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Digital transformation and the evolution of occupational skills in Ireland

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Digital Transformation in Ireland:
Challenges and Opportunities for Jobs and Investment

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o Disclaimer

- This research is funded by the Department of Enterprise, Tourism and Employment
- Views and remaining errors are those of the authors alone

1 Outline

1. Introduction
2. Mapping Exposure and Complementarity
3. Moving Between E-C Categories
4. Occupational Skills Requirements
5. Conclusions

1 Motivation

- Rapid development of technologies is reshaping labour markets
- National Digital Strategy, AI strategy, Skills Agenda provide framework for current policy approach
- Policymakers face the challenge of supporting workers to acquire new skills and transition between occupations
- This paper provides evidence in an Irish context to support policymaking in this area

1 Context

- Impact of artificial intelligence on labour markets is far from clear
- Occupational exposure measures developed based on the exposure of tasks to the new technologies (Felten et al., 2021)
- Measure of complementarity proposed to recognise that workers' skills may complement digital technologies rather than compete with them (Pizzinelli et al. 2023)
- Other measures of exposure proposed that focus on the extent to which jobs involve expertise, tacit knowledge and complex interpersonal interactions (Autor and Thompson, 2025) (Prytkova et al., 2024)
- New technologies likely to impact the labour market through gradual workforce reallocation rather than widespread job destruction.

1 Paper outline

- Map the exposure and complementarity of occupations in Ireland from 2007 – 2025
- Explore the characteristics of workers who move between occupations with different exposure/complementarity levels
- Map the rate of skills change across occupations by their relative exposure/complementarity levels
- Discussion of trends and policy implications

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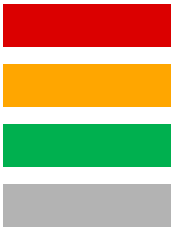
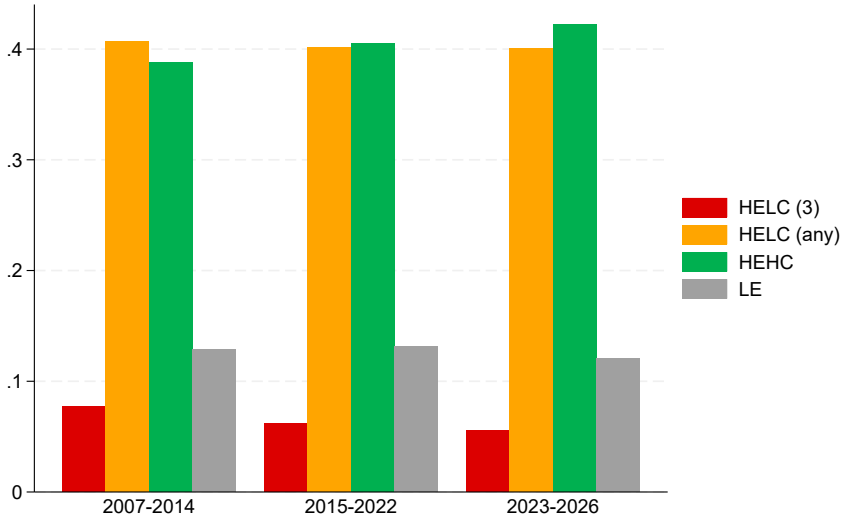
2 Our approach to exposure and complementarity

- We combine three different ways of measuring exposure with the leading method for measuring complementarity
- This results in four groups of occupations



- Strict high exposure and low complementarity
- Looser high exposure and low complementarity
- High exposure and high complementarity
- Low exposure

2 Share of total employment – changes predate LLMs (1)

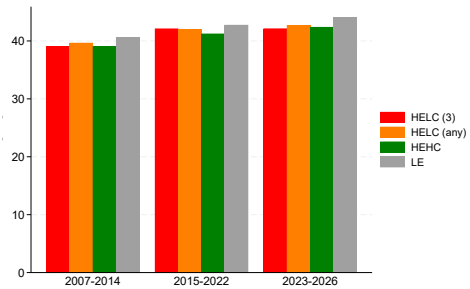


2 Share of total employment – changes predate LLMs (2)

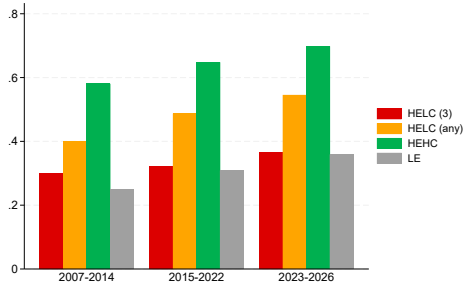
- HELC occupations have fallen as a share of total employment (e.g. sales workers, clerks and clerical support workers and customer service workers.)
- HEHC occupations have increased (e.g. professionals across health, education, science and technology and legal occupations, building and related trades workers, drivers, personal care workers, and managers across a range of jobs)
- Low exposure occupations remain at c. 12 per cent of total jobs (e.g. skilled agricultural workers, trades workers, handicraft workers; and assemblers.)
- These changes predate the recent arrival of powerful GPT tools

2 Average age and education vary by EC category but trends align (1)

Average age



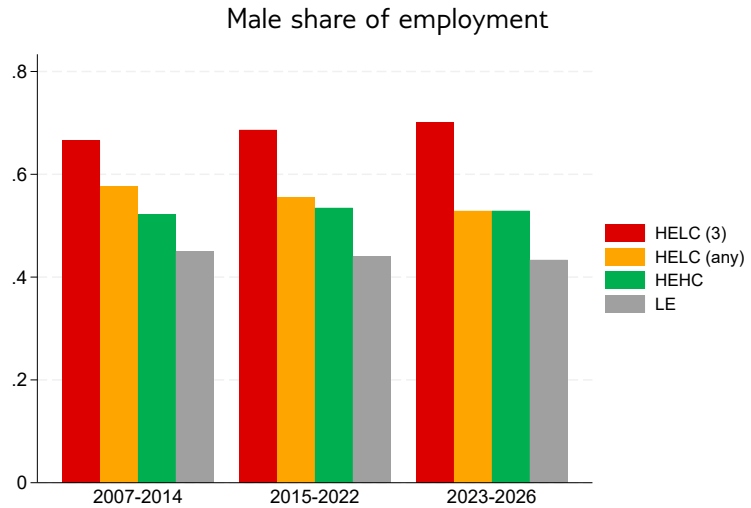
Share with third level education



2 Average age and education vary by EC category but trends align (2)

- The general trend of an ageing workforce is consistent across the EC categories
- Workers in low exposure occupations are on average two years older than in the other categories
- Trend of a more educated workforce over time is consistent across the EC categories
- Almost 70 per cent of workers in HEHC occupations have third level education

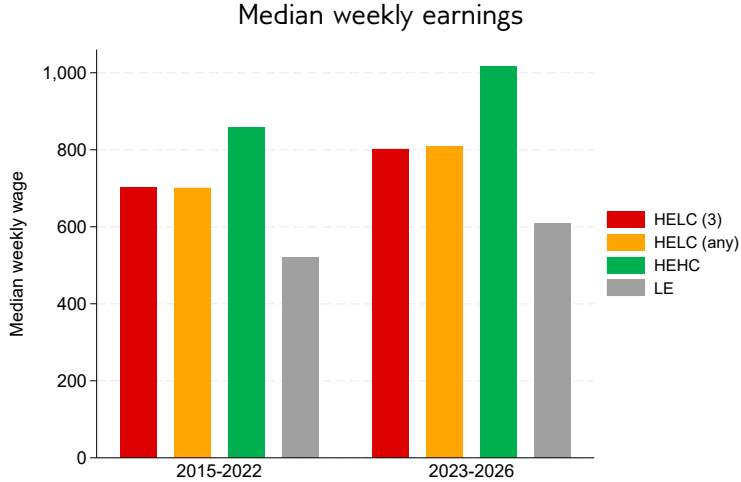
2 Male share of workers differs across EC category and trends diverge (1)



2 Male share of workers differs across EC category and trends diverge (2)

- The general trend of greater female labour force participation varies across EC category
- The male share of workers has increased in the strict HELC category, while it is constant in the LE and HEHC categories

2 Wages higher in HEHC category, lower in LE category



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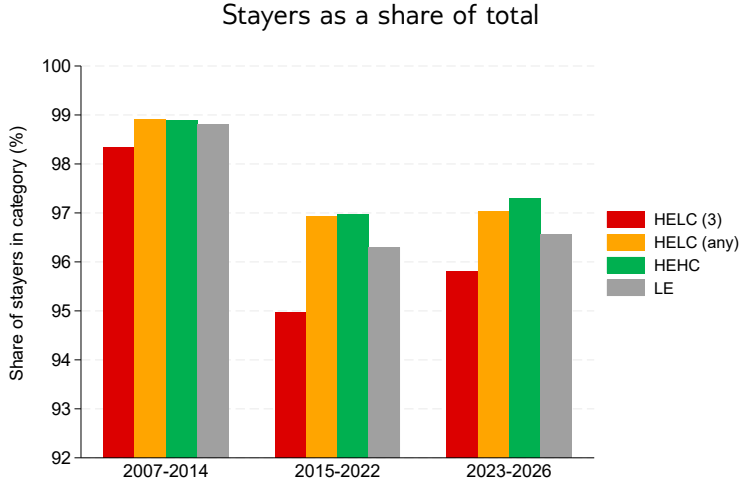
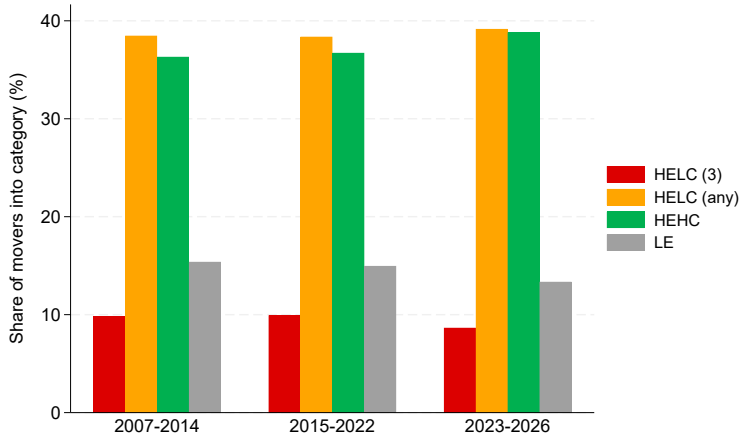
3 Movers and stayers

- Relatively few workers move across EC categories in any period (Yadav and McIndoe-Calder, 2026)
  - > Barriers to entry and exit: (digital) skills mis-match, education
- Which EC categories do workers move *out of* most frequently?
- Which EC categories do workers move *into* most frequently?
- What are the characteristics of ”movers” (those identified in the survey as switching jobs outside of their original EC category) relative to ”stayers”?

3 Workers in HELC (3) and LE less likely to be stayers



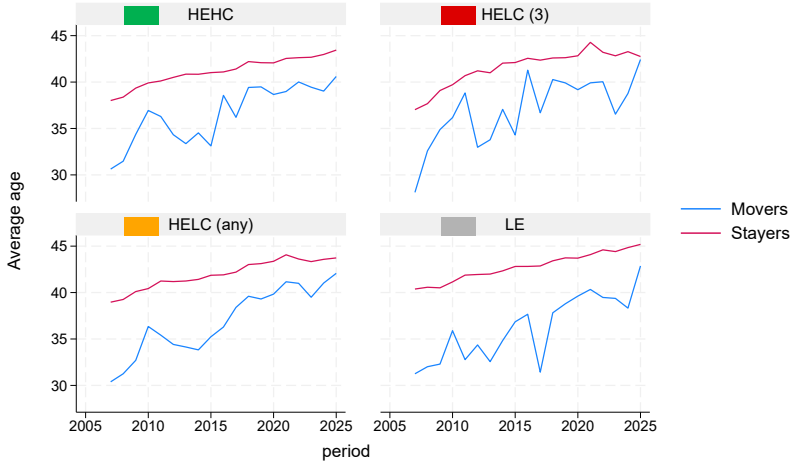
3 Share of movers by destination category



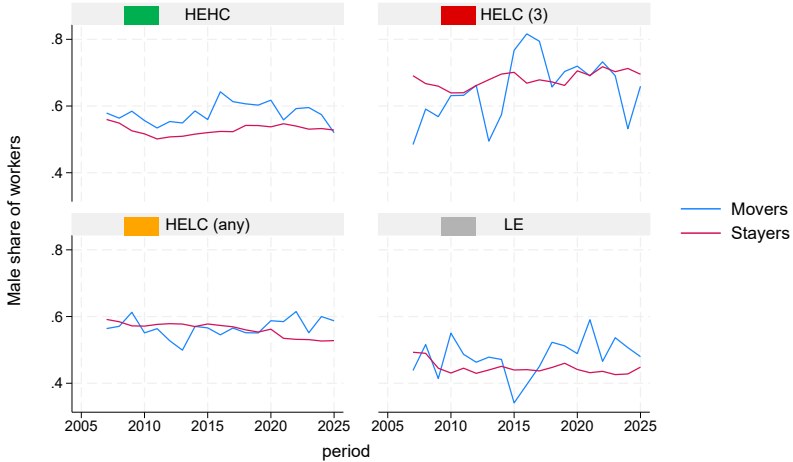
3 Mobility patterns draw attention to the HELC (3) category

- The pattern of destination categories is similar across the time periods for HEHC, LE and HELC (any)
- There is a slight decline in movement into the HELC (3) category
- May be attributable to fewer vacancies in these occupations or to a change in the barriers to entry or exit
- The HELC (3) category has each of:
  1. Falling employment (in absolute and in relative terms)
  2. Falling share of movers into these occupations
  3. Fastest fall in the share of stayers

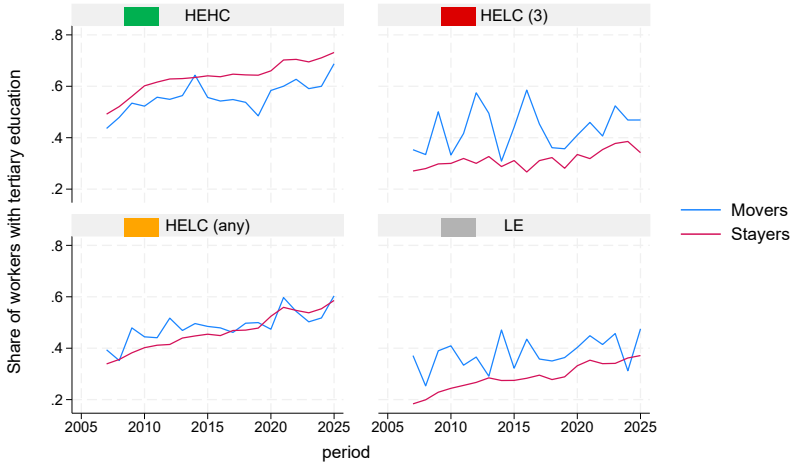
3 Movers are typically younger, but the gap is narrowing



3 Male share of movers and stayers



3 Share of movers and stayers with tertiary education



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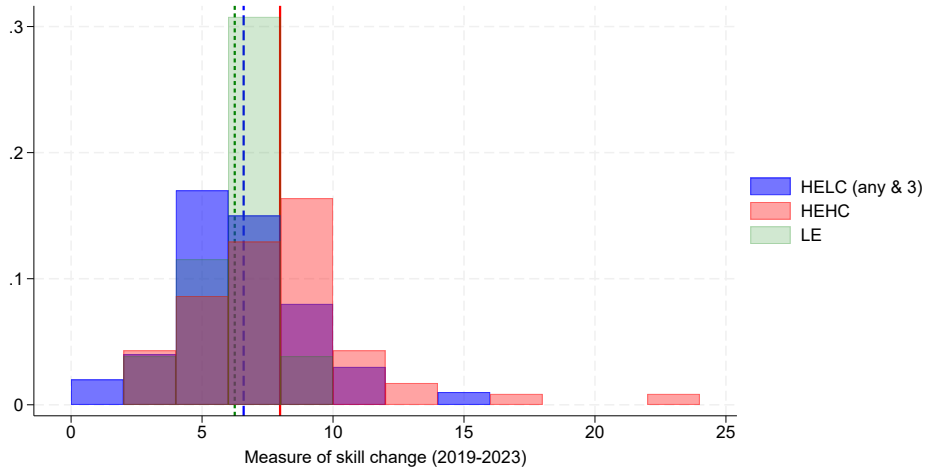
4 Occupational skills requirements are also changing

- Measure of skill change by occupation provided by Kelly et al (2026)
- Tracks changes in the skills requirements of occupations based on survey data and job advertisement
- Workers in jobs that are experiencing rapid skills change are more likely to experience skills deficits.
- Lower skilled jobs have experienced relatively few changes compared to high-tech jobs
- We apply the EC categories to the skills change measurement and find that occupations experiencing more rapid skill change are concentrated in the HEHC category

4 Skills change by Complementarity-Exposure category

Frequency of skills change measurement Exposure-Complementarity category



4 Importance of tracking skills changes

- HEHC occupations shown in the initial analysis to be increasing as a share of total employment
- Mover-stayer analysis highlights that this increase is being facilitated by movement from other EC categories as well as by new entrants
- Skills change analysis shows that HEHC occupations are experiencing the fastest changes in skills requirements
- These three findings, along with Yadav and McIndoe-Calder's finding that skills mismatch between two occupations is a barrier to mobility between them, suggest that support for workers who wish to upskill will be important going forward

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5 Main Findings and Next Steps

- Grouping of occupations proposed based on international methods but tailored to the Irish labour market
- Facilitates analysis of worker characteristics and continued monitoring of changes in the level of employment in each category
- We further track movers and stayers, finding evidence of movement of workers away from HELC occupations towards HEHC and LE over a long period of time
- Patterns in skills data are consistent with HEHC occupations becoming more difficult to access by those outside these occupations

- Explore associations between EC categories and both sectors and regions;
- Examine observable characteristics of those in occupations experiencing the most rapid skills changes

5 Policy implications

- Workers who wish to transition away from the slower-growing HELC occupations into HEHC or LE occupations may require support
- Education and training for HEHC occupations should reflect as far as possible the speed of skills changes
- Education and training opportunities should be scalable in the event of sharper contractions in demand for employment in HELC occupations

Thank you

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