Studies in Higher Education

ISSN: 0307-5079 (Print) 1470-174X (Online) Journal homepage: www.tandfonline.com/journals/cshe20

Beyond earnings: the multidimensional job quality premiums for university graduates in European labour market

Sangwoo Lee & Cesar Burga Idrogo

To cite this article: Sangwoo Lee & Cesar Burga Idrogo (12 Oct 2025): Beyond earnings: the multidimensional job quality premiums for university graduates in European labour market, Studies in Higher Education, DOI: 10.1080/03075079.2025.2571637

To link to this article: https://doi.org/10.1080/03075079.2025.2571637

STUDIES IN HIGHER EDUCATION
https://doi.org/10.1080/03075079.2025.2571637

Routledge
Taylor & Francis Group

Beyond earnings: the multidimensional job quality premiums for university graduates in European labour market

Sangwoo Lee[a] and Cesar Burga Idrogo[b]

[a]University of Warwick, Coventry, UK; [b]University College London, London, UK

ABSTRACT

This study examines how university education relates to multidimensional job quality beyond conventional earnings premiums across European labour markets. Drawing on the European Working Conditions Survey data collected in 2005, 2010 and 2015 from 26 countries, complemented by various national indicators, the study employs random-slope multilevel models to investigate graduate premiums across six job quality dimensions, their temporal evolution and the moderating role of educational expansion. The findings reveal substantial but highly heterogeneous graduate job quality premiums across different dimensions. The largest premium appears in *Skills and Discretion*, with moderate premiums in *Physical Environment* and *Prospects*. In contrast, no significant premiums are found for *Social Environment*, *Working Time Quality* or *Work Intensity*, indicating that graduate advantages are concentrated in specific job quality dimensions rather than universally distributed. Temporal patterns reveal selective changes rather than systematic stability, with temporary deteriorations in *Physical Environment* and *Work Intensity* around 2010 and some decline in *Skills and Discretion* by 2015. The magnitude of graduate premiums is moderated by national levels of tertiary educational attainment, with countries that have higher tertiary attainment rates, on average, show smaller job quality premiums in *Skills and Discretion* and *Physical Environment*, though this pattern is absent in other dimensions. These findings demonstrate that returns to higher education are neither uniform across job quality dimensions nor stable across institutional contexts, highlighting the importance of multidimensional frameworks for understanding graduate labour market outcomes.

ARTICLE HISTORY
Received 4 July 2025
Accepted 2 October 2025

KEYWORDS
Job quality; higher education; labour markets; graduate premiums; educational expansion; Europe

1. Introduction

The nature of work has undergone profound transformations in recent decades, with significant implications for how we conceptualise and measure job-related outcomes. Despite predictions of the 'end of work' due to digitalisation (Arntz, Gregory, and Zierahn 2016), individuals continue to dedicate substantial portions of their lives to employment, with work remaining central to both economic systems and personal identities. Given the ongoing yet changing nature of employment patterns, job quality has emerged as a crucial metric beyond earnings. Simultaneously, the global

CONTACT Sangwoo Lee Sangwoo.lee@warwick.ac.uk University of Warwick, Coventry, UK
Supplemental data for this article can be accessed online at https://doi.org/10.1080/03075079.2025.2571637.

landscape of higher education has witnessed remarkable expansion, with university enrolment more than doubling since 2000 to approximately 222 million students in 2024 (World Bank 2024). This convergence of workplace transformation and educational expansion raises crucial questions about returns on higher education, particularly given the considerable private and public resources devoted to tertiary education.

The extraordinary growth in higher education participation demands a comprehensive reassessment of graduate outcomes. As university education becomes increasingly accessible yet costly, students, families and policymakers require more robust evidence regarding the fuller range of returns on this substantial investment. Traditional analyses focusing solely on earnings premiums fail to capture both the complex trade-offs between monetary and non-monetary job benefits and the multidimensional nature of job quality that shapes individuals' overall work experiences and well-being. Individual workers nowadays increasingly value and negotiate for employment characteristics beyond compensation, including autonomy, flexibility, job security and conducive social environment (Green 2006; Kalleberg 2011). Growing empirical evidence demonstrates that these non-monetary aspects of work play an increasingly critical role in shaping health outcomes, job satisfaction and overall quality of life (Green et al. 2024; Wang et al. 2022). Furthermore, rising concerns about graduate underemployment and skill mismatches necessitate this broader framework for evaluating graduates' employment outcomes beyond simplistic binary measures of employment status or earnings.

The concept of 'job quality premiums' introduced in this study refers to the (dis)advantages that university graduates experience across multiple dimensions of job quality, compared to non-graduates. Drawing upon the job quality framework established by Eurofound (2012), this study examines six distinct non-monetary dimensions, including *Prospects, Skills and Discretion, Social Environment, Physical Environment, Work Intensity* and *Working Time Quality*. By adopting this comprehensive approach, this study moves beyond the limitations of traditional income-focused analyses to capture the fuller spectrum of employment benefits potentially derived from higher education.

The European context provides a particularly valuable setting for this investigation, providing substantial variation in institutional arrangements, labour market structures and higher education systems. Utilising the European Working Conditions Survey (EWCS) in 2005, 2010 and 2015, this study addresses three key research questions: (1) Do university graduates experience 'job quality premiums' compared to non-graduates? (2) How have these premiums evolved over time? And (3) How do national differences in the tertiary education attainment rate affect job quality premiums for graduates across European countries? By providing the first systematic examination of job quality premiums across multiple dimensions and European contexts, this study contributes significantly to our understanding of the comprehensive returns to higher education in the labour markets.

2. Theoretical framework: human capital theory complemented by the capability approach

Human capital theory (HCT), pioneered by Becker (1964) and Schultz (1961), conceptualises education as an investment in productivity-enhancing investment yielding labour market returns. Whilst traditionally applied to earnings, HCT also offers valuable insights into non-monetary job quality premiums through several mechanisms. Higher productivity makes graduates more valuable to employers, potentially enhancing job security, career prospects and access to professional development (Chevalier and Lindley 2009; Oreopoulos and Petronijevic 2013; Walker and Zhu 2008). In addition, specialised knowledge enables graduates to perform complex tasks with greater autonomy, reflected in the integration of *Skills and Discretion* in job quality framework (Eurofound 2012). University-acquired job search and negotiation skills may also help graduates secure positions with better working conditions (Purcell et al. 2013; Tomlinson 2012). However, HCT's emphasis on productivity and market valuation provides limited insight into how education shapes individuals' broader capabilities to access and benefit from quality employment. The capability approach,

pioneered by Sen (1999), provides a more comprehensive framework, conceptualising education as expanding individuals' substantive freedoms to pursue work aligning with their values. Within this framework, job quality fundamentally shapes how employment translates into capability enhancement, with high-quality jobs providing resources for capability expansion, fostering developmental environments and strengthening individual agency (Bonvin and Farvaque 2006; Sehnbruch 2008).

These perspectives offer distinct but interconnected lens for understanding graduate outcomes. HCT explains mechanisms through which education enhances productivity and generates employer demand, particularly for dimensions like *Skills and Discretion*. The capability approach provides an evaluative framework examining how credentials translate into expanded freedoms across multiple life domains. Whilst HCT effectively explains why graduates access certain job advantages, the capability approach illuminates why these multidimensional advantages matter beyond productivity gains. This synthesis recognises that whilst productivity enhancement drives certain graduate advantages, higher education's ultimate value lies in expanding substantive freedoms across all job quality dimensions. Moreover, this theoretical synthesis offers insights into potential variations in job quality premiums across various national contexts. Different welfare regimes, labour market structure and education systems create varying opportunity structures that influence how graduates convert their educational attainment into job quality outcomes. The capability approach's particular emphasis on conversion factors, i.e. personal, social and environmental conditions, that affect how resources translate into capabilities, provides a theoretical basis for examining cross-national variation in job quality premiums (Gangl 2001; Müller and Gangl 2003).

3. Relevant literature

3.1. Evolution of graduate labour market outcomes research

Graduate labour market research has evolved through distinct phases reflecting changing theoretical perspectives and labour market realities. Early studies, rooted in human capital theory, predominantly focused on employment rates and earnings as the primary indicators of successful transitions from (higher) education to work (Becker 1964; Mincer 1958; Psacharopoulos 1994). During this period, research consistently documented substantial earnings premiums associated with higher education across various national contexts (Blundell et al. 2000; Card 1999).

Rising graduate unemployment in the late 1990s shifted attention towards skill utilisation and job-qualification matches (Allen and van der Velden 2001; Green and McIntosh 2007). Researchers began distinguishing 'apparent' and 'genuine' overqualification (Chevalier and Lindley 2009) and examining differential impacts of overqualification versus skill underutilisation (Green and Zhu 2010). This research strand revealed increasing heterogeneity in graduate outcomes, with significant proportions of graduates experiencing some form of mismatch in their early careers (Levels, van der Velden, and Di Stasio 2014; Verhaest and Van der Velden 2013). Concurrent with the expanding focus on skills utilisation, researchers began examining graduate access to 'graduate jobs', or positions requiring degree-level qualifications (Elias and Purcell 2013; Green and Henseke 2016a). Whilst providing insights into graduate labour market stratification, this approach retained a dichotomous view distinguishing only between graduate and non-graduate occupations.

Most recently, research has embraced multidimensional job quality frameworks, recognising that graduates negotiate complex trade-off between monetary and non-monetary job characteristics, even within non-monetary features (Humburg and van der Velden 2015; Okay-Somerville and Scholarios 2013). However, despite sophisticated job quality frameworks, including Eurofound's (2012), systematic application to graduate outcomes remains limited. Existing multidimensional studies typically emphasise subjective job satisfaction over objective job quality indicators (Mora, García-Aracil, and Vila 2007), while longitudinal analyses continue prioritising earnings over broader job quality dimensions (Britton et al. 2020; Oreopoulos and Petronijevic 2013).

This study addresses these gaps by systematically applying a comprehensive job quality framework across multiple dimensions, time periods and 26 European countries, providing the first systematic analysis of how university education translates into multidimensional job quality premiums.

3.2. Cross-national variations in graduate labour market outcomes across Europe

Graduate labour market outcomes vary considerably across European countries, reflecting diverse institutional arrangements, educational systems and economic structures. A substantial body of research shows that the link between educational attainment and labour market outcomes is heavily mediated by national institutional configurations (e.g. Le, Wood, and Yin 2021; Marczuk 2024). Comparative studies consistently demonstrate that graduate premiums, typically measured through earnings or employment probabilities, differ significantly between countries (Hanushek et al. 2015; Reimer, Noelke, and Kucel 2008), shaped by interactions among educational systems, labour market regulations and welfare regimes.

Education system characteristics play a crucial role in determining graduate outcomes. Countries with highly stratified, vocationally oriented systems, such as Germany and the Netherlands, exhibit stronger links between educational credentials and initial labour market positions (Levels, van der Velden, and Di Stasio 2014; Müller and Gangl 2003). Conversely, less stratified academically oriented systems, common in Southern European, often show weaker education-employment linkages and longer school-to-work transitions for graduates (Wolbers 2007). Although the Bologna Process has sought to harmonise higher education across Europe, national differences in both structure and graduate outcomes persist (Storen and Arnesen 2011; Teichler 2011).

Labour market regulations also shape graduate transitions. Brzinsky-Fay (2007) highlights how different welfare state and labour market regimes generate distinct school-to-work patterns: liberal regimes (e.g. UK) enable rapid but potentially unstable labour market entry, while coordinated market economies (e.g. Germany) foster more stable, if slower, transitions. Such institutional variations affect not only employment probabilities but also job quality, as Gallie (2007) shows in relation to skill development opportunities, job security and autonomy.

Graduate labour markets differ further in occupational structures, public sector roles and industrial composition, creating diverse opportunity structures for graduates (Gangl 2001; Schomburg and Teichler 2011). Countries also vary in their capacity to absorb rising graduates numbers, leading to differing overeducation rates (Barone and Ortiz 2011; Verhaest and Van der Velden 2013). These disparities are compounded by economic conditions, which interact with institutional contexts to shape overeducation risks, especially during downturns (Tarvid 2013).

Beyond employment and overeducation, job quality also varies cross-nationally. Macroeconomic conditions, labour market institutions and welfare arrangements influence multiple job quality dimensions (Gallie 2013; Holman 2013). Eurofound (2012) reports substantial cross-national differences in multiple job quality dimensions, with Nordic countries consistently achieving higher job quality. Holman (2013) similarly finds that coordinated market economies tend to support better job quality, albeit with variations across different dimensions.

Despite this, the broader implications of institutional diversity for graduate job quality premiums remain under-explored. Whilst graduate earnings premiums (Britton et al. 2016; Noelke, Gebel, and Kogan 2012) and employment probabilities (Gangl 2003) have been examined, few studies assess how graduate premiums across multiple job quality dimensions vary between countries. Given Europe's institutional diversity, such analysis could yield valuable insights into how national institutional configurations shape the multidimensional returns to higher education.

3.3. Ability selection and its relationship with job quality dimensions

A persistent methodological challenge in estimating returns to higher education is ability selection bias – the tendency for individuals with higher ability to both enter university and secure better

employment outcomes (Card 1999; Heckman, Stixrud, and Urzua 2006). This bias can potentially inflate estimated returns, particularly earnings, where a large literature shows that omitting ability controls leads to upward-biased estimates (Blundell, Dearden, and Sianesi 2005; Carneiro, Heckman, and Vytlacil 2011). However, the implications of ability selection for job quality premiums require further theoretical consideration beyond its well-established effects on earnings.

In earnings research, ability selection is grounded in human capital theory: higher ability enhances productivity, raising earnings regardless of university attendance (Becker 1964). Empirical evidence confirms this, with ability-adjusted wage premiums reduced by 10–15% in the UK (Naylor, Smith, and Telhaj 2016) and by smaller margins elsewhere (Deming 2022; Denny, Harmon, and O'Sullivan 2004; Heckman, Humphries, and Veramendi 2018).

For non-monetary job quality dimensions, the relationship with ability is more varied and dimension specific. *Skills and Discretion* shows a moderate-to-strong theoretical linkage with ability, as higher cognitive ability may facilitate access to autonomous and cognitively demanding jobs (Gallie 2013), although this relationship is often mediated by organisational structures (Koehorst et al. 2021). *Prospects* (e.g. job security, progression) may also be influenced by ability but are more heavily shaped by broader structural factors (Kato and Scherbaum 2023).

In contrast, *Social* and *Physical Environments* show weak associations with individual ability, being largely driven by organisational culture, management practices and sectoral characteristics (Eurofound & ILO 2019; Karasek 1992; Siegrist et al. 2010). For example, Williams, Zhou, and Min (2020) found that ability has minimal influence on physical environment quality once occupation differences are accounted for. The relationship between ability and *Work Intensity* is more complex. Whilst higher ability can improve task efficiency, it may simultaneously lead to increased workload demands, particularly high-skilled occupations, which have disproportionate rises in work intensity over time (Green et al. 2022). Finally, *Working Time Quality* has a weak-to-moderate theoretical link to ability. Whilst schedule flexibility may serve as a reward for productivity among higher-ability workers (Williamson et al. 2024), working time arrangements are more commonly shaped by institutional and organisational policies than individual characteristics (Eldridge and Nisar 2011; Golden 2001).

These variations have significant methodological implications. Whilst robust ability controls are essential in earnings analysis, their necessity varies across job quality dimensions. Yet most large-scale surveys with job quality data (e.g. EWCS) lack direct ability measures, limiting conventional approaches. Rather than abandoning the analysis of job quality premiums, researchers must adopt strategies that acknowledge potential selection effects. First, findings must be interpreted with care, particularly for dimensions more plausibly linked to ability. Second, occupational and industry controls can partially account for ability-related sorting. Third, comparing outcomes across job quality dimensions with differing theoretical ties to ability can yield insight into the relative importance of selection. This study adopts such a multifaceted approach, guided by theoretical understanding and available data constraints.

4. Data, indicators and empirical approach

4.1. Dataset

The analysis utilises data from the European Working Conditions Survey (EWCS), collected by the European Foundation for the Improvement of Living and Working Conditions. The EWCS represents the most comprehensive survey on working conditions in Europe, having evolved since 1991 to encompass multiple dimensions of employment quality beyond traditional measures such as earnings and industry type, including work organisation, training, physical risks and workload. The study employs the EWCS integrated dataset from the UK Data Service, focusing on the 2005, 2010 and 2015 waves for their consistent job quality indicators. These waves used clustered random sampling with developed weights to ensure cross-country representativeness and comparability. Sample sizes

comprised 29,680 observations in 2005 and approximately 44,000 in both 2010 and 2015. The analysis includes 26 countries that were surveyed in all three waves and had complete country-level indicators available. Individual-level EWCS data are supplemented with country-level indicators from Eurostat (youth unemployment rates, tertiary education attainment for those aged 25–34, and government tertiary education expenditure as share of GDP), OECD (union density) and Harvard Growth Lab (Economic Complexity Index[1]).

4.2. Job quality indicators

In line with most scholars, this study adopts an objective definition of job quality, referring to job attributes that help meet workers' needs. These characteristics are distinct from, though related to, subjective experiences such as job satisfaction, and span both extrinsic features (often detailed in job contracts) and intrinsic aspects (e.g. tasks, relationships, working conditions) (Eurofound 2012; Felstead et al. 2019; Muñoz de Bustillo et al. 2011). While indicator sets vary substantially across studies (Stefana et al. 2021), most derive from the seven dimensions adopted by Eurofound (Eurofound 2012): *Earnings*, *Prospects, Skills and Discretion, Social Environment, Physical Environment, Work Intensity* and *Working Time Quality*.

The analysis constructs time-consistent indicators following Eurofound (2012) methodology but excludes *Earnings* due to two limitations: its high susceptibility to ability bias and its availability only in 2010 and 2015, restricting trend analysis. This exclusion is mitigated by extensive existing literature on graduate earnings premium across Europe (Green and Henseke 2021). The focus thus falls on the remaining six non-monetary dimensions, using variables from the EWCS, restricted to items consistently available across 2005, 2010 and 2015.

- *Prospects* include contract type, job security and career progression probability. This dimension reflects human capital theory's prediction that education enhances employer valuation and (Becker 1964), while also capturing workers' substantive freedoms to pursue valued life goals (Sen 1999)
- *Skills and Discretion* combine skills utilisation (e.g. solving unforeseen problems, complex tasks, learning new things, applying own ideas, training) with autonomy (e.g. choosing task, order, methods, speed, input into team composition). Drawing upon Karasek's (1979) demand-control model, this dimension represents both the conversion of educational investments into productive capabilities and worker agency.
- *Social Environment* captures both social support (from peers and managers) and absence of abuse (exposure to sexual attention, violence, bullying, harassment). This reflects how workplace relationship functions as both stress buffers and mechanisms for social learning and development.
- *Physical Environment* includes chemical/physical hazards (e.g. vibration, noise, temperature extremes, fumes, chemicals, infectious materials) and ergonomic risks (e.g. painful positions, lifting, heavy loads, repetitive movements). This dimension represents basic prerequisites for human dignity and functioning at work, fundamental to job quality frameworks (Bustillo et al. 2011).
- *Work Intensity* measures work pace through high-speed requirements and tight deadlines, availability of sufficient time to complete tasks, unforeseen tasks and interruptions. It also captures external pressures determining work pace, including colleagues' work pace, direct demands from people, performance targets, automatic machine speeds and direct control from supervisors. This dimension directly reflects Karasek's (1979) concept of job demands, the psychological stressors inherent in the work environment.
- *Working Time Quality* includes standard working hours and atypical working patterns (e.g. night work, weekend work, overtime, shift work), along with control over working time arrangements. As emphasised by research on working time mismatch, this captures workers' temporal flexibility

and capacity to achieve work-life balance, fundamental aspects of job quality and employee well-being (Ling, Wang, and Lu 2024).

Unlike Eurofound's summative methodology, this study constructs each index using Cronbach's Alpha, not for assessing reliability, given the pre-defined indicators, but as a method to generate standardised composite indices that capture the shared variance among items. This approach offers two key advantages over Eurofound's additive method: First, it avoids arbitrary weighting, enhancing construct validity. Second, it better accommodates missing data, preserving observations even when some variables are absent. Further details on the construction of job quality indicators using Cronbach's Alpha are provided in the Appendix.

All six indices were subsequently normalised to a 0–100 scale, where higher scores indicate better quality for all dimensions but *Work Intensity* where higher values indicate greater intensity and thus poorer working conditions.

4.3. Empirical approaches

To examine graduate job quality premiums across six dimensions and national contexts, multilevel linear regression models with random intercepts and random slopes for graduate status were employed. This modelling strategy accounts for the nested structure of individuals within countries and allows graduate premiums to vary across national contexts. The model is specified as follows:

$$Y_{ij} = \beta_{0j} + \beta_{1j} Graduate_{ij} + \sum_{K=2}^{n} \beta_{kj} X_{Kij} + r_{ij}$$

Where:

$$\beta_{0j} = \pi_{00} + \sum_{l=1}^{n} \pi_{0l} Z_{lj} + u_{0j}$$

$$\beta_{1j} = \pi_{10} + \sum_{l=1}^{n} \pi_{1l} Z_{lj} + u_{1j}$$

Y_{ij} indicates each of the six non-monetary job quality dimensions for individual i in country j; $Graduate_{ij}$ is the indicator for university education; X_{ij} denotes a vector of individual-level control variables (Level 1); Z_{lj} refers to country-level contextual variables (Level 2); r_{ij} is a normally distributed individual-level error term; u_{0j} is a normally distributed country-level error term for the intercept; and u_{1j} is a normally distributed country-level error term for the 'graduate' slope.

Individual-level Covariates (Level 1): The model includes controls for graduate status, demographic characteristics (gender, age, age-squared) and job characteristics (sector, firm size, industry classification, occupation [ISCO-88 2-digits]). The analysis employs a binary education classification distinguishing university graduates (ISCED levels 5–6) from non-graduates (ISCED levels 0–4). This classification encompasses substantial heterogeneity within the non-graduate group, particularly in countries with strong vocational systems, such as Germany and Austria, where non-graduates include both highly skilled apprentices and lower-skilled workers. This heterogeneity may attenuate the estimated graduate premiums, as skilled apprentices likely experience better job quality than the non-graduate average, making the findings more conservative.

Country-level Covariates (Level 2): Several theoretically grounded national-level indicators known to influence both higher education systems and labour market outcomes.

- Tertiary attainment rate: Reflects higher education expansion that may influence the relative value of degrees in the labour market (Green and Henseke 2021; Marginson 2016)
- Public expenditure on tertiary education: Captures national investment in higher education.

- Union density: Represents institutional protection of working conditions (Busemeyer and Iversen 2012)
- Youth unemployment rate: Indicates labour market tightness affecting graduates' bargaining power (Tholen 2014)
- Economic Complexity Index: Captures the knowledge intensity and sophistication of a country's economy

All country-level variables were standardised through grand-mean centring and scaled to standard deviation units. This facilitates interpretation and comparability of effect sizes, while also reducing potential multicollinearity in cross-level interactions (Enders and Tofighi 2007).

Temporal and interaction effects: To examine changes over time, survey year indicators for 2010 and 2015 (with 2005 as the reference year) were included, along with their interactions with graduate status. This allows for an assessment of how graduate job quality premiums have evolved over the 2005–2015 period. An interaction between graduate status and tertiary attainment rates was also included to test whether educational expansion moderates the graduate job quality premium.

Random effects structure: Random intercepts for countries (β_{0j}), allowing baseline job quality to vary across nations, and random slopes for graduate status (β_{1j}), permitting graduate premiums to differ between countries.

This specification enables the estimation of average graduate job quality premiums across Europe, while also capturing country-specific deviations and systematically assessing how national institutions moderate these outcomes.

5. Estimation and results

Table 1 presents the multidimensional job quality premiums for university graduates across European labour markets. The analysis reveals significant heterogeneity in how higher education translates into workplace advantages.

5.1. Average job quality graduate premiums across Europe

The results reveal significant but highly heterogeneous graduate premiums across different job quality dimensions. University graduates experience the largest premium in *Skills and Discretion* (5.99 points, $p < 0.01$), reflecting substantially greater autonomy, task complexity and skill utilisation in their work compared to non-graduates. *Physical Environment* shows the second largest premium (3.64 points, $p < 0.01$), indicating graduates access jobs with notably better physical working conditions and fewer environmental hazards. For *Prospects*, graduates enjoy an advantage (2.64 points, $p < 0.01$), suggesting enhanced job security and career progression opportunities. In contrast, *Social Environment* and *Work Intensity* show no significant difference between graduates and non-graduates, indicating that higher education does not systematically provide different workplace social dynamics or protect workers from excessive workload demands. Similarly, *Working Time Quality* shows no statistically significant graduate premium, suggesting that university degree does not protect against demanding working schedules or inflexible hours. This multidimensional pattern of graduate premiums extends our understanding of returns to higher education beyond conventional earnings measures, highlighting that graduate advantages predominantly manifest in skill utilisation, physical conditions and career prospects rather than in social, workload and working time arrangements aspects of employment.

5.2. Temporal evolution of graduate premiums

The analysis of interactions between graduate status and survey year reveals limited but notable temporal changes in job quality premiums. The data reveal a temporary deterioration in graduates'

Table 1. Graduate job quality premiums by dimensions.

	(1) Prospect	(2) Skills and Discretion	(3) Social Environment	(4) Physical Environment	(5) Intensity	(6) Working Time Quality
Year [Ref: 2005]						
2010	−0.122	1.521	0.428*	1.368***	−1.164***	1.243***
	(0.525)	(0.934)	(0.231)	(0.324)	(0.308)	(0.277)
2015	2.792***	5.304***	0.340	1.106**	−0.607	−0.753**
	(0.627)	(1.335)	(0.410)	(0.533)	(0.389)	(0.377)
Graduates	2.638***	5.993***	0.154	3.644***	−0.106	0.838
	(0.798)	(0.709)	(0.151)	(0.419)	(0.199)	(0.841)
Interaction Effects: Year # Graduates						
2010 # Graduates	−0.297	−0.710	−0.206	−0.850**	0.552**	−0.573
	(0.622)	(0.794)	(0.154)	(0.405)	(0.251)	(0.584)
2015 # Graduates	−1.311	−1.251*	−0.103	−0.638	0.478	−0.701
	(1.375)	(0.694)	(0.285)	(0.763)	(0.372)	(1.166)
Interaction Effects: Graduates # Tertiary Ed Attainment						
Non-graduates # Tertiary Attainment Rate	−0.403	−2.183***	−0.350	−0.010	0.144	1.008***
	(0.479)	(0.770)	(0.269)	(0.284)	(0.297)	(0.328)
Graduates # Tertiary Attainment Rate	−0.701	−2.411***	−0.386	−0.588***	0.160	0.641
	(0.674)	(0.747)	(0.245)	(0.195)	(0.375)	(0.507)
Male	2.154***	3.406***	−0.011	−1.735***	0.167	−3.767***
	(0.309)	(0.286)	(0.091)	(0.200)	(0.105)	(0.244)
Age	0.665***	0.625***	−0.032***	−0.155***	0.066**	−0.332***
	(0.076)	(0.071)	(0.010)	(0.033)	(0.030)	(0.058)
Age Squared	−0.008***	−0.007***	0.000**	0.002***	−0.001***	0.004***
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
Sector [Ref: Private]						
Public	1.382***	−0.092	0.179***	−0.658**	−0.568***	0.639*
	(0.418)	(0.331)	(0.068)	(0.287)	(0.175)	(0.348)
Other	0.178	0.780	0.118	−0.359	−0.435	0.265
	(0.273)	(0.531)	(0.105)	(0.315)	(0.318)	(0.421)
Firm Size [Ref: 1(Alone)]						
2–4	1.227	−2.445***	1.957***	−0.744	1.999***	3.357***
	(0.765)	(0.509)	(0.302)	(0.462)	(0.197)	(0.389)
5–9	1.299	−4.297***	2.047***	−1.139*	3.386***	6.112***
	(0.962)	(0.598)	(0.307)	(0.599)	(0.187)	(0.536)
10–49	1.843**	−4.619***	1.837***	−1.246**	3.904***	6.270***
	(0.784)	(0.567)	(0.263)	(0.583)	(0.171)	(0.443)

(*Continued*)

Table 1. Continued.

	(1) Prospect	(2) Skills and Discretion	(3) Social Environment	(4) Physical Environment	(5) Intensity	(6) Working Time Quality
50–499	2.003**	−4.418***	1.745***	−1.707***	4.211***	4.934***
	(0.870)	(0.522)	(0.269)	(0.509)	(0.173)	(0.430)
500+	2.949***	−3.449***	1.781***	−2.443***	4.446***	3.362***
	(0.869)	(0.647)	(0.277)	(0.424)	(0.337)	(0.521)
Industry	Included	Included	Included	Included	Included	Included
Occupation	Included	Included	Included	Included	Included	Included
Country-level Indicators						
Expenditure on Tertiary Education (standardised)	0.012	−0.426	−0.254	−0.051	−0.059	0.326
	(0.413)	(0.768)	(0.247)	(0.246)	(0.234)	(0.202)
Union Density (standardised)	0.777*	−0.456	0.035	0.478***	−0.453***	0.232
	(0.427)	(0.319)	(0.169)	(0.169)	(0.156)	(0.218)
Youth Unemployment Rate (standardised)	−1.609***	0.484	0.288***	−0.347**	0.589***	0.276*
	(0.229)	(0.592)	(0.086)	(0.165)	(0.128)	(0.158)
Economic Complexity Index (standardised)	−0.447	−2.996**	0.082	0.249	−0.539	−0.051
	(0.731)	(1.326)	(0.307)	(0.417)	(0.608)	(0.420)
Constant	43.571***	40.338***	94.391***	71.783***	14.682***	56.153***
	(2.757)	(1.656)	(0.466)	(1.350)	(1.640)	(2.215)
Between-Country Variance	2.05	2.13	0.18	1.06	0.364	2.36
Within-Country Variance	13.44	14.21	3.15	10.40	6.86	10.50
Observations	62,881	63,465	63,457	63,462	63,462	63,467

Note: Standard errors in parentheses. All models include sampling weights. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Work Intensity relative to non-graduates, with graduates facing increased work pressure in 2010 (0.55 points, $p < 0.05$). *Physical Environment* shows a significant decline in 2010 (−0.85 points, $p < 0.05$), while *Skills and Discretion* exhibit a marginally significant decline in 2015 (−1.25 points, $p < 0.10$). The remaining dimensions, i.e. Prospects, Social Environment and Working Time Quality, exhibited no statistically significant changes in graduate premiums over time, suggesting remarkable stability in these employment aspects throughout the period 2005–2015. These findings demonstrate dimension-specific temporal patterns in graduate job quality premiums. Mixed temporal patterns across job quality dimensions suggests that graduate advantages experienced notable volatility during the study period, with only *Prospects*, *Social Environment*, and *Working Time Quality* showing consistent stability.

5.3. Educational expansion effects

The interaction between graduate status and national tertiary attainment rates reveals robust evidence that educational expansion moderates job quality premiums across several dimensions. *Skills and Discretion* exhibit the strongest negative moderation effect (−2.41 points, $p < 0.01$), indicating substantially reduced graduate advantages in task complexity and autonomy in countries with higher levels of tertiary attainment rate, and a larger reduction than that experienced by non-graduates. Similarly, the *Physical Environment* premium shows significant negative moderation (−0.59 points, $p < 0.01$), suggesting that the benefits of higher education in terms of physical working conditions are less pronounced in contexts with higher rates of tertiary participation. Notably, non-graduates tend to enjoy better Working Time Quality where university degree attainment is more widespread, thereby reducing disparities between graduates and non-graduates. By contrast, the remaining dimensions, including *Prospects, Social Environment* and *Work Intensity,* show no significant moderation by tertiary attainment rates. Overall, these findings reveal a selective pattern where educational expansion primarily moderates job quality premiums in skills-related and physical environment dimensions, while other aspects remain unaffected by national university attainment levels.

5.4. Country-specific job quality premiums

Figure 1 illustrates country-specific graduate premiums across European regions, revealing distinct patterns in the magnitude across job quality dimensions. Dimensions with substantial variation show different regional patterns. *Skills and Discretion* exhibit considerable variation both within and across regions. Central and Eastern European countries generally show moderate to high graduate premiums (5.5–8.8 points), with some overlap with Western European countries which display substantial variation (3.8–8.7 points). Whilst some patterns align with institutional differences – such as consistently moderate premiums (2.3–4.5 points) in Northern European countries, reflecting strong institutional coordination – the distinction between coordinated and liberal market economies within Western Europe is less pronounced than theory might predict, with both Germany (7.1 points) and Switzerland (8.7 points) showing higher premiums alongside more moderate effects in the Netherlands (3.8 points). *Prospects* also demonstrate considerable variation across regions, with Southern Europe displaying the highest variation (0.8–7.5 points), Central and Eastern European countries showing consistently moderate to high premiums (2.0–4.9 points), and Northern Europe showing the most compressed range (−0.6–2.9 points).

Dimensions with limited variation show more uniform patterns. *Social Environment* demonstrates consistently marginal premiums across all regions (0.0–0.4 points), indicating that workplace social dynamics are largely unaffected by educational credentials once occupational and industrial soring is controlled. *Physical Environment*, *Work Intensity* and *Working Time Quality* exhibit mixed patterns, with moderate regional differences but no systematic institutional advantages.

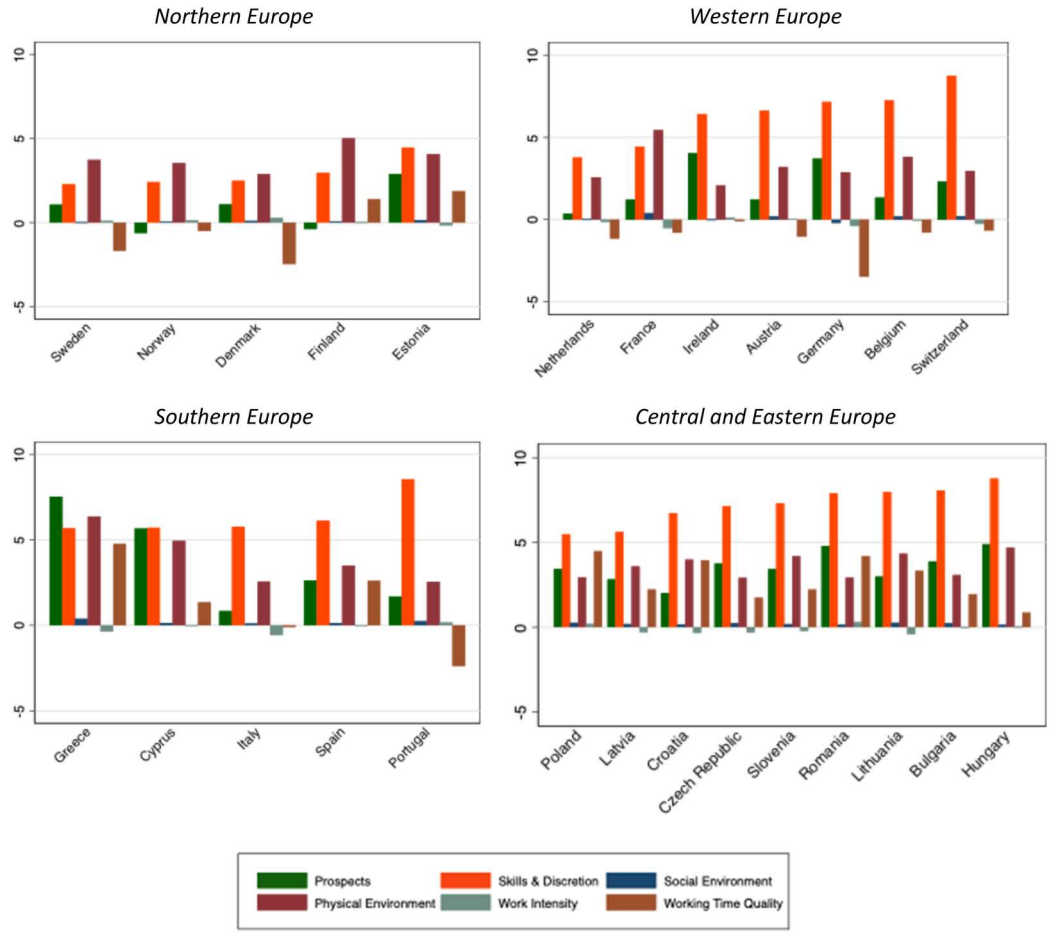

Figure 1. Country-specific graduate job quality premiums.

6. Discussion and conclusion

This study has examined multidimensional job quality premiums for university graduates across European labour markets, revealing significant heterogeneity across dimensions, general temporal stability with notable exceptions, moderation by educational expansion, and considerable cross-national differences.

First, the observed pattern of graduate premiums provides important insights into how higher education translates into workplace advantages. The substantial advantages in *Skills and Discretion Physical Environment,* and *Prospects,* contrasted with non-significant effects in *Social Environment, Work Intensity, and Working Time Quality,* challenge human capital theory's implicit assumption of uniform educational returns (Becker 1964). This selective pattern suggests that higher education's effects on individuals' workplace experiences operate differently across job quality dimensions rather than universally, supporting the integrated theoretical framework combining human capital theory with the capability approach. The large *Skills and Discretion* premium likely reflects the analytical and specialised competencies fostered by higher education, demonstrating that university credentials provide substantial advantages in accessing autonomous, cognitively demanding roles that utilise advanced problem-solving abilities. In contrast, the more modest premiums for *Physical Environment* and *Prospects* suggest that workplace safety conditions and job security are

also influenced by broader structural factors beyond individual educational qualifications, including organisational policies, industry characteristics and institutional labour protections.

The absence of significant premiums in *Social Environment* indicates that both graduates and non-graduates are exposed similarly to antisocial behaviours in the workplace, reflecting that interpersonal workplace dynamics operate largely independently of educational credentials once occupational and industrial sorting is accounted for. In addition, the absence of *Work Intensity* advantages may reflect that graduates face higher performance expectations and willingly accept increased work demands as career investment (Oreopoulos and Petronijevic 2013), while the lack of *Working Time Quality* premiums indicates that temporal arrangements are primarily determined by institutional factors, such as collective bargaining and labour regulations that apply uniformly across educational levels (Eldridge and Nisar 2011).

Second, the temporal analysis reveals selective changes in graduate premiums from 2005 to 2015, contrasting sharply with evidence of declining earnings premiums (Naylor, Smith, and Telhaj 2016) and challenging assumptions of uniform credential inflation across all employment outcomes. The temporary deterioration in *Physical Environment* and Work Intensity in 2010, along with some decline in *Skills and Discretion* in 2015, may reflect broader labour market shifts, such as effort-biased technological change and organisational restructuring affecting graduates disproportionately. This pattern suggests that graduates increasingly face trade-offs where enhanced skill utilisation and career prospects come at the cost of intensified work demands, reflecting both technological pressures and career investment strategies. However, the largely temporary nature of these effects and stability in other dimensions suggest that the fundamental benefits of university education have remained resilient, despite massification of higher education across Europe during this period (Eurostat 2024).

Third, the cross-national analysis of educational expansion offers a more differentiated picture. The interaction between graduate status and national tertiary attainment rates provides that, as the graduate population grows, the relative advantages of graduates diminish, but selectively. This selective attenuation is evident in *Skills and Discretion* and *Physical Environment*, lending partial support to credential inflation theories (Marginson 2016; Triventi 2013). However, the uneven nature of this decline, i.e. limited to specific dimensions, suggests that the rise in graduate proportions does not uniformly erode all job quality premiums. Rather than simply devaluing degrees, higher education expansion appears to restructure the composition of graduate premiums. Such a heterogeneous pattern supports Henseke's (2025) argument that we must recalibrate how we evaluate higher education, moving beyond monetary returns to capture the multidimensional impacts of mass expansion.

Fourth, the cross-national variation in graduate premiums further highlights institutional arrangements shape returns to education (Müller and Gangl 2003). The relatively large *Skills and Discretion* premiums observed in Central and Eastern European countries are consistent with the idea that university education offers a clearer productivity advantage in contexts where vocational training pathways are weaker and higher education expansion is relatively recent. However, our findings also reveal that several coordinated market economies, such as Germany and Switzerland, exhibit similarly high premiums, challenging the expectation that strong apprenticeship systems uniformly compress graduate advantages. While dual training systems may still narrow the skills gap between graduates and non-graduates in many coordinated market economies, these results highlight that even in well-institutionalised training regimes, graduates retain significant advantages in higher-autonomy and skill-intensive roles. In addition, the binary education classification used in this analysis encompasses substantial heterogeneity within the non-graduate group, particularly in these coordinated market economies where non-graduates include both highly skilled apprentices and lower-skilled workers, which may further contribute to more moderate graduate premiums. The negative *Working Time Quality* premiums observed in several Northern and Western European countries may indicate more equitable distribution of favourable working time arrangements across educational levels, potentially facilitated by stronger collective bargaining and labour

regulations that benefit all workers regardless of credentials (Eurofound 2021; Holman and Mcclelland 2011).

Despite these significant theoretical and empirical contributions, several limitations should be acknowledged. A key methodological concern is ability selection bias, where individuals with unobserved higher ability both attain degrees and secure better job quality outcomes. This bias is expected to vary by job quality dimensions: *Skills and Discretion* and *Prospects* may be more susceptible, while *Physical Environment* is primarily shaped by organisational or structural factors (Eurofound & ILO 2019). To address this, the Oster's (2019) method was used to assess robustness to omitted variable bias.[2] Table 2 presents robust findings that both confirm and challenge the theoretical expectations.

The *Physical Environment* premium remains robust after bias adjustment, declining by 33.2% to 2.43 points, suggesting moderate influence of ability bias. *Skills and Discretion* show some sensitivity to unobserved ability, with 34.5% reduction but retaining substantial magnitude. *Prospects* experience the largest adjustment with a 40.7% reduction but remains positive and meaningful. Overall, while the adjustments range from 33–41%, all dimensions retain positive effects, supporting the conclusion that university education confers genuine multidimensional job quality premiums, not fully explained by selection effects.

In addition, data constraints arise from the EWCS being primarily a working conditions survey rather than an education-focused survey, lacking detailed information on educational backgrounds such as field of study and institution type. The temporal scope covers 2005, 2010, 2015, with 2020 excluded due to changes in survey mode from COVID-19 disruptions.

Overall, these findings advance the graduate employability and labour market outcome literature by providing the first systematic evidence that non-monetary job quality premiums exist across multiple dimensions and vary significantly across institutional contexts, extending beyond traditional employment/earnings measures to capture higher education's broader roles in expanding workers' capabilities and substantive freedoms (Sen 1999). Whilst degrees maintain its value for developing advanced skills and securing better career prospects and physical environments, they provide more limited gains in social interactions, working time arrangements and workload. Further, this trade-off may help explain the so-called 'paradox of the dissatisfied graduate' whereby objective job advantages, e.g. higher pay, fail to translate into higher subjective wellbeing (Brown, Lauder, and Ashton 2011; Green and Henseke 2016b). Although selection effects prevent definitive causal claims, the systematic patterns across dimensions, countries and time periods, particularly the robust performance under conservative assumptions, provide strong evidence that higher education generates genuine multidimensional job quality advantages consistent with theoretical predictions.

These findings have important implications for policy and future research. Policymakers and universities should adopt a more holistic approach to evaluating graduate outcomes, considering not only earnings and employment but also job quality across multiple dimensions, as this better reflects the real value of higher education in enhancing individual wellbeing and productivity. Future research should explore how job quality premiums evolve over graduates' career trajectories, vary across fields of study and institutional types, and relate to subjective wellbeing. Longitudinal data will be particularly valuable for tracking how educational expansion and labour market interact to shape job quality premiums over time. As technological transformations and shifting work

Table 2. Robustness to selection on unobservable (Oster bounds).

Dimension	Original	Bias-adjusted	%Reduction
Prospects	2.638	1.563	40.7%
Skills and Discretion	5.993	3.926	34.5%
Physical Environment	3.644	2.433	33.2%

Note: Analysis implements Oster (2019) bounds assuming selection on unobservable at most equals selection on observables. All effects remain positive and substantial.

arrangement continue to reshape employment, sustained investigation into the multidimensional job quality premiums for graduates remains essential.

Notes

1. The ECI was introduced by Hidalgo and Hausmann (2009). Countries with higher complexity scores typically have more diversified, knowledge-intensive economies that may offer greater advantages to highly educated workers.
2. Oster (2019) formally assesses robustness to omitted variable bias by incorporating both coefficient movements and R-squared changes when adding controls, rather than relying solely on coefficient stability. For each dimension, we estimated: (1) a 'short' regression of each job quality dimension on education only, yielding $\dot{\beta}$ and $\dot{R}$; and (2) a 'full' regression adding all controls, yielding $\tilde{\beta}$ and $\tilde{R}$. The bias-adjusted treatment effect is calculated as $\beta^* = \dot{\beta} - \left\{ \delta(\dot{\beta} - \tilde{\beta}) \times \frac{R_{max} - \tilde{R}}{\tilde{R} - \dot{R}} \right\}$, where δ represents the ratio of selection on unobservables to observables (set to $\delta = 1$, assuming equal selection), and $R_{max} = \min\{1.3\tilde{R}, 1\}$ following Oster's recommendation. The bounding set $[\tilde{\beta}, \beta^*]$ represents the plausible range for the true treatment effect under these assumptions. Robustness is assessed by examining whether β^* remains positive and substantial, indicating that results cannot be explained by unobserved ability bias alone.

Acknowledgements

This work was supported by the University of Warwick, Research Development Fund 2024/25.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by University of Warwick.

ORCID

Cesar Burga Idrogo http://orcid.org/0009-0001-0632-8977

References

Allen, J., and R. van der Velden. 2001. "Educational Mismatches versus Skill Mismatches: Effects on Wages, job Satisfaction, and on-the-job Search." *Oxford Economic Papers* 53 (3): 434–452. https://doi.org/10.1093/oep/53.3.434.

Arntz, M., T. Gregory, and U. Zierahn. 2016. *The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis*. Paris: OECD Publishing.

Barone, C., and L. Ortiz. 2011. "Overeducation among European University Graduates: A Comparative Analysis of Its Incidence and the Importance of Higher Education Differentiation." *Higher Education* 61 (3): 325–337. https://doi.org/10.1007/s10734-010-9380-0.

Becker, G. 1964. *Human Capital—A Theoretical and Empirical Analysis, with Special Reference to Education*. United Kingdom: The University of Chicago Press.

Blundell, R., L. Dearden, A. Goodman, and H. Reed. 2000. "The Returns to Higher Education in Britain: Evidence from a British Cohort." *The Economic Journal* 110 (461): 82–99. https://doi.org/10.1111/1468-0297.00508.

Blundell, R., L. Dearden, and B. Sianesi. 2005. "Evaluating the Effect of Education on Earnings: Models, Methods and Results from the National Child Development Survey." *Journal of the Royal Statistical Society. Series a (Statistics in Society)* 168 (3): 473–512. https://doi.org/10.1111/j.1467-985X.2004.00360.x.

Bonvin, J.-M., and N. Farvaque. 2006. "Promoting Capability for Work: The Role of Local Actors." In *Transforming Unjust Structures the Capability Approach*, edited by S. Deneulin, M. Nebel, and N. Sagovsky, 121–142. Dordrecht: Springer Netherlands.

Britton, J., L. Dearden, L. van der Erve, and B. Waltmann. 2020. *The Impact of Undergraduate Degrees On Lifetime Earnings*. The IFS.

Britton, J., L. Dearden, N. Shephard, and A. Vignoles. 2016. *How English Domiciled Graduate Earnings Vary with Gender, Institution Attended, Subject and Socio-Economic Background (IFS Working Paper W16/06)*. London: Institute for Fiscal Studies.

Brown, P., H. Lauder, and D. Ashton. 2011. *The Global Auction: The Broken Promises of Education, Jobs, and Incomes*. New York: Oxford University Press.

Brzinsky-Fay, C. 2007. "Lost in Transition? Labour Market Entry Sequences of School Leavers in Europe." *European Sociological Review* 23 (4): 409–422. https://doi.org/10.1093/esr/jcm011.

Busemeyer, M., and T. Iversen. 2012. "Collective Skill Systems, Wage Bargaining, and Labor Market Stratification." In *The Political Economy of Collective Skill Formation*, edited by M. R. Busemeyer and C. Trampusch, 205–233. Oxford, UK: Oxford University Press.

Bustillo, R. M. de, E. Fernandez-Macias, J.-I. Anton, and F. Esteve. 2011. *Measuring More than Money: The Social Economics of Job Quality*. Cheltenham, UK: Edward Elgar Publishing Ltd.

Card, D. 1999. "The Causal Effect of Education on Earnings." In *Handbook of Labor Economics*, edited by O. C. Ashenfelter and D. Card, 1801–1863. Amsterdam, The Netherlands: Elsevier.

Carneiro, P., J. J. Heckman, and E. J. Vytlacil. 2011. "Estimating Marginal Returns to Education." *American Economic Review* 101 (6): 2754–2781. https://doi.org/10.1257/aer.101.6.2754.

Chevalier, A., and J. Lindley. 2009. "Overeducation and the Skills of UK Graduates." *Journal of the Royal Statistical Society* 172 (2): 307–337. https://doi.org/10.1111/j.1467-985X.2008.00578.x.

Deming, D. J. 2022. "Four Facts about Human Capital." *Journal of Economic Perspectives* 36 (3): 75–102. https://doi.org/10.1257/jep.36.3.75.

Denny, K., H. Harmon, and V. O'Sullivan. 2004. *Education, Earnings and Skills: A multi-country Comparison* [Working Paper Series].

Eldridge, D., and T. Nisar. 2011. "Employee and Organizational Impacts of Flexitime Work Arrangements." *Industrial Relations* 66 (2): 213–234. https://doi.org/10.7202/1006144ar.

Elias, P., and K. Purcell. 2013. Classifying Graduate Occupations for The Knowledge Society.

Enders, C. K., and D. Tofighi. 2007. "Centering Predictor Variables in Cross-Sectional Multilevel Models: A new Look at an old Issue." *Psychological Methods* 12 (2): 121–138. https://doi.org/10.1037/1082-989X.12.2.121.

Eurofound. 2012. *Trends in job Quality in Europe*. Luxembourg: Publications Office of the European Union.

Eurofound. 2021. *Working Conditions And Sustainable Work: An Analysis Using The Job Quality Framework* (Challenges and Prospects in the EU Series). Publication Office of the European Union.

Eurofound, & ILO (with European Foundation for the Improvement of Living and Working Conditions). 2019. *Working Conditions and Workers' Health*. Publications Office of the European Union.

Eurostat. 2024. *Tertiary Education Statistics*. Luxembourg City, Luxembourg: Eurostat.

Felstead, A., D. Gallie, F. Green, and G. Henseke. 2019. "Conceiving, Designing and Trailing a Short-Form Measure of job Quality: A Proof-of-Concept Study." *Industrial Relations Journal* 50 (1): 2–19. https://doi.org/10.1111/irj.12241.

Gallie, D. 2007. "Production Regimes, Employment Regimes, and the Quality of Work." In *Employment Regimes and the Quality of Work*, edited by D. Gallie, 1–34. Oxford: Oxford University Press.

Gallie, D. 2013. "Direct Participation and the Quality of Work." *Human Relations* 66 (4): 453–473. https://doi.org/10.1177/0018726712473035.

Gangl, M. 2001. "European Patterns of Labour Market Entry: A Dichotomy of Occupationalized vs. non-occupationalized Systems?" *European Societies* 3 (4): 471–494. https://doi.org/10.1080/14616690120112226.

Gangl, M. 2003. "The Only Way Is up?: Employment Protection and Job Mobility among Recent Entrants to European Labour Markets." *European Sociological Review* 19 (5): 429–449. https://doi.org/10.1093/esr/19.5.429.

Golden, L. 2001. "Flexible Work Schedules: Which Workers Get Them?" *American Behavioral Scientist* 44 (7): 1157–1178. https://doi.org/10.1177/00027640121956700.

Green, F. 2006. *Demanding Work: The Paradox of job Quality in the Affluent Economy*. Princeton: Princeton University Press.

Green, F., A. Felstead, D. Gallie, and G. Henseke. 2022. "Working Still Harder." *ILR Review* 75 (2): 458–487. https://doi.org/10.1177/0019793920977850.

Green, F., and G. Henseke. 2016a. "Should Governments of OECD Countries Worry about Graduate Underemployment?" *Oxford Review of Economic Policy* 32 (4): 514–537. https://doi.org/10.1093/oxrep/grw024.

Green, F., and G. Henseke. 2016b. "The Changing Graduate Labour Market: Analysis Using a new Indicator of Graduate Jobs." *IZA Journal of Labor Policy* 5 (1): 14. https://doi.org/10.1186/s40173-016-0070-0.

Green, F., and G. Henseke. 2021. "Europe's Evolving Graduate Labour Markets: Supply, Demand, Underemployment and pay." *Journal for Labour Market Research* 55 (1): 2. https://doi.org/10.1186/s12651-021-00288-y.

Green, F., S. Lee, M. Zou, and Y. Zhou. 2024. "Work and Life: The Relative Importance of job Quality for General Well-Being, and Implications for Social Surveys." *Socio-Economic Review* 4: 835–857.

Green, F., and S. McIntosh. 2007. "Is There a Genuine Under-utilization of Skills amongst the Over-qualified?" *Applied Economics* 39 (4): 427–439. https://doi.org/10.1080/00036840500427700.

Green, F., and Y. Zhu. 2010. "Overqualification, job Dissatisfaction, and Increasing Dispersion in the Returns to Graduate Education." *Oxford Economic Papers* 62 (4): 740–763. https://doi.org/10.1093/oep/gpq002.

Hanushek, E. A., G. Schwerdt, S. Wiederhold, and L. Woessmann. 2015. "Returns to Skills around the World: Evidence from PIAAC." *European Economic Review* 73:103–130. https://doi.org/10.1016/j.euroecorev.2014.10.006.
Heckman, J. J., J. E. Humphries, and G. Veramendi. 2018. "Returns to Education: The Causal Effects of Education on Earnings, Health, and Smoking." *The Journal of Political Economy* 126 (S1): S197–S246. https://doi.org/10.1086/698760.
Heckman, J. J., J. Stixrud, and S. Urzua. 2006. *The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior* (Working Paper 12006). National Bureau of Economic Research.
Henseke, G. 2025. "Contextualising the Extrinsic Outcomes of Higher Education during Mass Expansion: An Introduction." *Studies in Higher Education* 50 (5): 939–954. https://doi.org/10.1080/03075079.2025.2487216.
Hidalgo, C., and R. Hausmann. 2009. *The Building Blocks of Economic Complexity*. Harvard Center for International Development.
Holman, D. 2013. "Job Types and job Quality in Europe." *Human Relations* 66 (4): 475–502. https://doi.org/10.1177/0018726712456407.
Holman, D., and C. Mcclelland. 2011. *Job quality in Growing and Declining Economic Sectors of the EU. European Commission*, European Research Area.
Humburg, M., and R. van der Velden. 2015. "Skills and the Graduate Recruitment Process: Evidence from two Discrete Choice Experiments." *Economics of Education Review* 49:24–41. https://doi.org/10.1016/j.econedurev.2015.07.001.
Kalleberg, A. L. 2011. *Good Jobs, Bad Jobs: The Rise of Polarized and Precarious Employment Systems in the United States, 1970s-2000s*. New York: Russell Sage Foundation.
Karasek, R. 1992. *Healthy Work: Stress Productivity and the Reconstruction of Working Life (Revised ed. Edition)*. New York: Basic Books.
Karasek, R. A. 1979. "Job Demands, Job Decision Latitude, and Mental Strain: Implications for Job Redesign." *Administrative Science Quarterly* 24 (2): 285–308. https://doi.org/10.2307/2392498.
Kato, A. E., and C. A. Scherbaum. 2023. "Exploring the Relationship between Cognitive Ability Tilt and Job Performance." *Journal of Intelligence* 11 (3): 44. https://doi.org/10.3390/jintelligence11030044.
Koehorst, M. M., A. J. A. M. van Deursen, J. A. G. M. van Dijk, and J. de Haan. 2021. "A Systematic Literature Review of Organizational Factors Influencing 21st-Century Skills." *SAGE Open* 11 (4): 21582440211067251. https://doi.org/10.1177/21582440211067251.
Le, H., G. Wood, and S. Yin. 2021. "Labour Market Outcomes of Different Institutional Regimes: Evidence from the OECD Countries." *Cambridge Journal of Economics* 45 (1): 85–108. https://doi.org/10.1093/cje/beaa021.
Levels, M., R. van der Velden, and V. Di Stasio. 2014. "From School to Fitting Work: How Education-to-job Matching of European School Leavers Is Related to Educational System Characteristics." *Acta Sociologica* 57 (4): 341–361. https://doi.org/10.1177/0001699314552807.
Ling, W., S. Wang, and Z. Lu. 2024. "Working Time Mismatch and Employee Subjective Well-Being across Institutional Contexts: A job Quality Perspective." *Work, Employment and Society*.
Marczuk, A. 2024. "Literature Review of Comparative School-to-Work Research: How Institutional Settings Shape Individual Labour Market Outcomes." *Journal for Labour Market Research* 58 (1): 19. https://doi.org/10.1186/s12651-024-00375-w.
Marginson, S. 2016. "The Worldwide Trend to High Participation Higher Education: Dynamics of Social Stratification in Inclusive Systems." *Higher Education* 72 (4): 413–434. https://doi.org/10.1007/s10734-016-0016-x.
Mincer, J. 1958. "Investment in Human Capital and Personal Income Distribution." *Journal of Political Economy* 66 (4): 281–302. https://doi.org/10.1086/258055.
Mora, J.-G., A. García-Aracil, and L. E. Vila. 2007. "Job Satisfaction among Young European Higher Education Graduates." *Higher Education* 53 (1): 29–59. https://doi.org/10.1007/s10734-005-2377-4.
Müller, W., and M. Gangl. 2003. *Transitions from Education to Work in Europe: The Integration of Youth into EU Labour Markets*. Oxford: Oxford University Press.
Muñoz de Bustillo, R., E. Fernández-Macías, F. Esteve, and J.-I. Antón. 2011. "E Pluribus Unum? A Critical Survey of job Quality Indicators." *Socio-Economic Review* 9 (3): 447–475. https://doi.org/10.1093/ser/mwr005.
Naylor, R., J. Smith, and S. Telhaj. 2016. "Graduate Returns, Degree Class Premia and Higher Education Expansion in the UK." *Oxford Economic Papers* 68 (2): 525–545. https://doi.org/10.1093/oep/gpv070.
Noelke, C., M. Gebel, and I. Kogan. 2012. "Uniform Inequalities: Institutional Differentiation and the Transition from Higher Education to Work in Post-socialist Central and Eastern Europe." *European Sociological Review* 28 (6): 704–716. https://doi.org/10.1093/esr/jcs008.
Okay-Somerville, B., and D. Scholarios. 2013. "Shades of Grey: Understanding job Quality in Emerging Graduate Occupations." *Human Relations* 66 (4): 555–585. https://doi.org/10.1177/0018726712465094.
Oreopoulos, P., and U. Petronijevic. 2013. "Making College Worth It: A Review of the Returns to Higher Education." *The Future of Children* 23 (1): 41–65. https://doi.org/10.1353/foc.2013.0001.
Oster, E. 2019. "Unobservable Selection and Coefficient Stability: Theory and Evidence." *Journal of Business & Economic Statistics* 37 (2): 187–204. https://doi.org/10.1080/07350015.2016.1227711.
Psacharopoulos, G. 1994. "Returns to Investment in Education: A Global Update." *World Development* 22 (9): 1325–1343. https://doi.org/10.1016/0305-750X(94)90007-8.

Purcell, K., P. Elias, G. Atfield, H. Behle, and D. Luchinskaya. 2013. *Transitions into Employment, Further Study and Other Outcomes*. Warwick Institute for Employment Research.

Reimer, D., C. Noelke, and A. Kucel. 2008. "Labor Market Effects of Field of Study in Comparative Perspective: An Analysis of 22 European Countries." *International Journal of Comparative Sociology* 49 (4-5): 233–256. https://doi.org/10.1177/0020715208093076.

Schomburg, H., and U. Teichler. 2011. *Employability and Mobility of Bachelor Graduates in Europe*. Rotterdam: SensePublishers.

Schultz, T. W. 1961. "Investment in Human Capital." *The American Economic Review* 51 (1): 1–17.

Sehnbruch, K. 2008. "From the Quantity to the Quality of Employment: An Application of the Capability Approach to the Chilean Labour Market." In *The Capability Approach*, edited by F. Comim, M. Qizilbash, and S. Alkire, 561–596. Cambridge: Cambridge University Press.

Sen, A. 1999. *Development as Freedom*. Oxford: Oxford University Press.

Siegrist, J., J. Benach, A. McKnight, P. Goldblatt, and C. Muntaner. 2010. *Employment Arrangements, Work Conditions and Health Inequalities*. London: Institute of Health Equity.

Stefana, E., F. Marciano, D. Rossi, P. Cocca, and G. Tomasoni. 2021. "Composite Indicators to Measure Quality of Working Life in Europe: A Systematic Review." *Social Indicators Research* 157 (3): 1047–1078. https://doi.org/10.1007/s11205-021-02688-6.

Storen, L., and C. Arnesen. 2011. "Winners and Losers." In *The Flexible Professional in the Knowledge Society: New Challenges for Higher Education, Higher Education Dynamics*, edited by J. Allen, and R. van der Velden, 199–240. Dordrecht, Netherlands: Springer.

Tarvid, A. 2013. "Unobserved Heterogeneity in Overeducation Models: Is Personality More Important than Ability?" *Procedia Economics and Finance* 5:722–731. https://doi.org/10.1016/S2212-5671(13)00084-1.

Teichler, U. 2011. "Bologna – Motor or Stumbling Block for the Mobility and Employability of Graduates?" In *Employability and Mobility of Bachelor Graduates in Europe: Key Results of the Bologna Process*, edited by H. Schomburg, and U. Teichler, 3–41. Rotterdam: SensePublishers.

Tholen, G. 2014. *The Changing Nature of the Graduate Labour Market*. London: Palgrave Macmillan UK.

Tomlinson, M. 2012. "Graduate Employability: A Review of Conceptual and Empirical Themes." *Higher Education Policy* 25 (4): 407–431. https://doi.org/10.1057/hep.2011.26.

Triventi, M. 2013. "The Role of Higher Education Stratification in the Reproduction of Social Inequality in the Labor Market." *Research in Social Stratification and Mobility* 32:45–63. https://doi.org/10.1016/j.rssm.2013.01.003.

Verhaest, D., and R. Van der Velden. 2013. "Cross-country Differences in Graduate Overeducation." *European Sociological Review* 29 (3): 642–653. https://doi.org/10.1093/esr/jcs044.

Walker, I., and Y. Zhu. 2008. "The College Wage Premium and the Expansion of Higher Education in the UK." *The Scandinavian Journal of Economics* 110 (4): 695–709. https://doi.org/10.1111/j.1467-9442.2008.00557.x.

Wang, S., D. Kamerāde, B. Burchell, A. Coutts, and S. U. Balderson. 2022. "What Matters More for Employees' Mental Health: Job Quality or job Quantity?" *Cambridge Journal of Economics* 46 (2): 251–274. https://doi.org/10.1093/cje/beab054.

Williams, M., Y. Zhou, and Z. Min. 2020. *Mapping Good Work the Quality of Working Life across the Occupational Structure*. Bristol: Bristol University Press.

Williamson, S., H. Taylor, J. Lundy, and U. Jogulu. 2024. "Hybrid Working: From 'the new Normal' to 'Business as Usual' (UNSW Canberra Public Service Research Group Report No. 3). UNSW Canberra: Canberra, Australia. Retrieved from https://www.unsw.edu.au/content/dam/pdfs/unsw-canberra/psrg/2024-04-PSRG-Hybrid-Working-Publication-Report-No3-April-2024.pdf.

Wolbers, M. H. J. 2007. "Patterns of Labour Market Entry: A Comparative Perspective on School-to-Work Transitions in 11 European Countries." *Acta Sociologica* 50 (3): 189–210. https://doi.org/10.1177/0001699307080924.

World Bank. 2024. *Tertiary Education* [Text/HTML]. Understanding Poverty. https://www.worldbank.org/en/topic/tertiaryeducation.