We don't need no (over)education: Overeducation and skill mismatch among UK graduates

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19th June 2025

Labour Force and Annual Population Surveys User Conference

National Institute of Economic and Social Research

Introduction

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- **Human capital theory** has shown a positive relationship between education and wages.
- However, studies have shown that having the **required qualification** for the job matters.
- Graduates who have invested heavily in their education **might not experience the expected returns.**

Motivation - The UK Perspective

- 37% of adults are overqualified in the UK, the highest proportion among all OECD countries (OECD,2024).
- **Since the late 1980s**, rising university enrolment and automation of cognitive tasks have led to an oversupply of graduates, exceeding what the labour market can effectively absorb.
- But the UK continues to face **significant skill shortages.**
- Is it the **quality of degrees** rather than the quantity of degrees?
- **Hence, a crucial issue is to account for graduates' skill heterogeneity.**

Motivation - Why 'Skill' is Difficult to Quantify?

- Many aspects of individuals' skill sets are **difficult to measure.**
  - **Cognitive skills** are typically associated with the quantity and quality of formal schooling.
  - **Non-cognitive skills** include a range of personal characteristics such as personality traits and motivation, which are related to labour market outcomes but are typically more difficult to measure.
- Omitting key skills from analysis risks omitted variable bias, which is at the basis of the **endogeneity problem prevalent** in the overeducation literature.

This Paper - Main Objectives

- Presents **new evidence** on overeducation in the UK, focusing on graduate heterogeneity.
- Explores the role of occupational skill content, as classified by the ONS.
- We also account for graduates **university background** by including information on the selectivity of higher education institutions and graduates' degree classification.
- We also look at whether graduates **earned their degrees in the UK or abroad.**

Data

Data - Annual Population Survey

- Using four rounds of the **Annual Population Survey (APS)** covering the **2017-2020 period**.
- Our sample includes **all employees in full-time employment holding an undergraduate degree**, observed over the 2017-2020 period.
- The sample encompasses **over 18,000 individuals per year**, with 15,700 individuals in 2020.
- **2019** will be used as the benchmark to avoid any possible inconsistencies due to the COVID-19 pandemic.

Data - Key Variables

- **For each graduate**, we use information on individual characteristics (gender, age, experience, contract), region of residence (International Territorial Level 1) and industry (nine industries at the 1-digit SIC level).
- In addition, we include the following dummy variables;
  - **University Selectivity**
  - **Degree Classification**
  - **Stem Degree**
  - **UK Degree vs Foreign Degree**

Measuring Overqualification

- **Benchmark** constructed at the 3-digit Standard Occupation Classification (SOC) codes.
- For each occupation, we compute the average educational qualification +/- **1 standard deviation.**
- Levels of education above the benchmark identify **overqualification**, while levels or years below are defined as **underqualification**.
- **By construction,** no graduate worker can be classified as underqualified.
- To mitigate a potential age composition bias, we construct estimates of required education for two age groups: **(i) 16 to 35 years**, and **(ii) 36 to 64 years**.

Accounting for Skill Heterogeneity

- We use information on the skill content of occupations provided by ONS(2010).
- The **underlying assumption** is that the skill content of the occupation reveals the graduate's true skills.
- The ONS classifies all occupations under 4 skill groups based on the concept of **'skill level'** and **'skill specialisation'**

ONS Classifications of Skills

Table 1: Occupations Skill Taxonomy

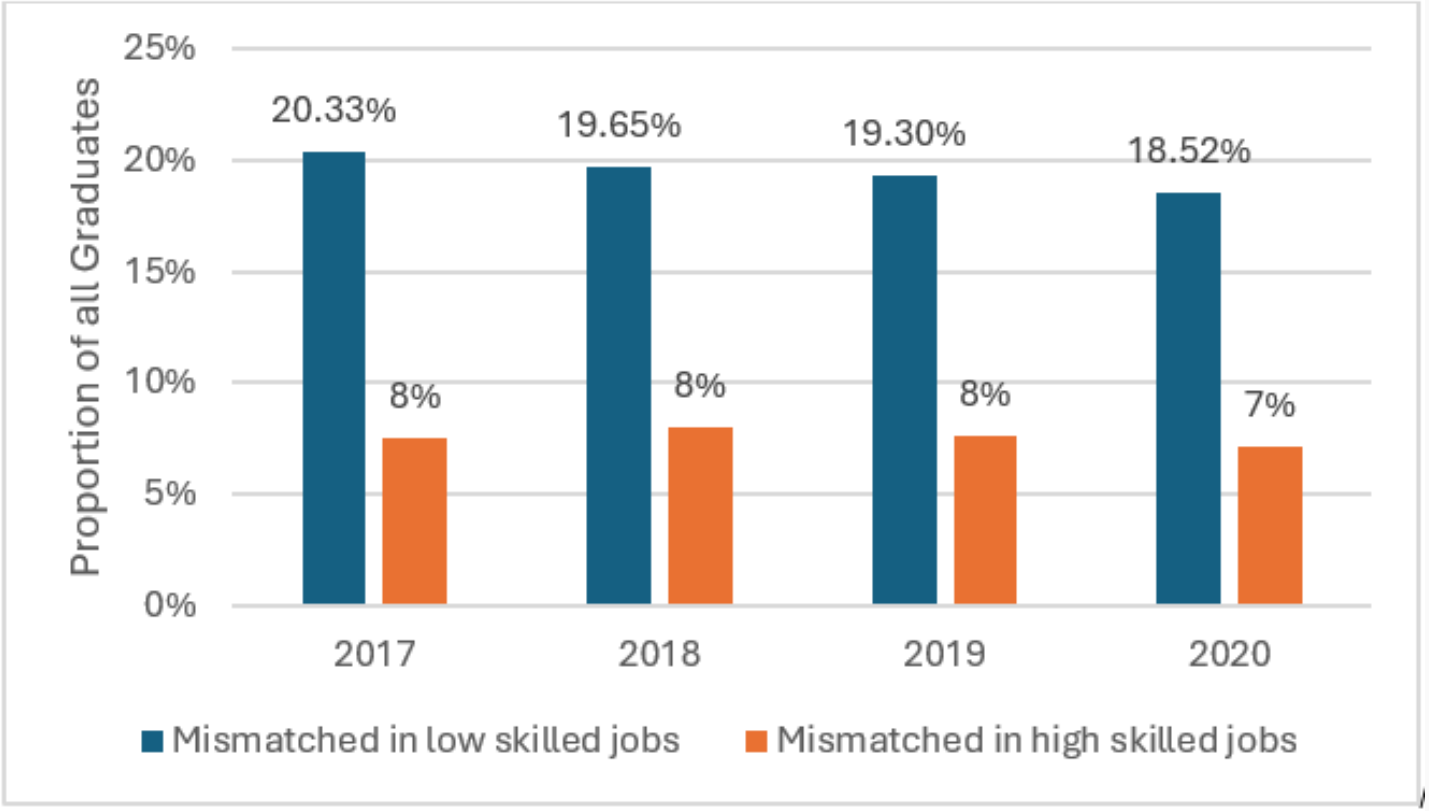
	Description	Examples
Low skills	Competence associated with general education is usually acquired during compulsory education.	Postal workers, hotel porters, cleaners, catering assistants
Lower Middle	Require knowledge provided via a good general education, plus a longer plus a longer period of work-related training or work experience	Machine operation, driving, caring occupations, retailing, clerical and secretarial occupations
Upper middle	Occupations that normally require a body of knowledge associated with a period of post-compulsory, but not normally to a degree level.	Trades occupations and proprietors of small businesses
High skills	Occupations requiring a degree or equivalent period of relevant work experience.	High-level managerial positions in corporate enterprises or national/local government.

Key Assumptions

- The **underlying assumption** is that the skill content of the occupation reveals the graduate's true skills.
- We distinguish between 2 groups: **(i) those employed in high- and intermediate-high-skilled occupations**; and **(ii) those in the intermediate-low and low-skilled occupations.**
  - For **group (i)** graduates have more skills than the job demands. Thus, both overeducated and overskilled.
  - For **group (ii)** graduates may be overeducated, but their skills align with job requirements. Thus, overeducated but not overskilled.
  - **Only group (i)** reflects a **true skill mismatch.**

Mismatch Status vs Overqualification

Figure 1: Mismatched graduates in high-skilled and low-skilled jobs, 2017-2020



Source: Annual Population Survey (APS), 2017-2020.

The Probit Model

Introduction to Probit Model

- We have two categories (matched and mismatched).
- The dependent variable (y) represent overqualification status.
- One unit increase, increases/decreases your probability of being mismatched.
- The omitted category is graduates in graduate-level occupations.

$$y = \begin{cases} 0 = \textit{graduate in graduate job (matched)} \\ 1 = \textit{graduate in non graduate job (overqualified)} \end{cases}$$

Introduction to Multinomial Probit Model

We distinguish between three categories:

(a) Graduates in graduate jobs **(matched – our benchmark)**

(b) Graduates in non-graduate high-skilled jobs

(c) Graduates in non-graduate low-skilled jobs

The Omitted category is graduates in graduate-level jobs.

Results: Probability of Overqualification (Marginal Effects)

	(1) Overqualified	(2) Overqualified in low-skilled jobs	(3) Overqualified in high-skilled jobs
Russell Group	-0.085***	-0.068***	-0.014***
First-class degree	-0.077***	-0.064***	-0.010*
STEM subject	-0.076***	-0.074***	-0.003
UK-born, foreign degree	0.005	-0.009	0.013
Foreign-born, UK degree	0.039**	0.186**	0.007
Foreign-born, foreign degree	0.117***	0.097***	0.028***
Recent graduates	0.024	0.029*	-0.007
Female	0.023***	0.074***	-0.049***
Permanent job	-0.033	-0.068***	0.044***
Small company	0.039***	0.013	0.025***
Other controls	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes
Observations	18,236	18,236	18,236

Estimating the Wage Equation

Relationship between Overqualification and Wages

We start from a standard Verdugo and Verdugo (1998) model:

$$\ln(\quad) = x\beta + y_1 D^O + y_2 D^U + y_3 E^T + \epsilon_i \tag{1}$$

Graduates only:

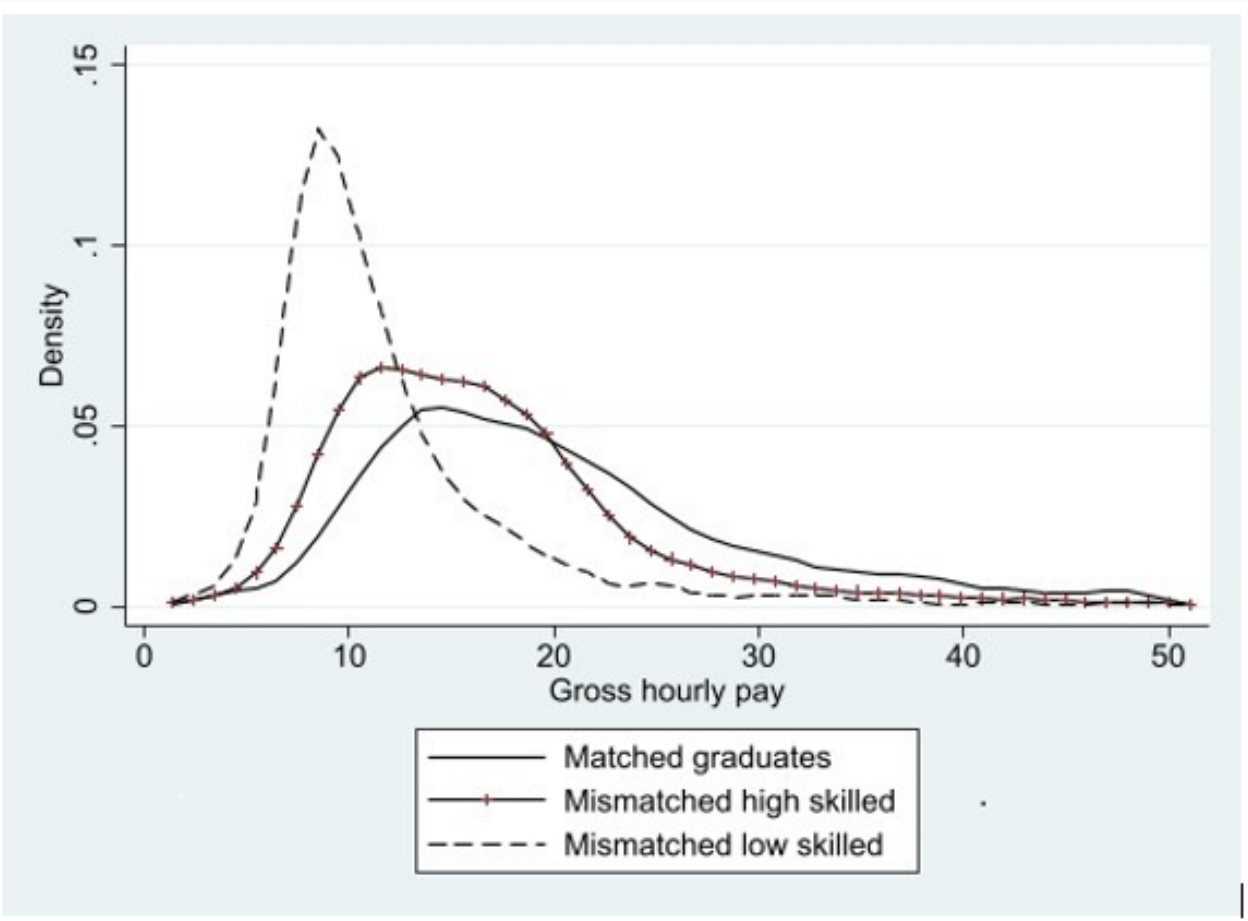
$$\ln(\quad) = x\beta + y_1 D^O + \epsilon_i \tag{2}$$

Accounting for differences in skills amongst graduates:

$$\ln(\quad) = x\beta + y_1 D^{HS} + y_2 D^{LS} + \epsilon_i \tag{3}$$

Results: Wages and Overqualification - 1

Figure 2: Distribution of hourly wages by mismatched status



Notes: levels of hourly wages above £50 per hour and below £2.5 per hour are not included in this figure. Source: Annual Population Survey (APS), 2019.

Results: Wages and Overqualification - 2

	(1) OLS	(2) OLS	(3) OLS
Overqualification	-0.320***	-	-
Overqualified in a low-skilled job	-	-0.363***	-0.362***
Overqualified in a high-skilled job	-	-0.210***	-0.209***
Russell Group	0.107***	0.107***	0.104***
First-class degree	0.046****	0.045***	0.043***
STEM subject	0.025***	0.024***	0.020**
Recent graduates	-0.078***	-0.076***	-0.077***
UK-born	0.054***	0.052***	-
UK-born, non-UK degree	-	-	0.000
Non-UK-born, UK degree	-	-	-0.023
Non-UK-born, non-UK degree	-	-	-0.075***
Female	-0.117***	-0.107***	-0.107***
Permanent job	-0.069**	-0.061**	-0.061**
Small company	-0.177***	-0.179***	-0.180***
Other controls	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes
Constant	1.215***	1.237***	1.285***
Observations	14,048	14,048	14,048
Adjusted R-squared	0.377	0.383	0.383

Conclusion

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- Approximately 7.64% of graduates are overqualified in high-skilled occupations **(skill mismatch)**, while the remaining 19.3% are overqualified in low-skilled occupations.
- 6% of graduates employed in low-skilled occupations graduated outside the UK
- Wage penalty for mismatched graduates estimated between 20% and 36.2%.
- Wage premium associated with anstrong academic background, as well as for degrees obtained in the UK.
- Gender discrimination continues to remain a significant feature.

Conclusion - Policy Recommendations

- Increase entry standards might be a possibility **but** it might prevent students from disadvantaged background to benefit from university education.

The evidence also shows:

- Reduce class size can promote students' achievement - which is negatively associated with overeducation (Bandiera et al. 2010).
- Strengthening collaborations between universities and employers (Pereira et al., 2020).
- Improving alignment between skills acquired abroad and UK labour market requirements could help reduce the extent of overqualification among foreign graduates.