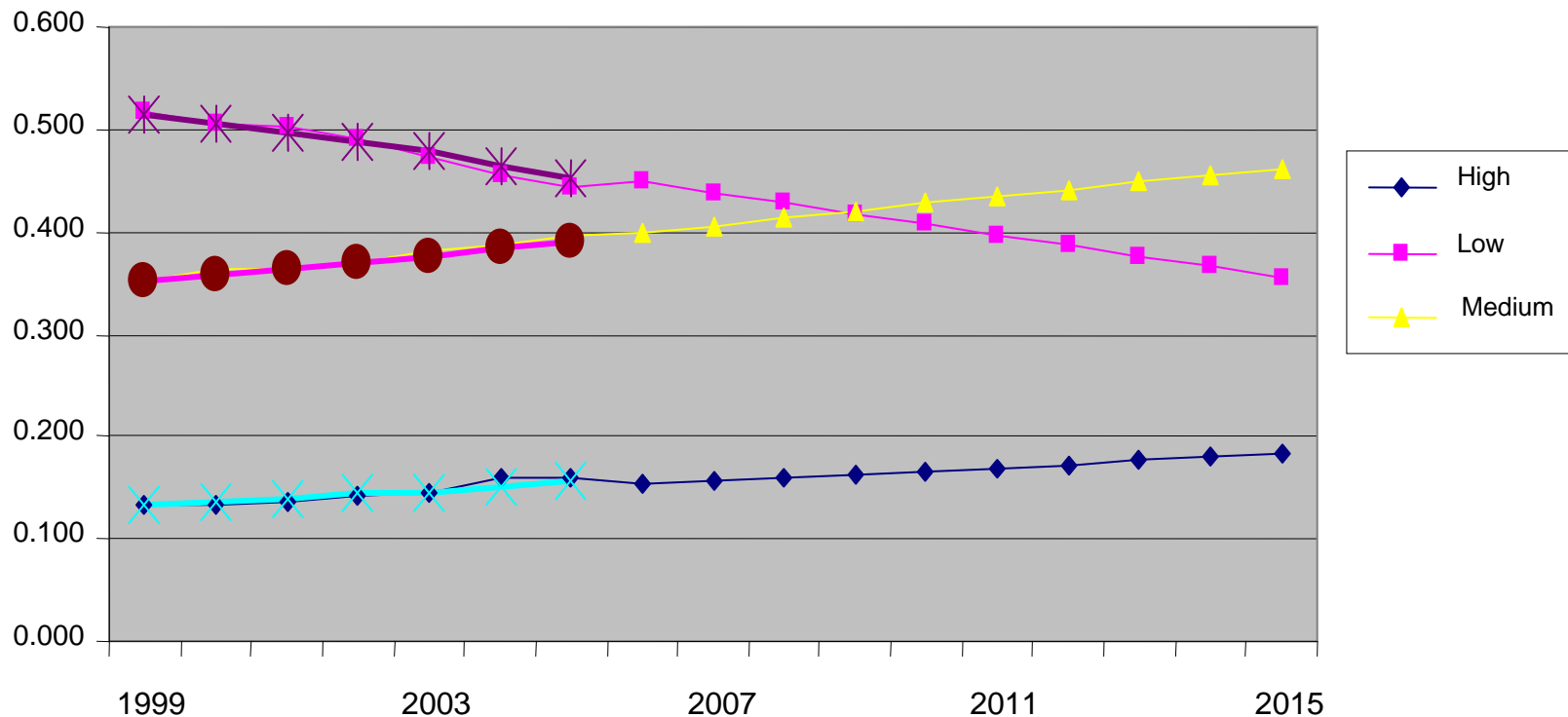
Historical and projected shares: UK

Qualifications Shares in working age population - UK



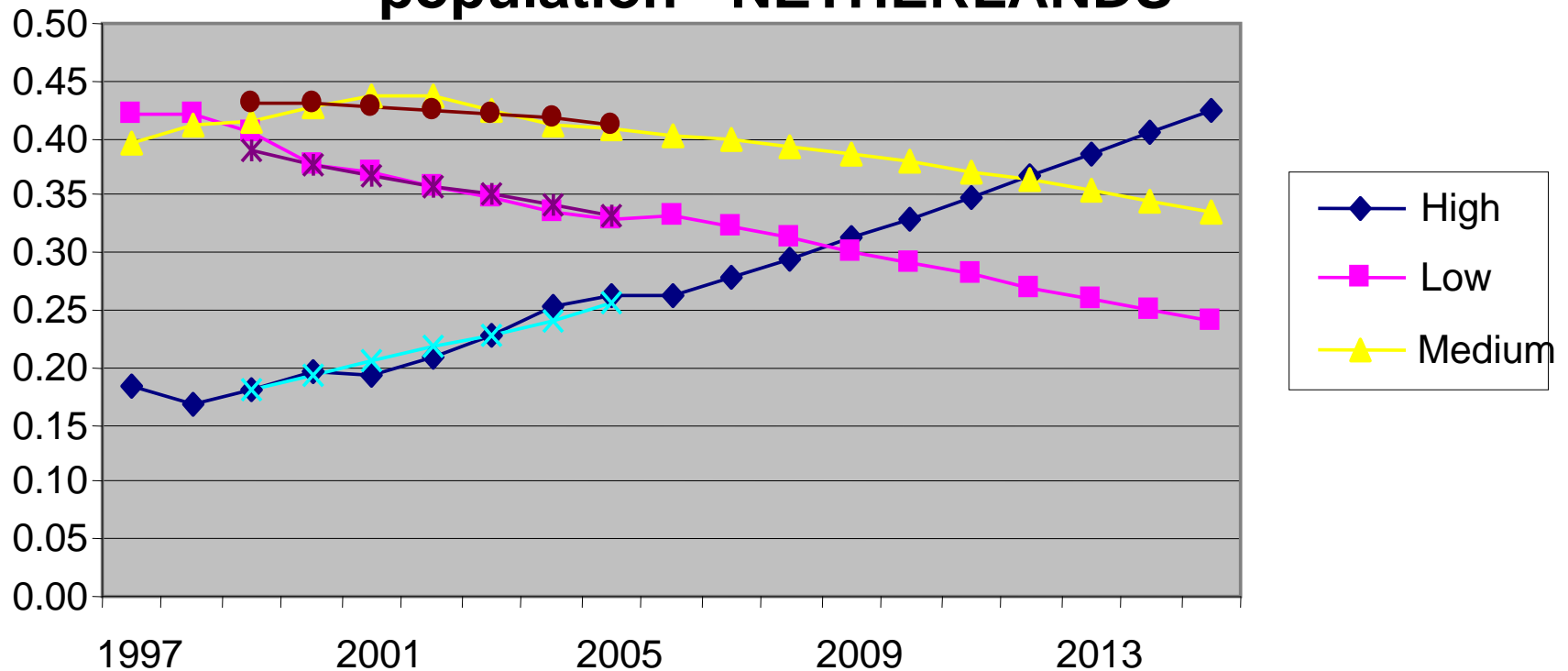
Historical and projected shares: GREECE

Qualifications Shares in working age
population - GREECE



Historical and projected shares: NETHERLANDS

Qualifications Shares in working age population - NETHERLANDS



Next steps

- **Further refinement of the modelling**
- **Expand the analysis to all countries**
- **Obtain the projections**
- **Input from individual country experts**
- **Comparison with Flow modelling work**
- **Finalising the results**

Conclusions

- **Data issues: gaps, discontinuities**
 - problems especially at a detailed level
- **Data issues:**
 - Very short time series
 - Key explanatory variables not available
- **Further investment in the data needed**
- **But simple modelling can produce plausible results at aggregate level**