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Under (employability and financial) pressure: the unequal effects of work experience on graduate earnings

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ABSTRACT

As students seek out work experience to become 'employable', many also do casual paid work while studying to ease financial pressures. But do different types of work experience affect graduates' earnings differently? We explore this question in this paper and discuss whether our findings are consistent with human capital or signalling theoretical perspectives. If human capital - any skill-developing work experience would increase earnings compared to doing nothing. If signalling – only certain (e.g. competitive) work experiences would improve earnings. We extend the work on the effect of placements on graduate earnings by Delis and Jones (2023) and respond to the authors' calls to analyse a larger UK sample by using rich, nationally representative survey data on students' higher education and post-graduation experiences (Futuretrack, $N \sim = 3200$). Using linear regression with extensive controls and sensitivity analysis, we demonstrate a hierarchy of work experience payoffs, with high, medium and low payoff groups, favouring internships and placements, career-related paid work, and casual paid work respectively. Career-related unpaid work shows no earnings advantages, and combining it with casual paid work may depress earnings, especially for female graduates. Our findings are therefore more consistent with the signalling, rather than the human capital, perspective. We further highlight that horizontal gender segregation in higher education subjects structures access to curricular work experience (sandwich and shorter placements) with differential earnings payoffs. We discuss the implications of our work for higher education institutions, careers professionals, employers and students regarding career information and access to work experience opportunities.

ARTICLE HISTORY

Received 11 November 2024 Accepted 3 April 2025

KEYWORDS

Internships; placements; casual paid work; unpaid work; employability; graduate earnings

1. Introduction

Most students know their degree is no longer 'enough' to secure a graduate job after university (Handley and den Outer 2024; Isopahkala-Bouret, Tholen, and van Zanten 2023; Tomlinson 2008) and seek out work experience to develop 'stand out' employability (Anderson and Tomlinson 2021; Handley and den Outer 2024; Jackson and Tomlinson 2022). Many students also work to earn money while studying, reflecting changes in student demographics following higher education

Supplemental data for this article can be accessed online at https://doi.org/10.1080/03075079.2025.2490801.

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(HE) expansion, tuition fee and students support regimes, and cost of living pressures (Lessky and Unger 2023). Employers encourage graduates to demonstrate 'job-readiness' (Purcell et al. 2017; Tomlinson and Anderson 2021), looking favourably on most work experiences (Irwin, Nordmann, and Simms 2019), although it is unclear what type of work experience results in higher payoffs.

Such developments are taking place across many countries' HE systems that have been underpinned by a market-based neoliberal ideology. The UK HE context provides a pertinent example of how these ideological pressures impact students' preparation for employment as they construct their employable graduate identities and accrue work experience during study (Anderson and Tomlinson 2021; Nicholas 2018). In this paper we explore whether there are differential returns to different types of work experience to problematise the employability rhetoric and highlight structural inequalities in the graduate labour market in the UK context.

In the UK, students may do different types of work experience to enhance their employment prospects. Students may work with industry through voluntary or mandatory one-year-long 'sandwich' or shorter placements incorporated into the subjects they study, which often include training/mentoring and can lead to 'graduate jobs' (Purcell et al. 2017; Roberts 2017). Students may also undertake paid or unpaid internships to which they voluntarily apply via internship schemes or speculative applications, or conduct unpaid work, e.g. volunteering (Irwin, Nordmann, and Simms 2019), that may or may not be related to their chosen career.

Students also do paid work alongside studying full-time, usually in hospitality and retail sectors, to earn money (Dennis, Louca, and Lemon 2018; Moreau and Leathwood 2006), and this proportion has recently risen from 35% in 2015 to 55% in 2023 in the UK (Neves and Stephenson 2023). Some view the increase in paid work as an opportunity for students to enhance employment prospects (Bell 2023). In the public discourse, the assumption that any type of work experience is a beneficial undertaking is widespread. We interrogate this assumption in this paper.

Work experience is associated with different student outcomes, not all of them positive. For example, research has found that some types of work experience, such as placements, are usually positively associated with student attainment (Jones, Green, and Higson 2017) and academic performance (Crawford and Wang 2016). However, other types, such as paid work, may negatively impact attainment and increase dropout rates especially when students work long hours (Callender 2008; Dennis, Louca, and Lemon 2018; Hovdhaugen 2013).

Research on the impact of different work experience activities on graduates' employment outcomes is more limited and the findings are mixed. Most studies focus on earnings after graduation. Voluntary placements may improve earnings, employment quality, and lower risk of unemployment (Delis and Jones 2023; Margaryan et al. 2022; Silva et al. 2016), although these effects may be temporary or not significant (Arsenis and Flores 2024; Di Meglio et al. 2022; Weiss, Klein, and Grauenhorst 2014). Many such studies are critiqued for relying on small samples, for a narrow focus, and for methodological limitations, highlighting the need for further research (Binder et al. 2015; Delis and Jones 2023).

Conversely, the relationship between paid work alongside studying full-time and post-graduation earnings is weaker. Quantitative studies have reported lower or non-significant effects if the paid work is unrelated to field of study (Geel and Backes-Gellner 2012; Weiss, Klein, and Grauenhorst 2014) – which we term 'casual paid work'.

Quantitative evidence suggests that unpaid work experience after graduation tends to depress earnings compared to being in paid work (Cerulli-Harms 2017; Holford 2021; Hunt and Scott 2023). However, less is known about the effects of unpaid work during study (Grant-Smith and McDonald 2018) – some findings have suggested it may improve job match (Purcell et al. 2012). Qualitative evidence suggests that career-related unpaid work experience can provide training, mentoring, networking and opportunities for short- or longer-term paid jobs (Hunt and Tzanakou 2021; Purcell et al. 2017), but quantitative evidence is lacking.

We aim to contribute to the quantitative evidence base for the effects of work experience on graduate earnings by addressing the following research questions:

- (1) Do different types of work experience have different effects on graduates' earnings?
- (2) Does taking part in casual paid work affect returns to other types of work experience activities?
- (3) Do work experience effects on earnings differ for different groups of graduates (by sex and socioeconomic background)?

Our paper builds on and extends the recent work of Delis and Jones (2023) that found a positive effect of voluntary sandwich placements on graduate earnings using data from a single UK HE institution (HEI). We employ a large nationally representative dataset of graduates' HE and employment experience (*Futuretrack*) to examine the effects of a wider set of work experience activities across different UK HEIs on graduate earnings, also extending our prior work (Tzanakou et al. 2021).

We make three contributions. First, we find evidence of high, medium and low payoff work experience groups, demonstrating a payoff hierarchy. Internships and shorter placements yield the highest earnings gains, followed by sandwich placements and career-related paid work in the middle group, and casual paid work in the low group. Career-related unpaid work yielded no earnings gains compared with no work experience. Second, we show that combining casual paid work with other work experience activities does not tend to diminish returns to work experience, except in the combination with career-related unpaid work. Third, by examining differential returns to graduates from different social groups, we show that the work experience payoff hierarchy is structured along gender and socioeconomic lines.

We start with an overview of the literature (section 2), including the conceptual set-up, and go on to the methodology (section 3) and results (section 4). The discussion in section 5 sets out our contributions and concludes the paper. Additional tables and figures are provided in the Appendix.

2. Literature review

The relationship between work experiences and labour market outcomes can be theorised in various ways. We focus on two perspectives dominant in interpreting the empirical evidence: human capital and signalling. These frameworks are widely used in the economics of education literature to frame the labour market returns to education and work experience (e.g. by Bolli, Caves, and Oswald-Egg 2021; Nunley et al. 2016; Van Belle et al. 2020, among others). From the human capital view, skill-building activities improve productivity and lead to higher earnings (Becker 1964). The human capital explanation for internships and placements has some empirical support (Bolli, Caves, and Oswald-Egg 2021) and there is a growing consensus that paid work directly related to students' field of study provides greater benefits than unrelated work (Dennis, Louca, and Lemon 2018; Geel and Backes-Gellner 2012; Sanchez-Gelabert, Figueroa, and Elias 2017; Van Belle et al. 2020).

From the signalling perspective (Spence 1973), work experience serves as an observable signal of graduates' unobserved innate 'ability' to employers. Effective signals should differentiate between graduates such that high-ability students will undertake the activity, but that it will be prohibitively difficult for low-ability students to take part. HE degrees used to act as such a signal, but the HE signalling function has weakened as HE has expanded (Tomlinson 2008). Employers now seek alternative signals: a competitive vacation internship with a prestigious employer may do just that (e.g. Irwin, Nordmann, and Simms 2019; Nunley et al. 2016; Weiss, Klein, and Grauenhorst 2014). Skill development need not matter – from the signalling perspective signal quality is paramount.

We do not formally distinguish between human capital and signalling explanations for work experience earnings premia but use these frameworks to shape our research questions and contextualise our findings. We take inspiration from Weiss, Klein, and Grauenhorst's (2014) suggestion to compare voluntary and mandatory placements. If both types develop skills and if employers can differentiate between them, the human capital perspective suggests that both voluntary and mandatory placements would lead to higher earnings, whereas the signalling perspective suggests that only voluntary placements would do so. Although our data does not distinguish between mandatory and voluntary work experiences, we propose the following: if the human capital mechanism holds, any skill-developing work experience would result in higher earnings compared to no experience. If the signalling mechanism holds, only certain experiences (e.g. competitive or extracurricular work experiences) would improve earnings.

Access to different types of work experience varies with student characteristics. Horizontal gender segregation across degree subjects may also structure different work experience options for different groups of students (Barone 2011; Ochsenfeld 2014). For example, male students may be more likely to access placements related to engineering, and female students – placements in subjects allied to medicine, with placement experience and outcomes underpinned by the dynamics of the labour market sectors in which these placements operate (Andrew et al. 2023; Leuze and Strauß 2016; Triventi 2013).

Students with lower financial resources may be less able to move to undertake internships or placements located in large cities and to take on unpaid work (Hunt and Scott 2023; Wright and Mulvey 2021). Students from disadvantaged backgrounds may be less able to draw on their social networks to arrange access to competitive internships (Bathmaker, Ingram, and Waller 2013).

Conversely, while casual paid work in a bar or supermarket may be easier to achieve, it may also crowd out other types of work experiences (Hordósy, Clark, and Vickers 2018) and may act as a weaker signal of ability. Students from disadvantaged backgrounds, who are more likely to take on casual paid work and to work longer hours than others (Lessky and Unger 2023; Moreau and Leathwood 2006), may be disproportionately affected. Alternatively, students juggling different work experience activities may send positive signals to employers by demonstrating their motivation. In this case, casual paid work combined with other work experience activities may boost graduates' earnings. If casual paid work develops employability skills, we may also, from a broad human capital perspective, expect to see it improve earnings compared to no work experience.

Empirical research often overlooks distinctions between different types of work experiences, focusing on their effects in isolation rather than in tandem. Definitions of placements, internships, and paid versus unpaid work tend to be blurred and inconsistent (Hunt and Tzanakou 2021). We have compiled research findings from our literature review to highlight the quantitative effects of different types of work experience on earnings and other labour market and educational outcomes, summarised in Table 1. This summary aims to guide the reader through the existing literature and its complexities and includes only studies relating to work experience during undergraduate study. The exception is unpaid work, where post- and pre-graduation experience is included owing to a general lack of evidence. The full version of Table 1, which is organised by work experience type and individual study and includes information on the research methodology, can be found in Appendix Table 19.

Qualitative inquiries generally highlight positive perceptions of student work experiences (Irwin, Nordmann, and Simms 2019). However, some quantitative research challenges the direct correlation between work experience and labour market success, while highlighting how certain activities reinforce inequalities and hinder social mobility (Holford 2021; Hunt and Scott 2023; Tzanakou et al. 2021). This small but growing body of evidence suggests that not all work experiences hold equal sway over labour market outcomes, with privileged individuals often gaining access to superior opportunities, perpetuating social disadvantage.

Another empirical difficulty that lies in estimating the causal impact of work experience on earnings is the presence of unobservable confounders – factors that are correlated with both the outcome (earnings) and the likelihood of accessing treatment (work experience) and that are difficult or impossible to measure. For example, work experience estimates may be biased upwards if high-ability candidates self-select into work experience and achieve higher earnings, or biased downwards if students with low employability take on work experience to improve it, or if excessive work negatively impacts HE attainment, reducing earnings. Some studies using instrumental variables, matching, and other techniques find support for upward bias (e.g. Delis and Jones 2023; Weiss, Klein, and Grauenhorst 2014), while others report downward bias (e.g. Bolli, Caves, and

Table 1. Type	of work experience	and its effects af	fter graduation	(literature review	summary).
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Type of work experience	Earnings	Other employment outcomes	Educational outcomes	Authors
Voluntary curricular placements (Optional work placements as part of a degree, such as 'sandwich' or other placements)	Mixed findings: Some studies show a positive effect; others find no significant effect.	Generally improves job match quality and job search duration, but effects on job security and employment rates vary.	Often linked to higher academic attainment (final- year grades, degree classification).	Arsenis and Flores (2024), Crawford and Wang (2016), Delis and Jones (2023), Di Meglio et al. (2022), Jones, Green, and Higson (2017), Margaryan et al. (2022), Weiss, Klein, and Grauenborst (2014)
Compulsory curricular placements (Mandatory work placements required as part of a degree, such as 'sandwich' or other placements)	Generally positive association with earnings, particularly in the short and medium term (1–5 years).	May reduce unemployment risk in short-term but varies by country context and study field; mixed findings on quality of job match.	N/A	Bolli, Caves, and Oswald-Egg (2021), Margaryan et al. (2022), Silva et al. (2016), Weiss, Klein, and Grauenhorst (2014).
Extracurricular internships (Non- degree-based internships, obtained voluntarily, usually during study vacations or post- graduation in the open market)	Mixed findings: Some studies find a positive effect (especially for paid internships), while others report no effect or negative effects for unpaid post-graduation internships	Can improve job match quality and interview recall, but unpaid post- graduation internships may reduce job security and earnings in the short- medium term.	N/A	Cerulli-Harms (2017), Hunt and Scott (2023), Irwin, Nordmann, and Simms (2019), Margaryan et al. (2022), Nunley et al. (2016), Weiss, Klein, and Grauenhorst (2014)
Paid work during study (Part-time or full-time employment while studying, either field-related or unrelated)	Field-related paid work has generally positive effects on earnings; unrelated work has smaller/ no effect.	May improve employment quality and responsibility if field-related, but excessive work hours may negatively affect employability.	Linked to lower academic attainment and higher dropout especially if work long hours. May improve attainment if work short hours and/or field-related.	Callender (2008), Dennis, Louca, and Lemon (2018), Geel and Backes-Gellner (2012), Hovdhaugen (2013), Sanchez- Gelabert, Figueroa, and Elias (2017), Van Belle et al. (2020), Weiss, Klein, and Grauenhorst (2014)
Unpaid work (Work without financial compensation, field- related or unrelated, including unpaid internships and volunteering)	Mostly negative effect on earnings, particularly for post-graduation unpaid internships; unpaid work during study may improve quality of job match.	May provide networking & training opportunities but may decrease employment quality. Volunteering not perceived as employable as paid internships.	N/A	Holford (2021), Hunt and Scott (2023), Hunt and Tzanakou (2021), Irwin, Nordmann, and Simms (2019), Purcell et al. (2012).

Oswald-Egg 2021). Attempting to measure such unobservable factors where possible (Di Meglio et al. 2022; Geel and Backes-Gellner 2012) can help address selection bias, but the problem of selection on unobservables remains. However, recent methodological developments allow researchers to estimate the extent of bias from unobservables (Cinelli and Hazlett 2020; similar in Di Meglio et al. 2022), improving robustness of causal claims.

Recent UK studies on placements and earnings addressing selection bias report mixed findings. Delis and Jones (2023) found a significant earnings increase (£2128 via ordinary least squares (OLS) regression, £1686 via propensity score matching (PSM)), while Arsenis and Flores (2024) found a

smaller, non-significant relationship. Both studies were limited to short-term earnings data from a single HEI six months after graduation and did not address unobserved selection bias. We extend this work by analysing a larger, representative UK dataset, exploring varied work experience types, and testing sensitivity to unobservable confounders (Cinelli and Hazlett 2020).

3. Data and methods

This paper uses data from the fourth wave of the *Futuretrack* study, a longitudinal online survey conducted by a research team at the University of Warwick that followed applicants to UK full-time undergraduate HE from 2005/06 through their studies and into early labour market experience over four waves.¹ Ethical approval was obtained from the researchers' institutional ethics committee. The first wave invited over 500,000 Universities and Colleges Admissions Service (UCAS) applicants, resulting in 120,000 usable responses from 277 HEIs (see Purcell et al. 2012). Subsequent waves followed students during study and post-graduation, yielding over 17,000 responses in the fourth wave (2011/12). The *Futuretrack* waves 1–4 dataset is available from the UK Data Service (SN 8032; Elias and Purcell 2016).

Whilst equivalent current data do not exist, *Futuretrack* enables analysis of labour market transitions in 2011/12, in the peak of the UK recession following the financial crisis, partially resembling graduates' transitions in current economic conditions (Bradley, Waller, and Bentley 2022). *Futuretrack's* strength lies in its longitudinal nature and its rich information about graduates' HE and career experiences compared to more general labour market studies such as the Labour Force Survey, and even to graduate-specific data, e.g. from the Higher Education Statistics Agency (HESA).

Our sample is restricted to first-degree UK-domiciled (both at time of application to HE and after graduation) UK-national graduates, who were aged 18 or 19 on 30th September 2006, who conducted most of their studies in the UK, and who were in full-time employment (excluding part-time, self-employed, and those in full-time education or training) at the time of the fourth wave of the *Futuretrack* survey (1.5–2.5 years after graduation, N = 4437).

Respondents were asked about different work experience activities they had done while studying. We focus only on graduates who did just one type of activity, those who combined one activity with casual paid work, and those who did no work experience. Most respondents did one, two, or no work experience activities (Appendix Table 6), and many combinations included casual paid work (Appendix Table 7), so we capture the experiences of the majority. We exclude those who did other work experience owing to low numbers, yielding a total of 3,282 respondents for subsequent analysis. The distribution of work experience activities is shown in Appendix Table 8. Fewer respondents did internships and placements combined with casual paid work compared to other activities, potentially limiting subgroup analysis.

Our methodology is inspired by Delis and Jones (2023), who control for a wide range of observable background factors (covariates) that influence both work experience type and earnings after graduation, to estimate the effect of work experience on earnings with OLS regression and by calculating the average treatment effect on the treated (ATET) with PSM. We build on their approach by examining a broader set of work experience types with a larger, nationally representative sample of UK graduates from the *Futuretrack* survey. Table 2 shows the variables we use for analysis, which we deliberately chose to be comparable,² except for having attended an independent secondary school.³ We additionally include UCAS points (a measure of secondary school attainment) and domicile at HE entry and post-graduation (to capture the London effect on graduates' earnings, as suggested by Delis and Jones (2023)). School attainment may be used as a proxy for ability (Berry, Gruys, and Sackett 2006; Geel and Backes-Gellner 2012) and UCAS points have been used as a measure of academic skills prior to HE entry (Di Pietro 2017). However, although ability remains correlated with educational attainment in the UK, the strength of this link has weakened in recent decades (Schoon 2010).

Table 2	. Va	ariabl	e ov	erview.
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Variable	Description
Earnings	Gross salary in current main job, midpoints from income categories measured in pounds.
Sandwich	=1 if did a sandwich year undergraduate placement, 0 otherwise
Placement	=1 if did one or more shorter structured work placements integral to the course, 0 otherwise
Internship	=1 if did a vacation internship with an employer, 0 otherwise
PaidCareer	=1 if did paid work to gain useful career related experience, 0 otherwise
PaidMoney	=1 if did paid work undertaken only for the money, 0 otherwise
None	=1 if did no work experience activity at all (reference category)
Unpaid	=1 if did unpaid work to gain useful career related experience, 0 otherwise
Female	=1 if respondent is female, 0 otherwise
Age19	=1 if respondent was 19 on 30 Sept 2006, 0 otherwise
Ses3_1	=1 if from a managerial & professional socioeconomic background (NS-SEC 1), 0 otherwise (NS-SEC 2 or 3)
White	=1 if respondent belongs to a white ethnic group, 0 otherwise
London_pre	=1 if lived in London at the time of applying to HE, 0 otherwise
London	=1 if currently lives in London, 0 otherwise
STEM	=1 if studied a Science, Technology, Engineering or Mathematics (STEM)-related subject, 0 otherwise (reference category)
SocSci	=1 if studied a social science-related subject, 0 otherwise
ArtHum	=1 if studied an arts and humanities-related subject, 0 otherwise
Interdisc	=1 if studied an interdisciplinary subject, 0 otherwise
Highest	=1 if attended a 'highest access tariff' category HEI, 0 otherwise
First	=1 if obtained a 'first-class' HE degree, 0 otherwise
Ucas	UCAS tariff points obtained on completing secondary education, 11 categories (0, 1 to 79, 80 to 119, 120 to 179,
	180 to 239, 240 to 299, 300 to 359, 360 to 419, 420 to 479, 480 to 539, and 540 plus). Owing to the large number
	of categories and ordinal meaning, it is treated as a continuous variable in the regression.

Our earnings data are categorical, divided into 15 'bins', with the first and last bins open ended. We treat our categorical income data as continuous using the midpoint approach, despite concerns about potential bias, given that we have a relatively large number of fine-grained bins (Bhat 1994).⁴ As data were collected over a few months during fieldwork in 2011/12, we do not deflate earnings in our analysis but do express them in 2004 prices to compare to Delis and Jones (2023) as appropriate.

We estimate the effect of different types of work experience during study, relative to no work experience, on graduates' earnings. This represents a conditional causal effect for the target population of full-time employed UK graduates if the following assumptions hold: (1) work experience causally affects earnings; (2) observed demographic covariates affect both the likelihood of undertaking work experience and earnings (confounders) and are included as controls; (3) there are no unobserved confounders that affect both undertaking work experience and earnings; and (4) common outcomes of both undertaking work experience and earnings (colliders) as well as variables downstream of treatment (mediators) are excluded to avoid endogenous selection and overcontrol bias (Elwert and Winship 2014). We are confident in assumptions 1 and 2 but discuss issues with assumptions 3 and 4 below.

We first set up a standard linear OLS wage regression looking at the effect of work experience activities on graduates' earnings, controlling for a range of characteristics, in the form:

$$Y_i = \alpha + \boldsymbol{W}\gamma + \boldsymbol{X}\beta + \varepsilon_i \tag{1}$$

where Y_i is individuals' gross annual salary in their job at the time of the survey, α is the constant and ε_i is the error term.

Work experience activities, W, comprise: sandwich year undergraduate placement (Sandwich), one or more shorter structured work placement/s integral to the course (Placement), vacation internship with an employer (Internship), paid work undertaken to gain useful career related experience (PaidCareer), paid work undertaken only for the money (PaidMoney, our indicator of casual paid work), unpaid work undertaken in order to gain useful career related experience (Unpaid). None of the above (WorkNone, residual category) forms the reference group.

Variable	Obs	Mean	Std. dev.	Min	Max
Earnings	3,238	21527.91	7859.58	4999.5	89999.5
Sandwich	3,282	0.126	0.331	0	1
Placement	3,282	0.105	0.306	0	1
Internship	3,282	0.052	0.222	0	1
PaidCareer	3,282	0.102	0.302	0	1
PaidMoney	3,282	0.470	0.499	0	1
Unpaid	3,282	0.130	0.337	0	1
WorkNone	3,282	0.211	0.408	0	1
Female	3,282	0.617	0.486	0	1
age19	3,282	0.280	0.449	0	1
ses3_1	3,101	0.597	0.491	0	1
White	3,277	0.894	0.309	0	1
London_pre	3,282	0.107	0.309	0	1
London	3,282	0.239	0.426	0	1
stem	3,277	0.441	0.497	0	1
socsci	3,277	0.245	0.430	0	1
artshum	3,277	0.179	0.383	0	1
interdisc	3,277	0.135	0.342	0	1
highest	3,282	0.381	0.486	0	1
first	3,281	0.199	0.399	0	1
ucas	2,895	7.611	2.260	1	11

Table	3.	Descriptive	statistics
Table	٠.	Descriptive	statistics.

Our controls, **X**, include: sex, age (in years, at 30 September 2006), parental occupation measured by the three-group National Statistics Socio-economic Classification (NS-SEC),⁵ ethnicity, domicile pre-HE and post-graduation, subject area of study, HEI access tariff, and UCAS tariff points (see Table 2). We include degree classification and post-graduation domicile to align with Delis and Jones (2023) despite their downstream position as consequences of work experience treatments. While including these factors may introduce endogenous selection and overcontrol bias, potentially violating assumption 4 (Elwert and Winship 2014), it allows us to account for their mediating roles, isolating the direct effect of work experience on earnings. However, this approach also hinders our ability to estimate the total causal effect of work experience and is a limitation of our analysis.⁶

We cannot fully satisfy assumption 3 of no selection on unobservables despite controlling for an extensive set of observed covariates, potentially leading to bias. The direction and magnitude of the bias likely vary by work experience type. However, by using the observed covariates in our model, we can test how large the possible unobservable factors would need to be to challenge our results (Cinelli and Hazlett 2020).

We additionally estimate the ATET, comparing earnings for those with work experience to their hypothetical earnings without it, controlling for observable covariates, to check robustness and compare with Delis and Jones (2023). Delis and Jones (2023) use PSM to calculate ATET but PSM is less suitable for multiple treatments due to challenges in finding comparable matches (Linden, Ryan, and Adams 2016). Instead, we use regression adjustment (RA) to compare predicted outcomes for treated and untreated groups at each treatment level, assuming the model is correctly specified and observed covariates are similarly distributed across treatments.

Our sample is skewed towards female participants (Table 3, 62%) and those from high socioeconomic backgrounds (60%). *Futuretrack* noted that sex and high UCAS points influenced wave 1 response rates, but respondents' socioeconomic background was similar to the target population at wave 1 (37% vs. 33%, Purcell et al. 2008). However, the proportion of respondents from higher socioeconomic backgrounds increased in wave 4.⁷ We control for sex, UCAS points, and socioeconomic background in our analysis using unweighted statistics although weights are available to correct for the over-representation of women and high achievers (Purcell et al. 2012). Analysis was conducted in *Stata 18*.







Figure 2. Work experience by NS-SEC.

4. Results

4.1. Descriptive statistics

The descriptive statistics for our sample are shown in Table 3. The type of work experience activity undertaken varied by sex and socioeconomic background (Figures 1 and 2). Female graduates were more likely than male graduates to have done casual paid work, career-related unpaid work, and



Figure 3. Box plot of annual earnings by work experience type.

shorter industry placements, and less likely to have done vacation internships and sandwich placements (Figure 1). Graduates from managerial and professional backgrounds were more likely to have done career-related and casual paid work and vacation internships than their counterparts from lower socioeconomic backgrounds (Figure 2).⁸ Descriptive statistics of respondent characteristics by work experience activities are shown in Appendix Table 9.

Graduate earnings vary by work experience type (single activity only) as shown in the box plot in Figure 3. Internships, sandwich and shorter placements, and career-related paid work have higher median earnings compared to unpaid and casual paid work. Earnings box plots by sex and NS-SEC are in Appendix Figure 5 and Figure 6.

4.2. Findings

The analysis proceeds as follows. First, we compare the effects on graduate earnings of doing different work experience activities with doing nothing on graduates' earnings to see if there are different payoffs to different types of activity. Second, we interact work experience activities with casual paid work to see whether having to work to earn money moderates the effect of other work experiences on earnings. Third, we run within-group regressions for sex and socioeconomic background categories to see whether the returns to different work experience activities differ for graduates from different social groups.

4.2.1. Do work experience activities yield different earnings payoffs?

To address our first question, we examine how different work experience activities affect graduate earnings compared with no experience. We restrict our sample to participants with one work experience activity (no combinations with paid work, N = 2641). We use robust regression (*rreg* command) to mitigate the influence of earnings outliers (Appendix Table 10 reports standard OLS results).

We find that work experience activities vary in terms of effects on earnings (Table 4, first two columns). Career-related paid work, sandwich placements, or shorter placements increased annual earnings by £1870-£3870 relative to no work experience. Our estimated sandwich placement effect (£2373, £1944 in 2004 prices)⁹ aligns with Delis and Jones (2023). Internships were associated

Table 4. The effect of work experience activities on earnings, robust regression.

Annual earnings	Robust OL	S (1)	Robust OLS w. int	eractions (2)
(£, 2011/12)	Coeff.	SE	Coeff.	SE
Sandwich	2660.49***	442.57	2655.72***	439.41
Placement	3869.89***	463.99	3926.31***	459.72
Internship	4819.35***	737.15	4946.26***	731.57
PaidCareer	1869.89**	546.51	1900.76***	544.09
Unpaid	292.12	499.46	305.83	497.05
PaidMoney	706.91*	319.62	734.62*	318.11
Sandwich#PaidMoney			-1128.85	794.31
Placement#PaidMoney			-580.35	910.55
Internship#PaidMoney			-1859.03	1004.33
PaidCareer#PaidMoney			-1108.62	751.53
Unpaid#PaidMoney			-1394.82*	683.78
Controls	Sex, age, parental oc	cupation (NS-SEC), ethr	nicity, domicile pre-HE and po	ost-graduation,
	subject area of stud	dy, HEI access tariff, de	gree class, UCAS points.	-
Constant	15448.48***	664.66	15810.91***	609.83
R-squared	0.287		0.292	
Adj. R-squared	0.281		0.286	
Model df	18		23	
Residual df	2154		2689	
F	48.22, <i>p</i> < .000		48.18, <i>p</i> < .000	
Root MSE	5720.3		5703.1	
N. of cases	2,173		2,713	

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

with a £4819 increase in gross annual earnings. Casual paid work yielded slightly higher earnings compared to no work experience (£707, p < .05). Career-related unpaid work had no substantive or significant effect on earnings relative to no work experience.

We test whether the work experience coefficients statistically differ from each other (Appendix Table 12) and identify three work experience payoff groups: internships and shorter placements in the high payoff group, sandwich placements and career-related paid work in the middle, and casual paid work in the low payoff group.¹⁰ Figure 4 demonstrates the hierarchical returns to work experience in a ranked coefficient plot of Model 1 estimates.

Effects on our control variables broadly align with Delis and Jones (2023, Appendix Table 11). Having obtained a first-class degree was positively associated with earnings. Living in London after graduation compared to elsewhere was associated with higher annual earnings, supporting Delis and Jones's (2023) conjecture that 'London [...] pay[s] a wage premium' (11).

To test robustness and further compare with Delis and Jones (2023), we estimate ATETs of individual work experiences using RA (*teffects ra* command). RA results largely align with robust regression; some ATETs are smaller, others larger, but the internship ATET is not significant (Appendix Table 13). The ATET for sandwich placements is £2967 (£2430 in 2004 prices), exceeding that of Delis and Jones (2023). Consistent with robust regression, RA confirms that career-related unpaid work does not significantly impact earnings compared to no work experience.

4.2.2. Does casual paid work moderate returns to work experience?

We now turn to our second question, whether combining work experience activities with casual paid work affects earnings. We use robust regression on the main sample (N = 3282), include a set of work experience dummies interacted with casual paid work, and keep the same controls. Interaction coefficients were negative but not significant. That is, combining work experience with paid work diminishes work experience gains, but this effect is not significantly different from zero. However, the interaction between career-related unpaid and casual paid work was negative, significant, and larger than the positive coefficient on casual paid work indicating that this combination decreases earnings relative to no work experience (p < .05, Table 4 last two columns, full results in Appendix Table 15, standard OLS in Appendix Table 14).



Figure 4. The heterogeneity of work experience effects on earnings. Note: Ranked coefficient plot (coefplot) from model 1 (robust OLS), single type of work experience only.

4.2.3. Do work experience payoffs differ for different graduates?

Last, we address our third question and explore whether work experience affects earnings differently for different social groups of graduates. To do this, we regress earnings on work experience and controls within sex and NS-SEC groups, effectively interacting the group variable with all the other variables in the model (Longhi and Nandi 2014). We omit the respective group variable from our list of controls in each regression. Selected results are presented below (Table 5), and full results are in Appendix Table 16.

The work experience earnings hierarchy differs by sex and socioeconomic background. For both female and male graduates, the high and medium payoffs groups broadly continued to hold, but casual paid work was no longer associated with earnings. Female graduates had higher payoffs for internships and placements relative to no work experience than male graduates, while career-related paid work was not significantly associated with male graduates' earnings. Combining casual paid work with internships, career-related paid and unpaid work depressed the returns to those activities for female graduates only (only the interaction between casual paid work unpaid work was significant for female graduates in the standard OLS regression (Appendix Table 17)).

The high, medium and low payoff work experience groups also broadly held across socioeconomic backgrounds. Relative to no work experience, internships, sandwich, and shorter placements yielded higher earnings for graduates from lower socioeconomic backgrounds than for their more advantaged peers. Casual paid work yielded small positive returns for graduates from managerial and professional backgrounds only. Combining casual paid work with other activities did not impact returns to work experience, except for career-related unpaid work (negative effect for high compared to low socioeconomic backgrounds). However, we could not find significant differences between coefficients from within-sex and within-socioeconomic-background regressions.¹¹ Our evidence for whether work experience effects on earnings differ between groups of graduates is therefore tentative.

	S	ex	1	NS-SEC
Work experience types	Female	Male	Managerial/professional	Intermediate, routine/manual
Condwich	2252 20***	2069 90***	2200 01***	2140 06***
Sandwich	2255.70	5000.09	509 3 <i>1</i>	651 52
Placamont	4240 00***	2000.14	2402 65***	031.33 4405 05***
Flacement	4249.99	2005.05	5403.05	4495.95
Internehin	J24.UI 7105 93***	2161.06**	000.04	033.40 5947 13***
Internship	1120 54	000 71	4525.55	1510.04
DeidConcer	1130.34	990.71	801.90	1172 50
PaldCareer	24/5.04	980.87	2314.92***	11/3.58
Universited	704.14	859.71	709.04	861.16
Unpaid	588.15	-315.37	450.91	-39.48
S : 114	580.49	967.99	648.26	/88.8/
PaidMoney	/49.65	800.73	934.50*	391.13
	406.04	513.74	428.29	479.17
Interactions				
Sandwich#PaidMoney	-1128.33	-1139.76	-323.73	-2174.63
	1011.23	1310.63	1079.16	1183.31
Placement#PaidMoney	-1135.72	2122.37	233.835	-1433.777
	997.397	2251.22	1276.08	1302.01
Internship#PaidMoney	-2968.21*	-1750.96	-1730.51	-2287.66
	1464.48	1436.09	1203.81	1955.49
PaidCareer#PaidMoney	-1985.15*	91.77	-1912.55	125.85
	963.07	1206.05	1001.32	1154.10
Unpaid#PaidMoney	-1626.47*	-728.27	-1926.49*	-321.64
	783.59	1440.77	887.22	1093.95
	Controls as in T	Table 4, except witl	nin-sex regressions exclude fer	nale, within-NS-SEC regressions
Constant	1/250 10***	15102 15***	16165 00***	15070 15***
Constant	727.06	1020 11	976 17	13970.13
0 anuarad	/ 5/.00	1029.11	0/0.1/	0 201
R-squared	0.248	0.319	0.277	0.301
Adj. R-squared	0.238	0.304	0.267	0.287
Model df	22	22	22	22
Residual df	1668	999	1587	1080
F	24.94	21.3	27.68	21.19
Root MSE	5561.83	5894.35	5853.07	5527.88
N. of cases	1691	1022	1610	1103

|--|

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

4.2.4. Sensitivity analysis

We conducted sensitivity analysis on the OLS regression results for single work experience types (no interactions, Appendix Table 10),¹² using the Stata *sensemakr* command (Cinelli and Hazlett 2020). This analysis assesses how strong potential unobservable factors (hypothetical unobserved confounders) would need to be to challenge our results. We use the *female* covariate to bound the strength of these unobserved confounders because *female* was strongly related to both type of work experience and to earnings. Unpaid work is excluded from the sensitivity analysis because it was not significantly related to earnings. Results are presented in Appendix Table 18, and the main implications are discussed below.

The robustness value (RV) for sandwich placement was relatively strong at 10.5%, meaning that unobserved confounders must explain at least 10.5% of the remaining unexplained (residual) variance in both Sandwich and earnings to nullify the estimated effect of sandwich placements. Shorter placements and internships had higher RVs than Sandwich, whereas the RV for paid career-related work was smaller, but still reasonably strong (7.8%). However, the RV for casual paid work was relatively weak, suggesting that the effect of doing casual paid work on earnings is more susceptible to influence from unobserved confounders, reflecting its smaller and less significant OLS regression coefficient. Overall, the sensitivity analysis supports the robustness of our estimates on Sandwich, Placement, Internship, and PaidCareer work experience types. Contour plots

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(Appendix Figure 7) show that an unobserved confounder would need to be over three times as strong as the *female* coefficient to nullify work experience effects. Given the extensive set of controls in our model, we consider this possibility unlikely.

5. Discussion

In this paper, we examined whether different types of work experience were equally beneficial for graduates' earnings. We explored whether combinations of casual paid work with work experience activities affected payoffs and investigated differences by sex and socioeconomic background. Building on Delis and Jones (2023), we extended analysis to multiple work experience types and tested sensitivity to unobserved confounders. This paper also adds to our prior work on the signalling versus human capital effects of internships during study on graduate outcomes (Tzanakou et al. 2021).

First, our key contribution is demonstrating a hierarchy of earnings payoffs to work experience activities, with high, medium and low payoff groups. Vacation internships and shorter placements are associated with the highest gains, followed by sandwich placements and career-related paid work (medium payoffs), and casual paid work (low payoffs). Notably, career-related unpaid work was not significantly associated with earnings. Our results were relatively robust to unobserved confounders, which would need to be more than three times as strong as the female effect on earnings to change our conclusions. Given the extensive set of observed covariates in our model, this possibility is unlikely.

Our findings align with the growing consensus that field-unrelated paid work is associated with lower earnings than field-related paid work (Geel and Backes-Gellner 2012; Sanchez-Gelabert, Figueroa, and Elias 2017; Van Belle et al. 2020), despite its potential to develop students' employability skills (Curtis and Shani 2002). We add to literature showing that placements and internships are positively associated with graduate earnings (Bolli, Caves, and Oswald-Egg 2021; Delis and Jones 2023; Hunt and Scott 2023; Margaryan et al. 2022), and to literature exploring differential returns but to fewer work experience activities (Weiss, Klein, and Grauenhorst 2014). Our findings thus contrast with human capital reasoning that assumes that all work experience types improve earnings compared to no work experience and are more intuitively consistent with signalling reasoning that only some activities improve earnings.

Second, we show that combining casual paid work with other work experience does not impact overall graduate earnings, supporting other research findings (Geel and Backes-Gellner 2012). However, combining casual paid work with career-related unpaid work depresses graduate earnings relative to doing no work experience at all. These findings challenge human capital reasoning that more of any type of work experience activities leads to improved earnings compared to less and is more consistent with signalling reasoning that casual paid work does not help employers differentiate between high- and low-ability applicants. Our findings on casual paid work are welcome news regarding the recent rise in the proportion of students having to do paid work to earn money (Neves and Stephenson 2023), except perhaps when done with career-related unpaid work, especially for female graduates (see below). Further research is needed on this issue to explore such combinations in more detail, and to see whether additional work experience activities compensate for this effect.

Third, gender and socioeconomic background shape access to and payoffs from work experience activities. Female graduates gained most from internships compared to other activities but were less likely than male graduates to undertake them. Female graduates also gained more from shorter placements, while male graduates saw higher earnings from sandwich placements. These differences may reflect horizontal gender segregation in university subjects offering placements often linked to particular industries and salaries (Andrew et al. 2023; Barone 2011; Ochsenfeld 2014; Triventi 2013). Combining casual paid work with career-related unpaid work, and, to a lesser extent, with internships and with career-related paid work, diminished earnings for female graduates. This aligns with studies finding negative signalling effects of unpaid internships after graduation (Cerulli-Harms 2017; Holford 2021; Hunt and Scott 2023) and suggests a potential gendered effect.

Similarly, graduates from lower socioeconomic backgrounds were also less likely to have done internships, that yielded highest earnings benefits, and more likely to have done placements, than their more privileged counterparts. Vacation internships may act as a convincing signal of graduates' ability for employers, possibly owing to their relative rarity, non-mandatory non-curricular nature, and that students actively apply to access them. Social networks may play a more important role in accessing speculative internships than curricular placements (Weiss, Klein, and Grauenhorst 2014; Wright and Mulvey 2021). These patterns suggest that female and lower-socioeconomic-group graduates are more likely than their counterparts to undertake work experience associated with lower gains post-graduation. Work experience 'choice' is therefore not solely individual but is also structured (Isopahkala-Bouret, Tholen, and van Zanten 2023; Leuze and Strauß 2016), affecting outcomes for graduates from marginalised backgrounds, and potentially contributing to gender and class wage gaps even at the early career stage.

5.1. Limitations and further research

Our study has several limitations, opening avenues for future research. First, unobserved confounders likely influence participation in work experience activities. While we estimated their potential impact, further research should develop methodologies for modelling access to work experience, analysing effects of different work experience types, and more formally identifying causal effects and mediation channels. Second, our sample was skewed toward higher socioeconomic backgrounds. Although we controlled for socioeconomic background, the *Futuretrack* fourth wave may be less representative of the target population than earlier waves. We echo Delis and Jones (2023) in suggesting HESA collect more comprehensive data on work experience types and employment quality to create a nationally representative, up-to-date dataset, enabling detailed intersectional research on access to and outcomes of work experience. Third, like Delis and Jones (2023), we cannot assess the long-term effects of work experiences across graduate careers. Future research could analyse the *Futuretrack* fifth wave to understand whether work experience effects persist over time.

While we cannot formally disentangle human capital and signalling explanations in this paper, our findings align more intuitively with signalling perspectives on work experience and earnings, consistent with prior research (e.g. Hunt and Scott 2023; Nunley et al. 2016; Weiss, Klein, and Grauenhorst 2014). Future research could develop theory testing by operationalising these theories more narrowly and by exploring alternative mechanisms for different work experience types.

Finally, although *Futuretrack* provides valuable data on graduates during a UK recession, exploring more recent data, especially after a similar but different 'crisis' period such as the post-Covid era, would be valuable, building on Hurrell et al. (in press). This is especially pertinent as work experience access and outcomes may change as hybrid and virtual opportunities emerge (Luchinskaya et al., under review). Furthermore, while earnings are important to evaluating work experience, complementary metrics such as job satisfaction, skill match and fulfilment also deserve exploration.

5.2. Practical recommendations

Our research highlights the need for HEIs and careers services to improve students' access to labour market information and to high-payoff work experiences. We have shown that, despite claims that all work experiences equally develop employability skills, earnings gains to work experiences vary, with internships, placements and career-related paid work yielding higher payoffs compared to unpaid career-related or casual paid work. HEIs should recognise these differential earnings outcomes, review their work-integrated learning offer, and address inequalities in work experience access and provision. Careers professionals should advise students on high-payoff work experiences in light of our findings. Employers can take an active role working together with HEIs and careers professionals by moving away from providing unpaid work experiences, ensuring that placements and

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internships develop field-relevant skills, and more transparently communicating the work experience activities they value.

Systematic differences in access to work experience activities highlight the need for better opportunities and knowledge to empower students, helping them navigate labour market inequalities. Beyond addressing students' individual agency, addressing structural inequalities in how work experiences are organised by universities and employers is crucial. This underscores the need for collaboration between HEIs, careers services, and employers to make high-payoff work experiences more accessible and inclusive, ultimately reducing early career inequalities in the labour market.

Notes

- 1. A fifth and last *Futuretrack* wave was carried out in 2019, yielding just over 6,000 responses ten years after graduation, but this wave is not currently available from the UK Data Service.
- Delis and Jones (2023) use: Placement dummy (variable of interest); Real wage (outcome); Final year mark, Year 1 mark, Age at Year 1, Combined Honours, Engineering & Applied Sciences, Life & Health Sciences, Languages & Social Sciences, Female, White ethnic background, White collar, Independent School (controls).
- 3. Including independent secondary school as a control did not improve model fit (adjusted R-squared) and substantially reduced sample size.
- 4. We assign a midpoint of 4999.50 for the lowest category and top-code the highest category to £89,999.50. We ran ordered probit and interval regression to test reliability (results not reported).
- 5. Managerial and professional (NS-SEC 1), intermediate (NS-SEC 2) and routine and manual (NS-SEC 3) occupations.
- 6. Domicile post-graduation and degree classifications may be viewed as 'bad controls', i.e. they introduce another causal channel by which the treatment affects the outcome (e.g. work experience may lead to moving to London (or to a higher degree result) and so to higher wages). Removing them did not substantially affect results.
- 7. The reason for the increase in high-NS-SEC respondents is unclear. Institutional email addresses for respondents were no longer available for wave 4 data collection and alternative email addresses provided by respondents were used. Alternative email address stability may be correlated with socioeconomic background but further research is required to test this and other reasons for the change in socioeconomic composition.
- 8. That graduates from more advantaged backgrounds were more likely to have done casual paid work runs counter to the literature (e.g. Moreau and Leathwood 2006) and may be an idiosyncrasy of our sample.
- 9. We used https://www.bankofengland.co.uk/monetary-policy/inflation/inflation-calculator.
- 10. Under Bonferroni adjustment, applied in multiple comparison tests to reduce risk of false positives, the difference between the high and middle payoffs groups and the low and no payoffs groups disappears. However, this adjustment may be too conservative when the number of comparisons is large, so we maintain the earnings payoffs groups as above.
- 11. We used the seemingly unrelated regression (*suest*) Stata command. We ran standard OLS (omitting the top two earnings midpoints to minimise outlier influence) because *suest* cannot be used with robust regression.
- 12. Sensemakr is not compatible with the robust regression *rreg* command.

Acknowledgements

We would like to thank the seminar participants at Work, Employment & Organisation, University of Strathclyde and our colleagues for their constructive comments, Professors Kate Purcell and Peter Elias at the Warwick Institute for Employment Research, as well as the editors and anonymous reviewers of this Special Issue for their valuable comments. We also acknowledge the Warwick Institute for Advanced Studies for funding our previous collaborative work which this single country research paper extends.

Disclosure statement

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

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