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Work in Progress

From Learning to Earning?

Analysing participation in job-related training and its impact on wage in the UK

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The UK's growing skills gap and limited job-related training opportunities

Context: current trends

- **Automation:** 1.5 million people in England have jobs at high risk of automation¹
- **Net-zero:** the UK has committed to net-zero emissions by 2050, which means a likely reduction of roles in carbon-intense industries and an increase in green sector roles
- **Life expectancy:** More 50+ year olds are in work and employment rate for 50–64-year-olds has increased from 60% to 71% from 2000 to 2024²



Issue: skills shortage

Skills Shortage

- **78%** of organisations indicating a decline in output due to the scarcity of relevant skilled labour³
 - Potentially costing the UK economy **£39 billion annually**⁴
- **>1/3 of all vacancies in 2022 were skill shortage vacancies**, compared to 22% in 2017⁵
- **25.5 million workers will require upskilling** and **5 million will require retraining** by 2030⁶

Lack of training and funding

- **<50% of employers provided on-the-job training** (down from 53% in 2017), and the average investment in training per employee was £1,780, compared to £2,010 in 2017 (accounting for inflation)⁵
- **Spending today on adult education is nearly two-third lower in real terms than in 2003-04**⁷

There are two types of 'skilling' in the work context:

- **Upskilling:** acquiring **additional** skills in a specific domain, building upon their existing knowledge and competencies
- **Reskilling:** acquiring **new** skills to meet the requirements of alternative roles (e.g., in a different occupation or industry)

A large body of research shows that there are a range of **personal and job-related determinants** of learning

Research questions



RQ1: Who accesses job-related training in the UK?

> **What we expect to find:** People most in need of reskilling / upskilling are not accessing it



RQ2: Do people who engage in job-related training in the UK see an increase in income?

> **What we expect to find:** No, the market does not yet recognise job-related training in the way it recognises formal learning

Methodology (1/2): Data sample

UK Labour Force Survey: Quarterly survey on the employment circumstances of the UK population

RQ1: Who accesses job-related training in the UK?

Quarterly dataset

Dataset used: Q1 2022

Dependent variable: Participation in job-related training

In the last 3 months, have you taken part in any education or any training connected with your job or a job that you might be able to do in the future? (ED13WK, FUTUR13)

RQ2: Do people who engage in job-related training in the UK see an increase in income?

Longitudinal five-quarter dataset

5Q Dataset used: Q1 2022 – Q1 2023

Dependent variable: Wage in Quarter 5

Control variables

Personal factors: gender, age, previous educational attainment, ethnicity, whether they live with a spouse / partner, presence of dependent children at home, and whether they have British nationality or not

Job-related factors: weekly wage, whether work is in London or not, tenure, public or private sector, full-time or part-time, permanent or temporary contract, occupation, industry, whether they work from home, and if they have supervisory / managerial responsibilities

Methodology (2/2): Models

RQ1: Who accesses job-related training in the UK?

OLS linear regression

$$\begin{aligned} P_i &= \beta_0 + \beta_1 AGE_i + \beta_2 SEX_i \\ &+ \beta_3 EDUCATIONAL ATTAINMENT_i + \dots + \beta_n X_{n,i} \end{aligned}$$

Equation 1

where

P_i is the probability of participating job-related education or training.

β_0 is the intercept.

$AGE_i, SEX_i, EDUCATIONAL ATTAINMENT_i, \dots, X_{n,i}$ are the personal and job-related characteristics for individual i .

β_1 to β_n are the coefficients for each independent variable (age, sex, level of educational attainment, etc).

RQ2: Do people who engage in job-related training in the UK see an increase in income?

Panel regression using a Mincer log wage equation:

$$\ln w_{i,t} = \beta X_{i,t} + \gamma N_{i,t-1} + \ln w_{i,t-1} + F_{i,t-1} + \varepsilon_{i,t}$$

Equation 2

where

$\ln w_{i,t}$ is the natural logarithm of wage for an individual i at time t .

$\beta X_{i,t}$ is the vector of independent variables (including personal characteristics such as age, sex, and level of educational attainment, and job-related characteristics).

$N_{i,t-1}$ is the lagged variable indicating whether individual i participated in job-related education and training.

$\ln w_{i,t-1}$ is the natural logarithm of the wage level in the previous period.

$F_{i,t-1}$ are the fixed effects capturing time-invariant individual-specific heterogeneity.

Findings

RQ1: Who accesses job-related training in the UK?

RQ2: Do people who engage in job-related training in the UK see an increase in income?

Findings (1/5):
The pandemic has changed men and women's participation rates in job-related training

Participation rates in job-related training¹ for people aged 25-64 in the UK, 2013 – 2023 (weighted %)



Notes: (1) Job-related education and training defined as respondents who completed job-related training or education in the last 3 months (ED13WK & FUTUR13)

Findings (2/5): Those who participate in job-related training are not those the most in need of reskilling and/or upskilling

OLS coefficients for determinants of participation in job-related training¹ for 25–64-year-olds in the UK (Q1 2022)

Variables	All	Male	Female		All	Male	Female
Female	-0.00			Occupation (<i>Ref: Professional Occ.</i>)			
Age band (<i>Ref: 25-34</i>)				Managers, Directors And Senior Official	-0.06**	-0.04	-0.09**
35-44	-0.00	-0.03	0.03	Associate Professional Occ.	-0.01	-0.03	0.01
45-54	0.01	-0.02	0.04	Administrative And Secretarial Occ.	-0.06**	-0.00	-0.09***
55-64	0.04	0.04	0.05	Skilled Trades Occ.	-0.07**	-0.06*	-0.09
Age (quadratic)	-0.00	-0.00	-0.00	Caring, Leisure And Other Service Occ.	0.04	0.11	0.01
Highest qualification (<i>Ref: degree or equivalent</i>)				Sales And Customer Service Occ.	-0.03	-0.04	-0.01
Other higher education	0.00	0.01	-0.00	Process, Plant And Machine Operatives	-0.06*	-0.06	-0.03
A-level or equivalent	-0.00	-0.01	0.01	Elementary Occ.	-0.08***	-0.09**	-0.08*
GCSE grades A*-C or equivalent	-0.08***	-0.09***	-0.06*	Industry (<i>Ref: Education</i>)			
Other qualifications	-0.08**	-0.06	-0.10**	Agriculture, forestry and fishing	0.03	0.01	0.13
No qualification	-0.18***	-0.19***	-0.16***	Mining and quarrying	-0.03	0.01	-0.16
Don't know	-0.16***	-0.13**	-0.21***	Manufacturing	-0.06	-0.04	-0.07
White Ethnicity (<i>Ref: Nonwhite</i>)	0.00	0.02	-0.02	Electricity, gas, air cond supply	-0.05	0.01	-0.22***
Married / civil partner (<i>Ref: Not married</i>)	-0.01	0.00	-0.02	Water supply, sewerage, waste	-0.03	0.01	-0.09
1 or more dep. child at home (<i>Ref: No children</i>)	0.01	-0.01	0.02	Construction	-0.05	-0.05	0.01
British Nationality (<i>Ref: Not British</i>)	0.02	0.01	0.03*	Wholesale, retail, repair of vehicles	-0.06*	-0.02	-0.10**
Gross weekly pay in main job	0.00	0.00	0.00	Transport and storage	-0.01	0.00	-0.01
London as place of work (<i>Ref: Not London</i>)	-0.02	-0.04	0.01	Accommodation and food services	-0.04	-0.05	-0.01
Tenure (<i>Ref: <1 year</i>)				Information and communication	-0.08*	-0.06	-0.07
Between 1 and 5 years	-0.03	-0.02	-0.04	Financial and insurance activities	-0.01	0.02	-0.03
Between 5 and 10 years	-0.05*	-0.04	-0.06	Real estate activities	-0.02	-0.03	-0.01
10 years or more	-0.06***	-0.06*	-0.07*	Prof, scientific, technical active	-0.03	-0.02	-0.01
Public sector (<i>Ref: Private sector</i>)	0.06**	0.05	0.07**	Admin and support services	-0.07*	-0.07	-0.04
Part-time contract (<i>Ref: Fulltime</i>)	-0.00	0.04	-0.02	Public admin and defence	-0.02	0.01	-0.03
Temporary role (<i>Ref: Permanent role</i>)	0.02	0.03	0.02	Health and social work	0.07**	0.08	0.07*
				Arts, entertainment and recreation	-0.05	-0.02	-0.07
				Other service activities	-0.01	0.08	-0.06
				Households as employers	-0.07	0.45	-0.27***
				Extraterritorial organisations	-0.06	0.01	-0.35***
				Work from home (<i>Ref: Not WFH</i>)	-0.01	0.01	-0.03
				Managerial (<i>Ref: Not managerial</i>)	0.04**	0.06***	0.01
				Constant	0.37***	0.32***	0.39***
				Observations (unweighted)	8,096	3,794	4,302
				R-squared	0.06	0.06	0.07

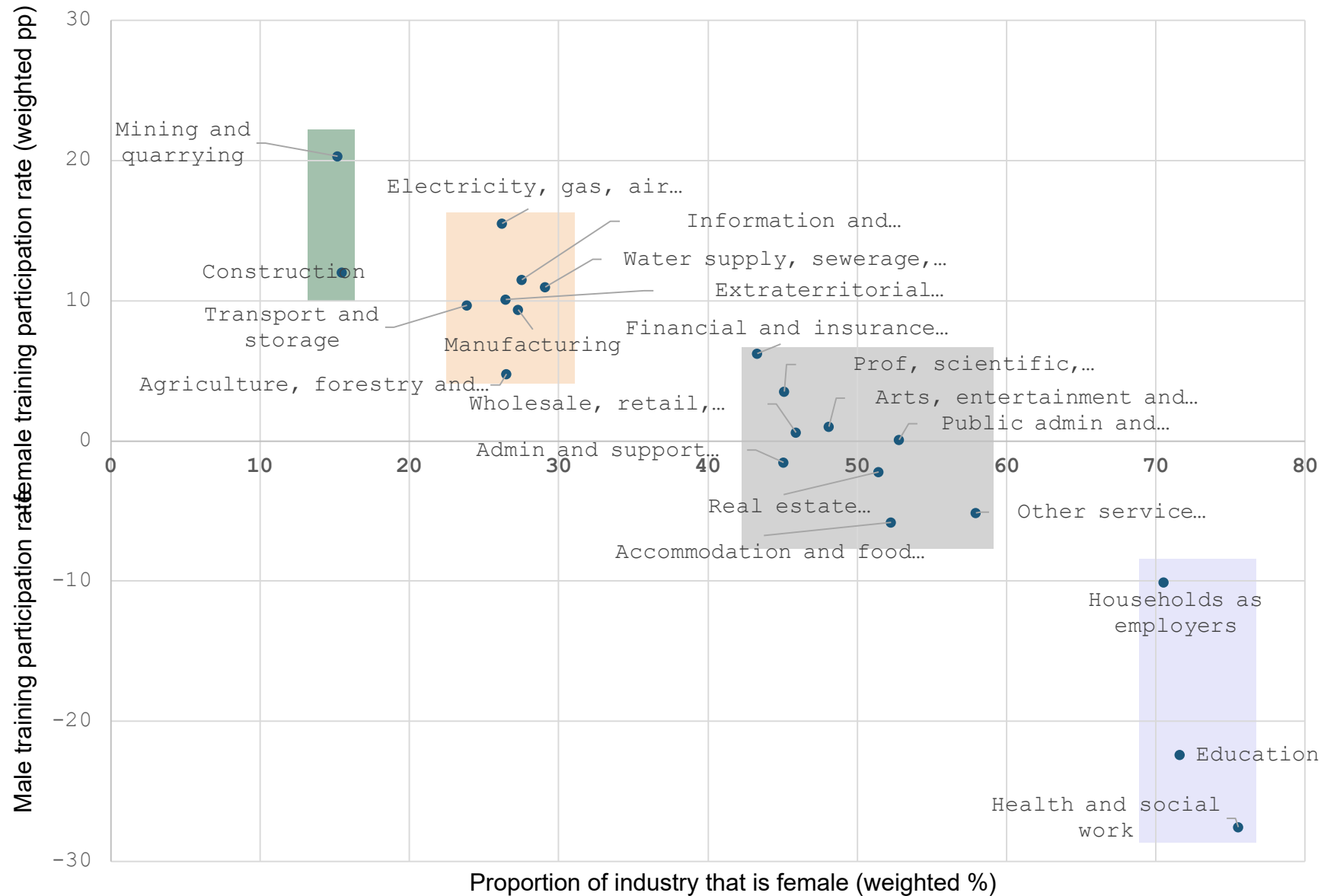
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*** p<0.001, ** p<0.01, * p<0.05

Notes: (1) Job-related education and training defined as respondents who completed job-related training or education in the last 3 months (ED13WK & FUTUR13).

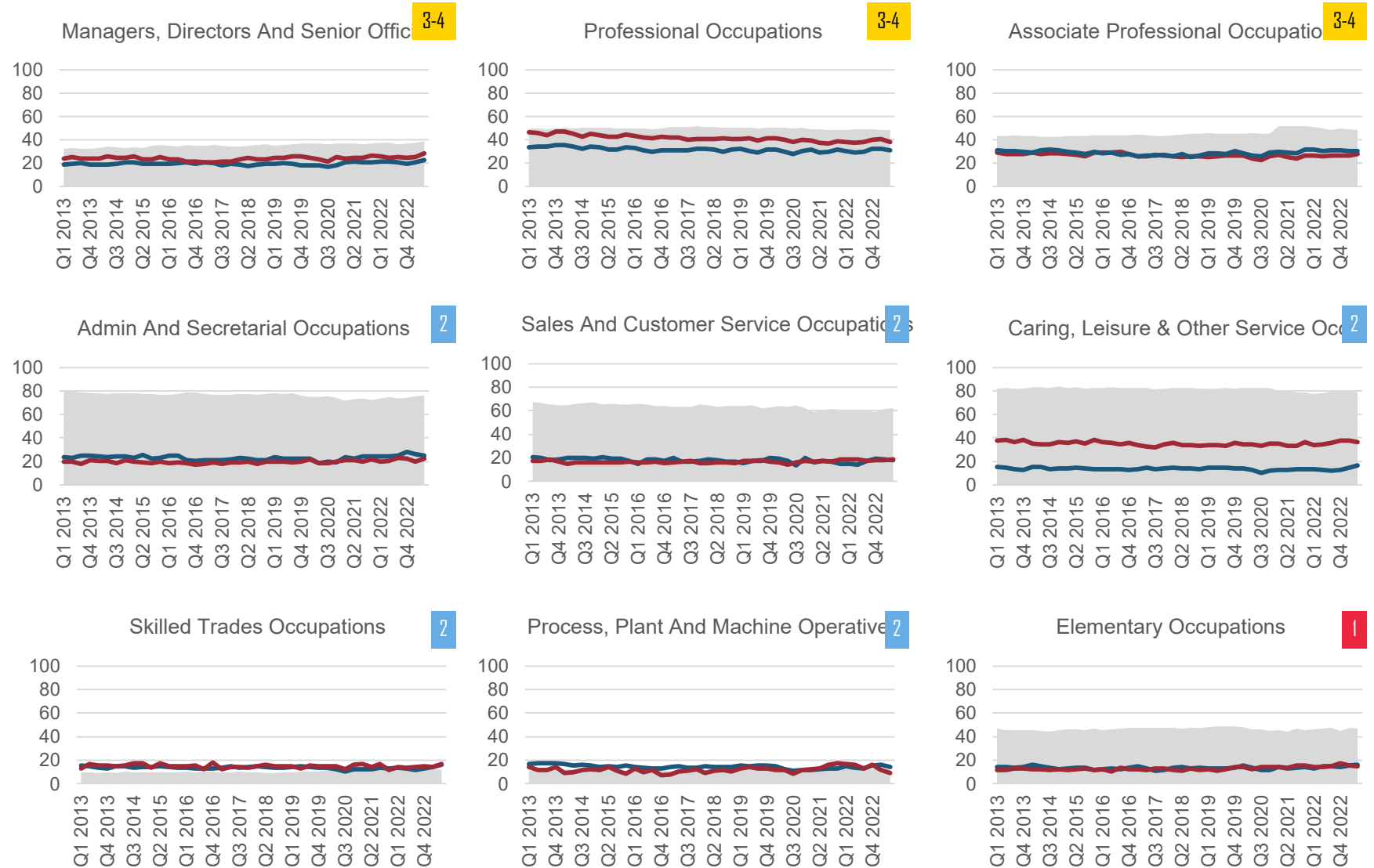
Industry gender composition and job-related training¹ participation rate gaps for 25–64-year-olds in the UK (Q1 2022)

Findings (3/5):
The minority gender in an industry has lower job-related training rates



Findings (4/5): Skill level matters when examining men and women's participation in job-related training by occupation

Female and Male participation in job-related training¹ and proportion of occupation that is female,
Q1 2013 – Q2 2023 (weighted %)
Male participation in job-related training, female training in job-related training, proportion of occupation that is female.
Skill level² shown in top right



Notes: (1) Job-related education and training defined as respondents who completed job-related training or education in the last 3 months (ED13WK & FUTUR13).
(2) International Labour Organization

Findings

RQ1: Who accesses job-related training in the UK?

RQ2: Do people who engage in job-related training in the UK see an increase in income?

Findings (5/5): Women participating in job-related training have a higher wage in 12-15 months' time than those who did not participate

OLS coefficients for determinants of wage in Q5 for 25–64-year-olds in the UK (Jan 2022 – Mar 2023)

Variables	All	Male	Female	Variables	All	Male	Female
Job-related training or education Q1	0.05	0.01	0.10*	Occupation (<i>Ref: Professional Occupations</i>)			
Female	-0.03			Managers, Directors And Senior Official	0.03	-0.12	0.08
Age band (<i>Ref: 25-34</i>)				Associate Professional Occupations	-0.06	-0.07	-0.05
35-44	0.00	0.00	0.00	Administrative And Secretarial Occupations	-0.13**	-0.20*	-0.09
45-54	0.09	0.02	0.13	Skilled Trades Occupations	-0.06	-0.12*	-0.23
55-64	0.15	0.03	0.26	Caring, Leisure And Other Service Occupations	-0.26	-0.17*	-0.25
Age (quadratic)	0.00	0.00	0.00	Sales And Customer Service Occupations	-0.02	-0.08	0.05
Highest qualification (<i>Ref: degree or equivalent</i>)				Process, Plant And Machine Operatives	-0.07	-0.10	-0.02
Other higher education	0.02	-0.02	0.01	Elementary Occupations	-0.26***	-0.25**	-0.32***
A-level or equivalent	-0.07*	-0.04	-0.09	Industry (<i>Ref: Education</i>)			
GCSE grades A*-C or equivalent	-0.05	0.02	-0.13	Agriculture, forestry and fishing	0.02	0.05	0.01
Other qualifications	-0.08	-0.06	-0.01	Mining and quarrying	0.10	0.10	
No qualification	-0.03	-0.02	-0.04	Manufacturing	0.13	0.17*	0.16
Don't know	-0.06	-0.16	0.04	Electricity, gas, air cond supply	0.05	-0.02	0.21
White Ethnicity (<i>Ref: Nonwhite</i>)	-0.02	-0.03	-0.03	Water supply, sewerage, waste	0.15	0.07	0.22
Married / civil partner (<i>Ref: Not married</i>)	-0.02	0.02	-0.04	Construction	0.05	-0.02	0.19
1 or more dep. child at home (<i>Ref: No children</i>)	0.02	-0.04	0.04	Wholesale, retail, repair of vehicles	0.14	0.17*	0.11
British Nationality (<i>Ref: Not British</i>)	-0.04	-0.01	-0.08	Transport and storage	0.16	0.15	0.20*
Wage in Q1	0.75***	0.77***	0.72***	Accommodation and food services	0.33***	0.37***	0.27*
London as place of work (<i>Ref: Not London</i>)	0.06	0.00	0.11	Information and communication	0.15	0.12	0.17
Tenure (<i>Ref: <1 year</i>)				Financial and insurance activities	0.25*	0.05	0.41**
Between 1 and 5 years	-0.02	-0.09	0.00	Real estate activities	0.02	-0.09	0.27*
Between 5 and 10 years	-0.02	-0.12*	0.02	Prof, scientific, technical activ	-0.01	-0.07	0.04
10 years or more	-0.01	-0.09	0.03	Admin and support services	0.15	0.12	0.23
Public sector (<i>Ref: Private sector</i>)	0.06	0.06	0.09	Public admin and defence	0.06	0.12	-0.01
Part-time contract (<i>Ref: Fulltime</i>)	-0.02	-0.07	0.01	Health and social work	0.05	0.08	0.01
Temporary role (<i>Ref: Permanent role</i>)	0.24*	0.16	0.29	Arts, entertainment and recreation	0.23*	0.20*	0.26*
				Other service activities	0.21	0.23*	0.19
				Households as employers	0.05		0.09
				Extraterritorial organisations	0.25**	0.25**	
				Work from home (<i>Ref: Not working from home</i>)	0.03	0.01	0.05
				Manager/foreman/supervisor (<i>Ref: Not manager</i>)	0.02	0.02	0.06
				Constant	1.80***	1.69***	1.92***
				Observations (unweighted)	921	445	476
				R-squared	0.76	0.77	0.78

*** p<0.001, ** p<0.01, * p<0.05

Notes: (1) Job-related education and training defined as respondents who completed job-related training or education in the last 3 months (ED13WK & FUTUR13).

Current status of the research

So far, the findings show:

- Broad **consistency with the existing literature**
- Some **emerging trends** about gender interacting with occupation and skill level to affect take-up of job-related training
- Some evidence of job-related training leading to **higher returns for women**



Next steps:

- Further analysis
- Robustness checks

Findings: Overview

RQ1: Who accesses job-related training in the UK?

- 1) The pandemic had a larger negative effect on male than female participation in job-related training, and male participation took longer to rebound immediately after the pandemic, but **male participation has increased three times as fast as female participation over the last two years** and, if this trend continues, male participation will overtake female participation rates by Q2 2027.
- 2) **Those who participated in job-related training are not those the most in need of reskilling and/or upskilling.** In most quarters, those with higher educational attainment was a significant predictor, but other personal characteristics were not once job-related factors were included. For job-related factors, tenure, public versus private sector, having managerial responsibilities, and occupation and industry were significant predictors in most quarters reviewed. However, these factors explain only 6-7% of the variation in job-related training participation.
- 3) **The minority gender in an industry has lower job-related training rates.**
- 4) **Skill level matters when examining men and women's participation in job-related training by occupation:** Women make up a minority of high-skilled occupations but consistently train more than men (2013 – 2023). The gender difference in participation in mid-skilled occupations is less stark; and both men and women have low rates of training in low-skilled occupations.

RQ2: Do people who engage in job-related training in the UK see an increase in income?

- 5) **Women participating in job-related training are statistically more likely to have a higher wage in 12-15 months' time than those who did not participate,** though the same trend is not observed for men.



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Appendix

Definitions

Contexts of learning,
reskilling & upskilling

Contexts of learning

Formal

- Occurs in a **structured form of education** in schools, vocational education and training institutes, colleges, and universities
- Leads to a certificate recognised in the **national qualification framework**¹

Non-formal

- Occurs in **structured education within and outside educational institutions**
- **Do not lead to a certificate recognised** in the national education framework¹
- For example: adult literacy programmes, basic education for out-of-school children, courses on life skills

Informal

- Neither structured nor leads to a certificate recognised by the national education framework¹
- For example: observing other people, unscheduled activities with a coach or expert, spontaneous instruction from a colleague at work

Upskilling & reskilling

Upskilling

- Acquiring **additional** skills in a specific domain to enhance employability and adaptability²
- Helps individuals meet the changing demands of the labour market by **building upon their existing knowledge and competencies**

Reskilling

- Acquiring **new** skills to transition into a different occupation or industry²
- Involves **a more substantial transformation** in an individual's skill set and career trajectory
- May involve developing entirely new skills or building upon existing ones to meet the requirements of **alternative** roles²

Job-related training most likely takes place in non-formal learning, though it may also be in formal or informal contexts. It may be for reskilling or for upskilling purposes.

Determinants of learning (1/2): Personal factors

Existing literature	Considerations
<p>Age: Older individuals are less likely to participate in education (Davis, 1996; Lindsay et al., 2013; OECD, 2019; Wolbers, 2005)</p>	<ul style="list-style-type: none">• There are cross-country differences in whether this learning is achieved inside or outside the formal education system (Beblavy et al, 2014)• Early retirement schemes discourage participation of older workers and flexible retirement schemes encourage it (Fouarge & Schils, 2009)
<p>Previous educational attainment: Individuals with higher educational attainment levels are more likely to engage in adult learning (Dieckhoff & Steiber, 2011; Wolbers, 2005; Boeren, 2009; Kilpi-Jakonen et al., 2015; Lindsay et al., 2013; Roosmaa et al., 2019)</p>	<ul style="list-style-type: none">• Perhaps participation is driven more by perception of job insecurity (Elman & O’Rand, 2002)
<p>Gender: Women are more likely to participate in formal learning, but men are more likely to engage in non-formal learning (Daemmrich et al., 2016; Dieckhoff & Steiber, 2011; Kilpi-Jakonen et al., 2015; Knoke & Ishio, 1998; Wolbers, 2005; Zoch, 2023)</p>	<ul style="list-style-type: none">• Country-specific contexts: liberal countries, like the UK, show comparatively high participation rates for women (Kilpi-Jakonen et al., 2015)• Women may be more likely to take part-time work, which has lower rates of training participation (Dieckhoff & Steiber, 2011)
<p>Caregiving responsibilities: Some research finds that women with children are less likely to participate (Zoch, 2023), while others find that there is no effect (Dieckhoff & Steiber, 2011), perhaps masked by women masking these effects by ‘catching up’ to compensate for time spent away from the labour market. Men with children participate more (Dieckhoff & Steiber, 2011)</p>	
<p>Marital status: Married or cohabitating individuals are more likely to receive education compared to single people (Cai, 2011; Hällsten, 2011; O’Connell & Byrne, 2012)</p> <p>Marital premium applies more to men than for women</p>	<ul style="list-style-type: none">• Single workers more likely to participate in formal education programs compared to married workers in some cases (Zhang & Palameta, 2006)

Determinants of learning (2/2): Work-related factors

Existing literature

Considerations

Contract type (permanent/temporary): Permanent employees are more likely to participate (Cai, 2011; Lindsay et al., 2013; O'Connell & Byrne, 2012)

- Overall labour market context (Dieckhoff, 2007; Ortiz, 2010)

Working time (full-time / part-time): Full-time workers are more likely to participate (Lindsay et al., 2013; Albert et al., 2010). Those with more working hours had higher participation rates (Görlitz & Tamm, 2016; Almeida & Aterido, 2008)

Occupation: Professionals, technicians, and associate professionals had higher participation rates compared to semi- or unskilled manual workers (Wolbers, 2005; Groenez, 2007)

- This finding holds across public and private sectors (Lindsay et al., 2013)
- Women face larger disadvantages when in male dominated occupations (Dieckhoff & Steiber, 2011; Wotschack, 2019)

Industry: Financial institutions and other services have higher levels of training (Albert et al., 2010)

Tenure: As years of service increase, rates of *general* training decrease (though this does not hold for specific training) (Albert et al., 2010)

Previous unemployment: Previous unemployment spells were associated with lower rates of adult learning participation (Dieckhoff, 2007)

- May be confounded by education levels and personality traits (Dieckhoff, 2007)

Firm size: Larger firms are more likely to provide training (Wotschack, 2019; Galindo-Rueda et al., 2002; O'Connell & Byrne, 2012)

Additional finding:
Occupational
skill levels
correlate with
wage disparities
in Q5, even after
controlling for
initial wage,
personal factors
and other job-
related factors

Pairwise comparisons of marginal linear predictions, run for Model 2 (using Q1 2022 – Q1 2023 data)

Occupation pair	All	Male	Female
Administrative And Secretarial Occupations vs Managers, Directors And Senior Official	-0.161* (0.071)		
Administrative And Secretarial Occupations vs Professional Occupations	-0.133** (0.048)	-0.202* (0.085)	
Caring, Leisure And Other Service Occupations vs Managers, Directors And Senior Official	-0.285* (0.14)	-0.170* (0.068)	
Elementary Occupations vs Administrative And Secretarial Occupations	-0.122* (0.06)		-0.239* (0.093)
Elementary Occupations vs Associate Professional Occupations	-0.197** (0.059)	-0.178* (0.078)	-0.279** (0.081)
Elementary Occupations vs Managers, Directors And Senior Official	-0.284*** (0.075)		-0.408*** (0.11)
Elementary Occupations vs Process, Plant And Machine Operatives	-0.185** (0.069)		-0.303** (0.107)
Elementary Occupations vs Professional Occupations	-0.255*** (0.061)	-0.248** (0.078)	-0.324*** (0.092)
Elementary Occupations vs Sales And Customer Service Occupations	-0.231** (0.079)	-0.168* (0.073)	-0.372*** (0.103)
Elementary Occupations vs Skilled Trades Occupations	-0.200** (0.068)		
Skilled Trades Occupations vs Managers, Directors And Senior Official			-0.312* (0.157)
Skilled Trades Occupations vs Professional Occupations	-0.117* (0.054)		
Design df	920	444	475
Observations (unweighted)	2,235	1,065	1,170

*** p<0.001, ** p<0.01, * p<0.05

Data sources

Quarterly dataset

Office for National Statistics, Social Survey Division, Northern Ireland Statistics and Research Agency, Central Survey Unit. (2023). *Quarterly Labour Force Survey, 1992-2023: Secure Access*. [data collection]. 38th Edition. UK Data Service. SN: 6727, DOI: <http://doi.org/10.5255/UKDA-SN-6727-39>

5-quarter dataset (longitudinal)

Source: Office for National Statistics, Social Survey Division (2023). *Labour Force Survey Five-Quarter Longitudinal Dataset, July 2010 – Mar 2023: Secure Access*. [data collection]. 15th Edition. UK Data Service. SN: 7909, DOI: <http://doi.org/10.5255/UKDA-SN-7909-15>