SKILLS MISMATCH AND SKILL USE AS FACTORS OF PARTICIPATION IN JOB-RELATED NON-FORMAL LEARNING

LIISA MARTMA, PROF. ELLU SAAR

INSTITUTE OF INTERNATIONAL SOCIAL STUDIES, TALLINN UNIVERSITY, ESTONIA

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INTRODUCTION

Ageing populations and accelerating economic change increases the importance of **updating skills over** the **life course** (Cunha et al., 2006).

Lifelong learning is essential due to rapidly **changing skill demands** and for **economic progress** (World Economic Forum, 2014).

There has been **little interaction** between the literature of **adult education** and **skills mismatch**, despite the fact that training could be a response to situations of job-skill mismatch (Messinis and Olekalns, 2008).

INTRODUCTION

Training can improve the **gap** between **existing skills and the skills required** by the new technologies (Buchtemann and Soloff 2003) and may be an important **remedy** for skill obsolescence (de Grip 2006; de Grip and van Loo 2002).

There are several studies analysing the **impact of over- and undereducation** on training participation (e.g. van Smoorenburg and van der Velden, 2000; Büchel and Mertens, 2004; Verhaest and Omey, 2006).

The studies analysing **the impact of skill mismatch** on training particiation are rare (Desjardins, 2014):

- overskilled workers are offered less training opportunites compared with matched and underskilled workers

THE IMPACT OF SOCIAL CONTEXT, PREVIOUS STUDIES

How do institutions mediate the effect of job tasks and skills on training participation?

- **The impact of different institutions** (Brunello, 2004; Bassanini et al., 2005; O'Connell and Jungblut, 2008; Roosmaa and Saar, 2010; Vogtenhuber, 2015; Ehlert, 2021): *tracking in education systems*; *vocational orientation*; *employment protection legislation*; *collective bargaining coverage*; *active labour market policies.*

But the effect of skills and skill mismatch and the modifying role of macro-level structural factors on training participation is limited:

- Some studies have examined how these factors (e.g. *business cycle*, *technological change, automation,* ***innovation***) affect skills mismatch, but not the effect on training (see overview of Brunello and Wruuck, 2021).

AIM

This paper aims to extend previous analyses by examining how:

- *skills, skill use and skills mismatch* determine participation in non-formal education;

- *structural demand-side characteristics* (innovation index) modifies the effect of these factors on participation in training:
  - We assume that higher innovation increases demand for higher skills **->** increases training participation and reduces the training gap of different groups

HYPOTHESES

H1: Underskilled workers participate more likely in job-related non-formal education (ref required skills) and overskilled less likely

H2: Higher innovation increases participation in job-related non-formal education:

- H2a: The positive effect is stronger for underskilled workers
- H2b: The positive effect is stronger for low-skilled workers
- H2c: The positive effect is stronger for workers whose jobs have low numeracy skill requirements

VARIABLES

Skill mismatch:

- We computed an indicator for numeracy skill mismatch using realised matches approach, based on (van der Velden & Bijlsma, 2019):
  - This approach assumes that **each occupation** has a **typically required level of skills**. We calculated the **average numeracy skills** in the **ISCO-08 2-digit occupational group** for each country separately:
    - if the workers skills were 0.5 standard deviations higher/lower then we classified them as overskilled/underskilled.

Numeracy skills (mis)match variable, frequency table

	%	N
Required skills	42%	15 103
Underskilled	27%	9611
Overskilled	31%	11 404
Total	100%	36 118

Notes: We calculated the average numeracy skills in the ISCO-08 2-digit occupational group for each country separately, if the workers skills were 0.5 standard deviations higher/lower then we classified them as overskilled/underskilled.
Source: PIAAC, authors' calculations.

VARIABLES

Numeracy skills: For numeracy skills, we use the average of the PV-s.

Numeracy skill use: frequency of skills used in the workplace, six items on the use of **numeracy skills at work** (e.g. 'In your job, how often do you usually calculate prices, costs, or budgets?'

- Scale: simple **average scores** for these sets of items
  - higher score indicates more frequent use of numeracy skills at work

Control variables: gender, age group, educational level, size of the company

Structural demand-side characteristic: innovation index (GII, 2012)

DATA AND METHOD

14 European countries

Sample restricted to **full-time** employees (>32 hours per week), self-employed excluded

Logistic regression models with interactions

RESULTS

Table 1. Effect of mismatch, numeracy skills and skill use at the workplace on participation in job-related non-formal education.

	M1	M2	M3	M4
(Mis)match (ref required skills)				
Underskilled	**-.378*** **	**.336*** **	.255***	**.144* **
Overskilled	**.134*** **	**-.496*** **	-.436***	**-.355*** **
Numeracy skills		.015***	.012***	.008***
Numeracy skill use			.238***	.177***
Constant	.101***	-3.868***	-3.623***	-3.491***

Notes: ***p<0.01, * p<0.05, control variables (gender, age group, educational level, firmsize) are only included in Model 4.
Source: PIAAC, authors' calculations.

RESULTS, MISMATCH X INNOVATION INDEX

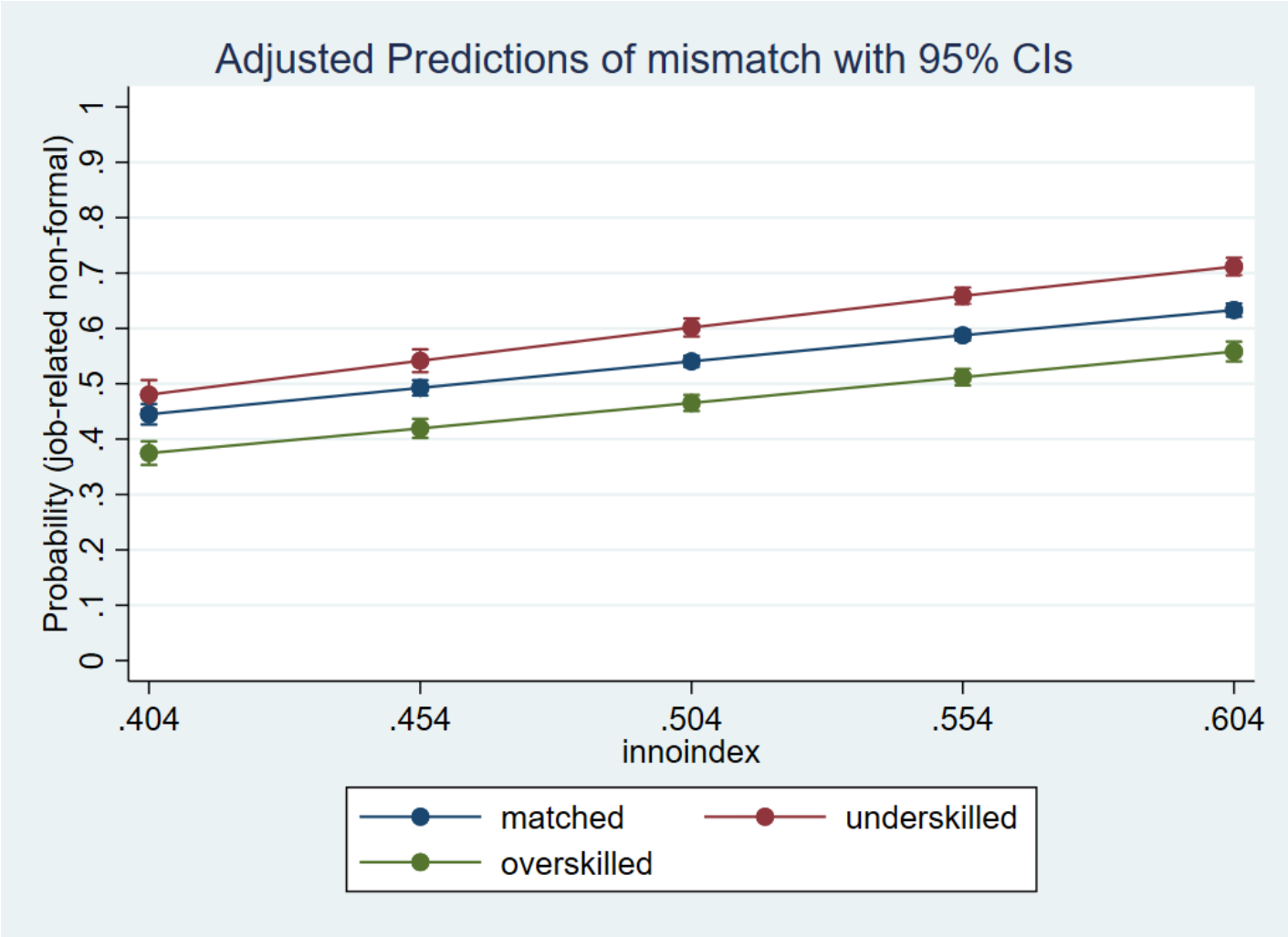

Figure 1. Predictive margins of participation in non-formal education according to mismatch status and innovation index.
Notes: Model includes (mis)match, numeracy skills, numeracy skill use, gender, age group, educational level, firmsize, innovation index and interaction of mismatch and innovation index.
Source: PIAAC, authors' calculations.

RESULTS, NUMERACY SKILLS X INNOVATION INDEX

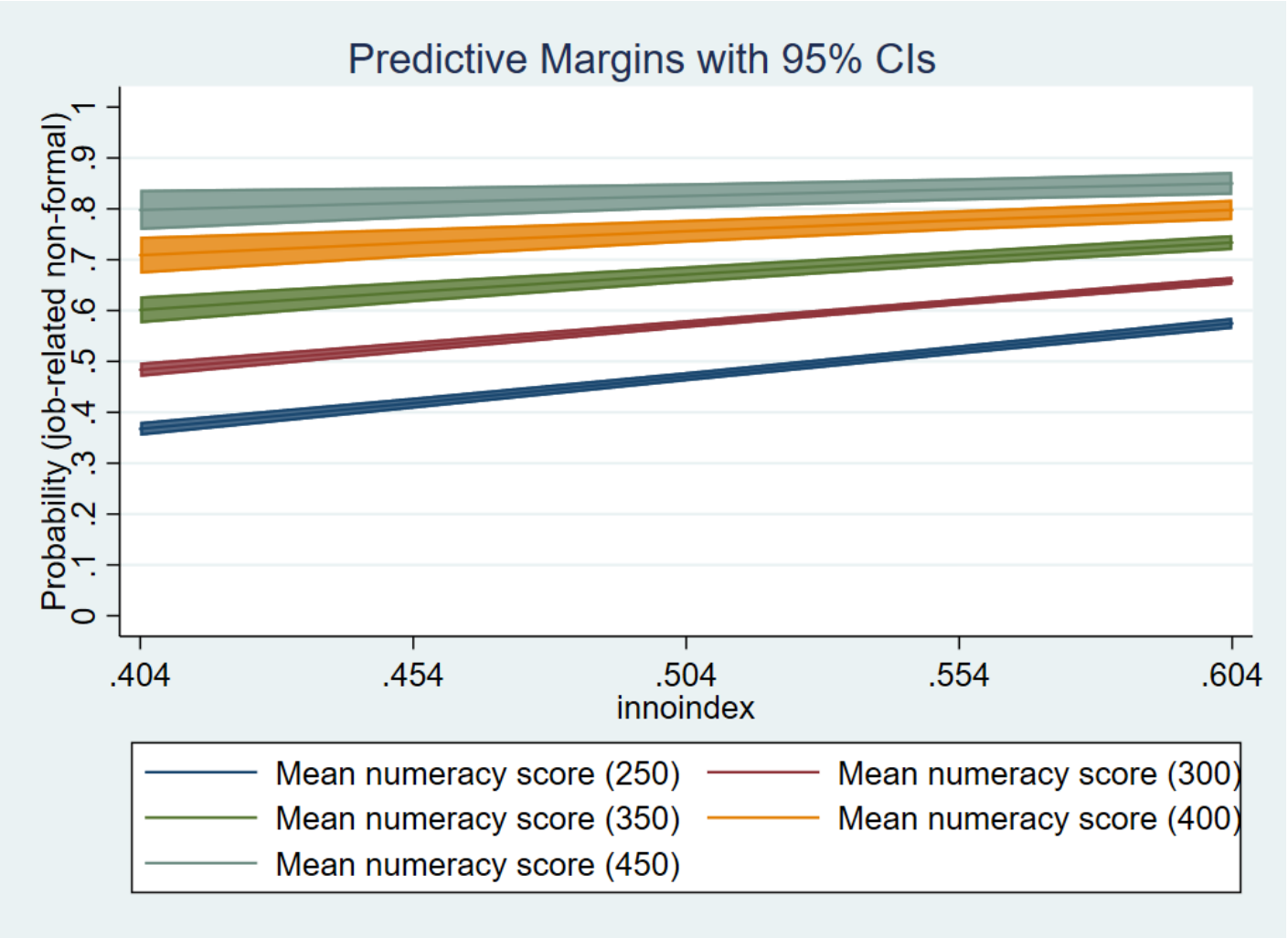

Figure 2. Predictive margins of participation in non-formal education according to mean numeracy skills and innovation index.
Notes: Model includes (mis)match, numeracy skills, numeracy skill use, gender, age group, educational level, firmsize, innovation index and interaction of mean numeracy skills and innovation index.
Source: PIAAC, authors' calculations.

Results, numeracy skill use x innovation index

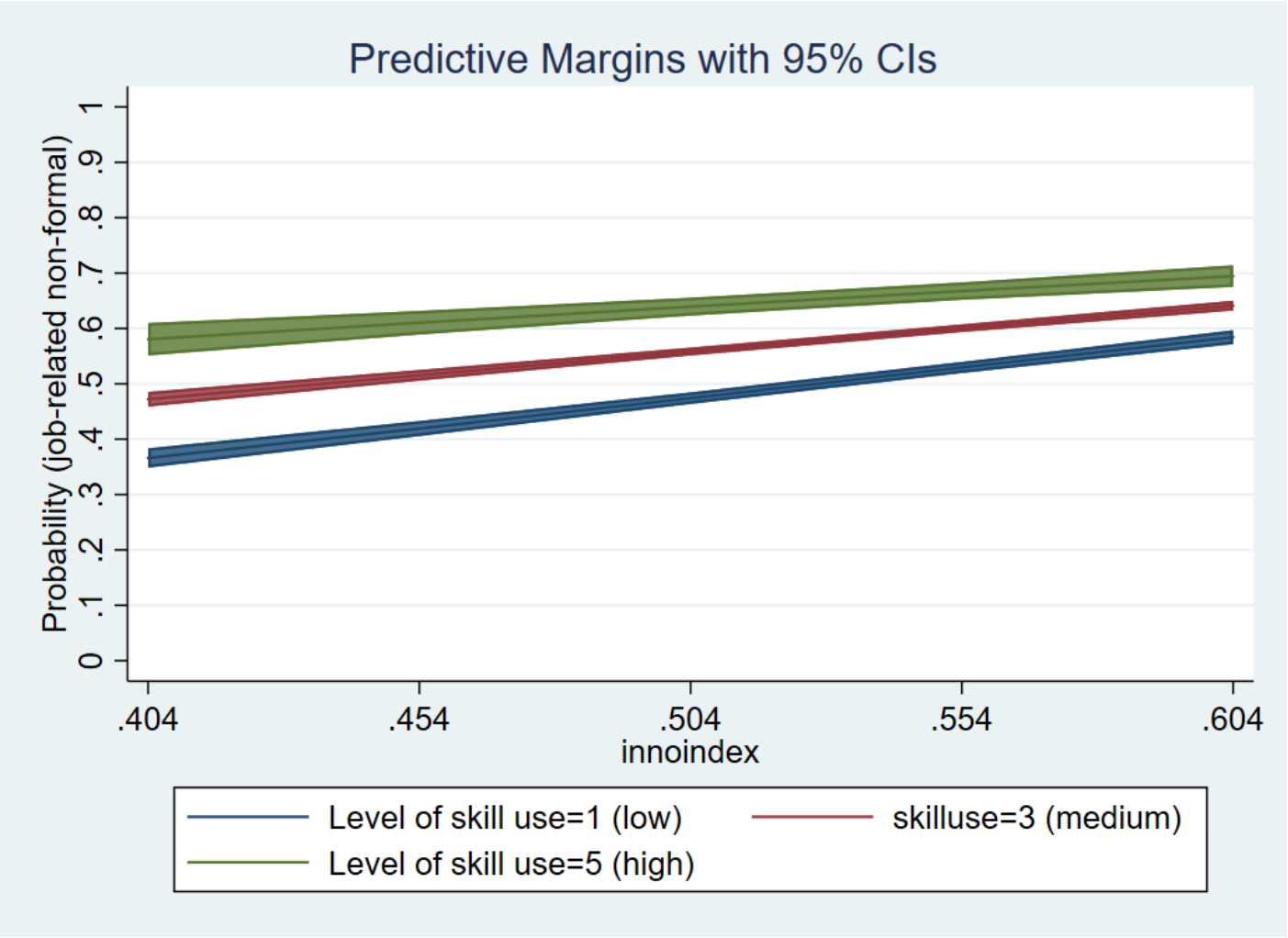

Figure 3. Predictive margins of participation in non-formal education according to levels of numeracy skill use at work and innovation index.
Notes: Model includes (mis)match, numeracy skills, numeracy skill use, gender, age group, educational level, firmsize, innovation index and interaction of numeracy skill use and innovation index.
Source: PIAAC, authors' calculations.

CONCLUSIONS

Being underskilled could serve as a **positive context** in relation to participation in training:

- Underskilled show greater investments in training to substitute for their lack of skills needed to perform at an adequate level in their job

Being **overskilled** could act as a **negative context:**

- Overskilled are less likely to participate in training
- Also their initial stock of skills may deteriorate due to non-use
  - deterioration may decrease the complementarity of further learning investments and accumulation of human capital

Our study suggests that **the supply of skills** and the utilisation of **skills at the workplace** plays an important role in determining who receives job-related non-formal training

- Although skills are important, **skill use** at the workplace seem to have a strong effect on participation

CONCLUSIONS

Higher innovation reduces training gap –> the positive effect on participation is stronger for:

- low-skilled workers
- workers who are less often using numeracy skills at their job

Important to foster optimal utilization of the existing skill base and participation in training for high- and also low-skilled workers -> maintains flexible workforce

FURTHER RESEARCH

Add additional structural characteristics to the models:

- demand-side -> % of skill-intensive jobs (e.g high-level managerial and technical jobs)
- Supply-side -> % of workers with tertiary education; mean skill-level in a country

Compare the results by using different methods for measuring skills mismatch.

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THANK YOU!