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JONES, Chris and WANG, Yuan <<http://orcid.org/0000-0003-0696-7290>>

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The performance effects of international study placements versus work placements

Chris Jones¹ · Yuan Wang² 

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Abstract

To be competitive, universities across the world are embedding an international perspective into every layer of an institution's operational structure. For higher education (HE) providers that offer sandwich degrees (4-year undergraduate courses with a compulsory placement after the second year), this allows students to choose a range of options. Students can enter the labour market for one year, or they can go overseas to study at a foreign institution. For some students, it might even be possible to do both. However, regarding final year degree performance, which option leads to higher student performance? In this paper, we aim to shed light on this empirical question. Our results are drawn from Aston University (UK) which is a world-leading University in Advanced Technology. Overall, using a large student dataset, we find that for students who have a compulsory placement built into their degree programme, the work placement has a more powerful impact on student performance compared to an international study placement abroad. Our findings have important implications for universities across the world that offer sandwich degrees to their students.

Keywords British higher education · Degree performance · Work placement · International study placement

Introduction

Higher education institutions across the world are increasingly integrating placements into their academic programmes. This is notable in the UK, where the option to do a work or international study placement has been part of the curriculum for many decades. Students who choose these types of programmes often have a choice — whether to enter the labour market or whether to study abroad. The rationale for choosing a period of employment is that work placements may improve future employability and allow students to gain labour market skills that traditional degree programmes cannot offer, which is well known as a pedagogical strategy of work integrated learning (e.g. Jackson, 2015; Schonell & Macklin, 2019; Smith & Worsfold, 2015). Pegg et al. (2012) argue that a period of work experience

✉ Yuan Wang

¹ Aston Business School, Aston University, Aston St, Birmingham B4 7ET, UK

² Sheffield Business School, Sheffield Hallam University, Howard Street, Sheffield S1 1WB, UK

generates skills, understanding and personal attributes that make graduates more likely to gain employment and be successful in their chosen future occupations. Integrating theoretical knowledge from their university experience with workplace practice develops students' professional skills. By providing real-world context to theoretical subjects, work placements provide knowledge, experience and abilities that better prepare students for the challenges that they face and enhance their work readiness, self-efficacy and teamwork skills which eventually boosts employability (e.g. Prescott et al., 2021; Smith & Worsfold, 2015). Whilst the rationale for a study placement abroad is that the placement allows students to build on what they have learnt during prior study at their home institution and then gain additional experience of life in another country (see Bachner & Zeutschel, 2009; Dwyer, 2004; Engberg, 2013; Paige et al., 2009). Study placements develop important cross-cultural skills which are considered a necessity in an increasingly interdependent world (Hurst, 2019). To some extent, studying in a foreign country may also encourage students to take a more global perspective generating intercultural knowledge, competence and engagement (Engberg, 2013), which also helps to improve future employability.

This paper investigates which option has the biggest impact upon student performance in the final year of study after the work or overseas study placement in Aston University in the UK. Our findings generate a number of interesting and counterintuitive insights by comparing the performance effects for a set of students who have compulsory placements as part of their degree programme. These insights have important implications for higher education institutions across the world that offer these types of courses. For example, student performance often impacts upon published league tables¹ for academic departments. If the work placement effect is more powerful than the study placement effect, then it is important to understand why this is the case and then design effective assurance mechanisms to mitigate the difference. This could mean closer scrutiny of the international partners used by the higher education (HE) institution, or it could provide the rationale for study placements abroad to include an employment dimension.

In addition, our study also provides important policy implications for HE institutions and the HE sector overall. If the alternative types of placement enhance students' academic performance heterogeneously across different degree programmes, recognition of this difference is vital for leaders and decision-makers in HE institutions. Determining the appropriate role of placements in the university curriculum depends critically on a more comprehensive examination of the costs and benefits associated with curriculum inclusion. Universities in the UK employ many staff to develop a network of employers and international partners to facilitate the application process for students obtaining placements during the placement year. However, the programme management team rarely pays attention to the student-specific needs and demands when providing this service. Student-staff partnerships have become increasingly important with respect to decision-making in HE (e.g. Cassidy et al., 2021; Mercer-Mapstone & Bovill, 2020). Understanding the impact of student-specific characteristics on academic performance will assist programme management teams in

¹ There are three commonly used UK league tables (the Complete University Guide, the Guardian University Guide and the Times and Sunday Times Good University Guide). Subject specific league tables are also provided accordingly. Teaching quality, student satisfaction, research quality, entry scores, good honours, career prospects, student-staff ratio, services and facilities spend are common categories used in these tables. For the exact measurements of each table, please check their websites. The UK league tables play an important role in student choice (Gibbons, Neumayer and Perkins, 2015). Hence, league tables directly affect university's income post the higher education funding reforms which were implemented in 2012.

universities to find the right placements for students that help students accumulate professional skills, boost self-efficacy and maximise student potential.

Our research uses multivariate regression to analyse this question based on a sample of 2,785 students from Aston University in the UK over the period 2009–2016. Our main finding suggests that work placements are preferable to overseas study placements by 1.38 marks. However, in terms of magnitude, our estimates are not inconsistent with other studies that look at the impact of placements on performance (e.g. Crawford & Wang, 2016; Mandilaras, 2004; Mansfield, 2011; Surridge, 2009). Hence, our results provide evidence that work placements appear to be more beneficial — a somewhat counterintuitive finding as one would think that additional study would lead to an improvement in future study performance. Interestingly, however, when we compare the results across disciplines, the magnitude changes. Our results indicate that the work placement effect relative to the study placement effect is much stronger for business school students compared to students from languages and social sciences. Furthermore, our analysis also finds that the work placement effect is much weaker for females compared to males. Our results are consistent across a number of empirical specifications and are robust to selection bias when we utilise propensity score matching (Abadie & Imbens, 2006 and 2016).

The remainder of this paper is set out as follows. In the “Literature review” section, we review the literature on placements and student performance and provide a clear basis for why this study is an important contribution to the literature. In the “Data and preliminary results” section, we discuss the data used and provide summary statistics. In the “Methodology and estimation results” section, we outline the methodology for each key finding and present our results. In the “Robustness checks” section, we include some robustness tests to check the sensitivity of our main findings. The final section concludes by discussing the implications of our results and suggests possible limitations that scholars may use to build upon our research.

Literature Review

The literature on the performance effects of work placements has grown significantly in recent years as student data has become more easily obtainable and the fact that higher education institutions have now been running their placements programme for many years. In the UK, high tuition fees have meant that the quality of learning and teaching in HE has grown in importance as students need to be assured that their investment is value for money. Notwithstanding the effects of international and domestic league tables, HE providers are facing increasing pressure to enhance quality for their students and ensure that all students reach their potential. This means that student metrics are increasingly being used to monitor the performance of students throughout their time at university (see Woodall et al., 2014; Langan and Harris, 2019).

The current literature on the impact of work placements on student performance provides ambiguous results, but the weight of evidence is more suggestive that work placements improve student performance. Duignan (2002) finds limited evidence of performance effects utilising two cohorts of business students, whereas Gomez et al. (2004) utilise multivariate regression analysis and find a final year placement effect of around 4 percent on student performance. Similar estimates are reported by Surridge (2009) for a cohort of accounting and finance students with a placement effect on academic performance of around 3.6 percent. In addition, studies by Mansfield (2011), Crawford and

Wang (2016) also find evidence of a significant impact upon academic performance with the latter also finding evidence for international students. Furthermore, more recent studies that control for the issue of sample selection — in that students who chose to do a placement may perform at a higher standard regardless of whether they undertake a placement — have also found a positive effect. Jones et al. (2017) utilise matching techniques to control for sample selection bias and find a work placement effect in the region of 2–4%. Their findings also suggest that there are differences across disciplines with the greatest effects appearing to impact upon engineering and applied science students and business school students. More recently, Routon and Walker (2019) used national survey data collected from more than 600 American colleges and universities. Their results show that students' self-reported GPA at graduation is slightly higher (0.076) for those students who participated in an internship during their academic course compared to those who didn't participate. However, Prescott et al. (2021) find that students' academic performance is negatively affected by the internship, whilst it was ongoing after controlling for other factors using 14 years of semester-by-semester data from undergraduate business students enrolled at a private liberal arts university in the USA.

In parallel to the literature on work placements, there is also a vast literature that has investigated both qualitatively and quantitatively the impact of students studying abroad. Stone and Petrick (2013) provide an excellent review of the literature, and they argue that students experience a personal growth in terms of life skills and knowledge from independent international travel. According to Paige et al. (2009), studying abroad is found to be “one of the most important experiences students can have during their undergraduate years”. Accordingly, the study abroad may allow students to search for new experiences and learn about new cultures (Sanchez et al., 2006; Taylor & Rivera, 2011; van Hoof, 2006). The year abroad may also provide many short-term and long-term benefits. Dwyer (2004) find that studying abroad can change a student's perspective or worldview. Bachner and Zeitschel (2009) argue that studying abroad makes students more independent and may improve self-confidence. In terms of intellectual and cognitive ability, Miller-Perrin and Thompson (2010) find that students exposed to foreign travel increased their achievement scores relative to those students with less exposure. Recently, the results of Cardwell (2020) indicate that students who undertook a study abroad placement showed an average of 2–3% improvement on overall average grade.

To summarise, it would appear that both work placement and a year abroad generates a significant number of educational benefits to students on top of the typical higher education experience. One anticipates that either should feed through into final year degree performance once students return from their placement in comparison to those students who do not go on placement. Nevertheless, as far as we are aware, there are no studies that examine the relative impact of work placements versus international study placements. Hence, we build on previous literature by examining the performance effects with respect to the type of placement. Both types of placement may indeed improve student performance, but which route leads to better results? If one route does have a higher performance effect, it is important that HE institutions are made aware of the difference so that they can design assurance mechanisms to mitigate the difference. This, therefore, is the paper's crucial contribution. By looking at a set of students who have completed a compulsory placement as part of their degree, we can investigate this issue. Furthermore, because we only include a sample of students where the placement is compulsory, the self-selection problem that has been identified in the literature (Driffield et al., 2011; Jones et al., 2017) is mitigated.

Data and preliminary results

In this paper, we include all undergraduate students who successfully graduated from Aston University with a compulsory placement from the 2008/2009 academic year up to the 2015/2016 academic year.² It is important to note that the compulsory placement only applies to Home and EU students, but not to overseas students.³ Hence, we exclude the overseas students from our study.

During the placement year (after the second year), students can choose between either a work placement, an international study placement, or a combination of both. The standard Aston University regulations require students to take 48 weeks of professional training including any holiday time awarded by the company. During the period under investigation, students had the opportunity to international study at over 80 partnership universities across the world. The work placements can either be a paid period of employment or voluntary work for free. For those students who choose a combined placement, they usually spend one term abroad (between 15 and 24 weeks). Regarding assessment, the students were asked to write a placement essay which counts as credits to their final degree classification and a reflective diary that records their placement experience.

In total, our sample includes 2,785 students who undertook compulsory placements. These students are drawn from two of Aston's schools: Aston Business School (ABS) and the School of Languages and Social Sciences (LSS).⁴ Among those, 2,452 students chose to work during the placement year, 224 students chose the international study option, whilst 109 students chose a combination of both.⁵ Hence, we can categorise students into three different groups. Table 1 provides some group summary statistics. Following Jones et al. (2017), the final year average mark is used to represent student's performance after the placement year, which is the dependent variable in this paper.

Overall, Table 1 indicates that the sample average final year score is 65.28%. The work placement group has the highest score (65.59), which is 0.31 marks higher than the sample average. In contrast, those students who studied abroad for the whole of the placement year performed the least well, whilst those who chose both options tend to lie in between. Both of these groups have an average final year score below the sample average. The standard deviation in the international placement group is the highest of the three groups, which indicates that the final year scores in the international placement group exhibited the highest degree of dispersion.

To explore the nature of our data further, we plot the sample distribution of final year performance and distributions of final year performance across three groups in order to make a brief comparison before proceeding with the analysis. In Fig. 1, the dashed orange line shows the distribution of final year performance for all students in the sample. The solid blue line shows the distribution for those who picked a work placement; the solid green line shows the distribution for students who only chose an international study

² None of the current and withdrawn students are included in our sample to ensure the accuracy of student information. There are no missing data on variables in use in this study.

³ The overseas students are those from non-EU countries.

⁴ In general, Aston's other schools offer optional placements. So, we exclude these students from the sample.

⁵ It seems that the subsample of choosing the international study placement is much smaller compared to its counterpart. However, this is a common practice across British universities due to tradition and culture. The number of UK students who participated in study abroad is lower than similar sized European countries, such as France and Italy (Cardwell, 2020).

Table 1 Performance and demographic characteristics by group

Variable	Work	Work and inter- national study	International study	Full sample
<i>A. Performance</i>				
Final year average mark	65.59 (6.43)	64.44 (6.62)	62.33 (7.27)	65.28 (6.57)
Second year average mark	61.42 (7.25)	61.00 (6.42)	58.94 (6.91)	61.21 (7.22)
First year average mark	61.16 (8.77)	60.73 (6.66)	58.80 (8.21)	60.95 (8.67)
<i>B. Characteristics</i>				
Age	19.7 (2.09)	19.8 (1.36)	20.1 (2.64)	19.7 (2.12)
Female	0.48 (0.50)	0.72 (0.45)	0.45 (0.50)	0.49 (0.50)
White	0.50 (0.50)	0.68 (0.47)	0.49 (0.50)	0.51 (0.50)
Black	0.08 (0.28)	0.10 (0.30)	0.13 (0.34)	0.09 (0.28)
Asian	0.32 (0.47)	0.11 (0.31)	0.25 (0.43)	0.31 (0.46)
Mixed	0.04 (0.19)	0.04 (0.19)	0.05 (0.23)	0.04 (0.19)
Grammar ^a	0.019 (0.14)	0.018 (0.14)	0.013 (0.12)	0.018 (0.13)
Higher managerial and professional	0.157 (0.36)	0.165 (0.37)	0.094 (0.29)	0.152 (0.36)
Lower managerial and professional	0.210 (0.41)	0.229 (0.42)	0.201 (0.40)	0.210 (0.41)
Intermediate occupations	0.183 (0.39)	0.183 (0.39)	0.143 (0.35)	0.180 (0.38)
Routine and semi-routine	0.144 (0.35)	0.119 (0.33)	0.125 (0.33)	0.141 (0.35)
EU ^b	0.07 (0.25)	0.14 (0.35)	0.16 (0.37)	0.08 (0.27)
No. of observations	2,452	109	224	2,785

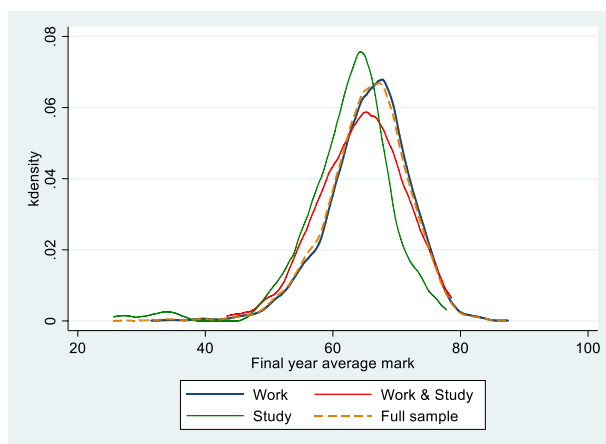
Numbers reported in the table are group means. Group standard deviations are given in the parentheses, correspondingly

^aThe Grammar schools refer to secondary schools (ages 11–18) that are fully selective and funded by the state, which are different from private schools. In England, students have to pass the entry test to enter a Grammar school called the 11+.

^bEU students stand for those students that are from EU countries. In the UK, the EU students pay the same fees as the UK (or home) students

placement; and the solid red line shows the distribution for students who did a combination of the two.

It seems that the shape of the distribution for the students who chose work placement (solid blue line) does not deviate much from our sample distribution (dashed orange line). Though, it exhibits a shorter left tail, which indicates that there are fewer weaker students

Fig. 1 Final year performance by group

in this group. The shape of the distribution for students who took international study placement (solid green line) is much taller and thinner than the sample distribution. This indicates that the majority of students in this group received a score around the group mean (62.33) with less variability. In contrast, the shape of the distribution for students who picked a combination of work and international study is fatter than the sample distribution and with two short tails. This shows that for these students, their performance is less variable across individuals, which indicates that student performance is much more predictable in this group. This variance may however be due to the more homogeneous demographic background within this group.

Due to the fact that our descriptive statistics indicate that students who undertake international study placements tend to be weaker — as proxied for by their average first and second year marks — we need to show some caution in terms of interpretation when running our standard regression models. This is because there might exist some selection bias in that the weaker students could not find an ideal work placement so instead went abroad to study as a last resort. Therefore, we need to control for student's initial academic performance which could be a crucial factor affecting the probability of undertaking one type of placement. We use the second year average mark to represent a student's performance before the placement year. This proxies for initial underlying ability and engagement at university.⁶ Furthermore, as a robustness check, we also undertake propensity score matching to ensure no further selection bias as we are cautious that certain student characteristics make students more likely to choose the international study placement over a work placement, and vice versa.

If we take a closer look at panel B in Table 1, which shows student demographic characteristics, we find that students in the international study placement group tend to have a lower socioeconomic background. We also find that a smaller proportion of students in this group attended grammar school compared to the other groups, though the difference is not substantial. It is possible that the students who chose international study placements are those who really do appreciate the opportunity of accessing a study abroad; it is also possible that this

⁶ Due to the high correlation between the first average mark and the second year average mark, we cannot include both of them in our regression models. Hence, we selected the second year mark because it is often not determined until after the students have chosen their work placement.

type of opportunity may not have been available to them prior to university. Hence, selection bias may exist.

There is also heterogeneity in the ethnic background across the different groups compared to the sample mean as indicated in Table 1. It seems that EU students are more likely to choose the international study option. One suspicion is that these EU students went back to their home countries during the placement year. Hence, to achieve unbiased and consistent estimation results, we need to control for student heterogeneity (e.g. Angrist & Pischke, 2009; Dale & Krueger, 2002; Krueger, 1999). We include variables to control for student demographic characteristics as listed in panel B of Table 1. These include age, gender, ethnicity (White, Black, Asian and Mixed), socio-economic background (higher managerial and professional, lower managerial and professional, intermediate occupations and routine and semi-routine) and whether or not students come from the EU in line with many existing empirical studies in the field of students' academic performance and placements (e.g. Crawford & Wang, 2015 and 2016; Jones et al., 2017; Mansfield, 2011; Surridge, 2009).

Methodology and estimation results

In this section, we outline the econometric models to undertake the analysis and report the results. The methodology used is very similar to previous studies, for example, Crawford and Wang (2016) and Jones et al. (2017). We report our results in a stepwise manner to make it easier for the reader. We begin by running benchmark regressions that investigate the impact of work versus international study placements on final year student performance. After this, we look more closely to see if the performance effect differs based on gender and then consider the effect based on academic discipline.

Econometric modelling

We are interested in investigating how alternative types of placement affect student overall performance in the final year for those students where going on placement is compulsory.

$$YF_i = \alpha_i + \beta_1 Y2_i + \beta_2 Work_i + X_i' \delta + \varepsilon_i \quad (1)$$

Equation (1) represents our baseline regression model. For each student i , we regress the final year average mark (YF_i) on second year average mark ($Y2_i$) to proxy for initial ability pre-placement, a set of student-specific characteristics contained in the vector X_i and most importantly a dummy variable $Work_i$ which equals 1 if a student chooses a work placement and equals 0 otherwise. The latter variable and its estimated coefficient is our primary interest. If the estimated β_2 is positive and statistically significant, there is evidence that students who chose work placements perform better in the final year compared to other students who chose international study placements. Conversely, if the coefficient is negative and statistically significant, then we can say the opposite.

There is a proportion of students who chose a combined work and international study placement. It is essential to check whether this group is statistically significantly different from the students who choose only one route during the placement year. In order to do this check, we include one more regressor in Eq. (1):

$$YF_i = \alpha_i + \beta_1 Y2_i + \beta_2 Work_i + \beta_3 Work_i \times Study_i + X_i' \delta + \varepsilon_i \quad (2)$$

where $Work_i \times Study_i$ is a dummy variable which equals 1 if a student chooses a combined work and international study placement and equals 0 otherwise. If β_3 is statistically significant and positive, it indicates that students who chose a combined placement perform better on average than other students who either picked work placements or international study placements on their own. Whereas if β_3 is statistically significant and negative, it shows that the students who chose a combined placement perform at a lower rate than the work placement students on average. Whether the former students perform better or worse compared to the international study placement students depends upon the sum of β_2 and β_3 . If $\beta_2 + \beta_3 > 0$, the students who took combined placements perform better than the students who chose international study placements. If $\beta_2 + \beta_3 < 0$, the students who took a combined placement perform less well than the students who just chose an international study placement.

The variables contained in X_i include student age on entry, female as 1/0 dummy variable, grammar schooling as 1/0 dummy variable and whether or not a student is from the EU as 1/0 dummy variable. We also control for ethnicity by including four major ethnic groups in the UK (White, Black, Asian and Mixed) and socio-economic background by adding four social classes (higher managerial and professional, lower managerial and professional, intermediate occupations and routine and semi-routine). The precise variable definitions and data statistics are reported in the Appendix, Table A1. The correlation matrix is provided in the Appendix, Table A2.

The selection of the regressors follows the existing empirical literature that studies the determinants of student's performance in HE (e.g. Crawford & Wang, 2016; Jones et al., 2017; Mansfield, 2011; Surridge, 2009). We divide them into three categories: student's personal characteristics, student's pre-university educational background and student's family background. When discussing the impact of student's personal characteristics on their academic performance, age and gender are two non-negligible factors that have been investigated in the literature (see Richardson & Woodley, 2003; Mansfield, 2011). Using university students enrolled in property management and development courses in the UK, Mansfield (2011) found a non-linear impact of age on students' academic performance, whereas Wan and Cheo (2012) reported a negative effect of age on students' academic performance using a sample of economics students from Malaysia and Singapore.

The existing literature suggests that prior schooling is an important predictor of a student's university academic performance (e.g. Crawford & Wang, 2015; Sothan, 2019). Although students admitted to Aston university have all met a reasonably similar minimum entry requirement, prior schooling may differ substantially across students, in particular in terms of funding per student. In the UK, Grammar schools appear to be higher-performing schools academically compared to other non-selective schools (Morris & Perry, 2017). It is also important to control for the location of prior schooling as students from outside of the UK may have studies using English as a second language. It is generally believed that linguistic skills of non-native speaking students tend to hinder their academic performance (Crawford & Wang, 2015).

Finally, students' family background is captured using the family's ethnicity and socio-economic status. The existing literature suggests that family background plays a vital role in student's academic performance (e.g. Crawford & Wang, 2015 and 2016; Jones et al., 2017; Mansfield, 2011; Surridge, 2009). Previous literature indicates that student performance is positively associated with social class in that wealthy and better educated families tend to play a more supportive role on students' performance than their counterparts through both monetary and non-monetary means (e.g. Crawford & Wang, 2016; Jones et al., 2017; Sothan, 2019). It is undoubtedly true that students may face financial

pressures, social isolation and other kinds of barriers in HE due to the disadvantaged family backgrounds. Furthermore, lower academic attainment is commonly observed among ethnic minority groups discussed in Richardson (2008) and more recently in Bunce et al. (2021). The major reason is that ethnic minority groups face some barriers due to cultural differences. Bunce et al. (2021) argue that there may also exist societal and institutional racism and discrimination which induces the attainment gap in academic performance.

Benchmark regression

Table 2 provides estimation results using the full sample. We gradually add more variables into the benchmark regression. Column (1) exhibits the estimation results solely based on the variable of interest (*Work*) without any control variables. In column (2), we include all controls, i.e. the model in Eq. (1). In column (3), we include all controls and also the interaction term: *Work* \times *International study*, i.e. the model in Eq. (2).

As we can see from column (1), the estimated coefficient for *Work* is positive and statistically significant at the 1% significance level. This indicates that students who chose work placement are likely to perform better than students who took an international study placement on average by 3.21 marks in the final year. However, once we include all of the control variables in column (2), the estimated coefficient falls in magnitude to 1.38 but still remains positive and statistically significant at the 1% significance level. Hence, including the controls is important and ensures an unbiased estimate for β_2 .

Our results do not change significantly if we include the interaction term as shown in column (3). In fact, the estimated impact of *Work* on students' performance increases slightly. Overall, if we subtract estimated β_3 from β_2 , we find that for students who choose a combined work and international study placement, their final year performance effect is 0.38 marks higher compared to those students who only choose an international study placement.

In summary, our results show a clear ranking in terms of student performance in the final year. A pure work placement has the biggest performance effect followed by a work/international study combination, followed by an international study placement. Hence, work placements, in terms of final year mark, appear preferable compared to international study placements in terms of student performance in the final year. Our results suggest that placements improve academic performance, as they do in other countries such as Australia (e.g. Schonell & Macklin, 2019), the UK (e.g. Gomez et al., 2004; Jones et al., 2017; Surridge, 2009) and the USA (Routon & Walker, 2019), but our findings are nuanced in the sense that it is the work placement that has a dominant effect.

Regarding the controls in column (2), it seems that a higher second year score positively associates with final year performance, which is consistent with the existing literature (e.g. Crawford & Wang, 2016; Jones et al., 2017). Female students are likely to have higher scores than males on average, which is in line with the finding of Prescott et al. (2021) that female students enjoy a 0.012 higher GPA compared to male students in the USA. The same results can also be seen in Gomez et al. (2004) and Surridge (2009) using student data from the UK. The results also indicate that younger students are likely to perform better than older students at the 1% significance level, which is consistent with the findings in Wan and Cheo (2012) using university students from Malaysia and Singapore. It seems that our findings regarding age and gender do not support the conclusion in Sothan (2019) drawn from Cambodian university students, who found that age and gender are muted in terms of academic performance.

Table 2 Benchmark estimation results

Variable/specification	(1)	(2)	(3)
Work	3.210 ^{***} (0.501)	1.379 ^{***} (0.391)	1.428 ^{***} (0.392)
Work \times International study			- 1.051 ^{**} (0.451)
Y2		0.600 ^{***} (0.014)	0.599 ^{***} (0.014)
Age		- 0.424 ^{***} (0.079)	- 0.424 ^{***} (0.079)
Female		0.900 ^{***} (0.175)	0.938 ^{***} (0.175)
White		0.907 ^{**} (0.386)	0.913 ^{**} (0.383)
Black		- 0.258 (0.521)	- 0.265 (0.519)
Asian		0.768 [*] (0.416)	0.733 [*] (0.414)
Mixed		0.545 (0.564)	0.536 (0.560)
Grammar school		- 0.554 (0.592)	- 0.560 (0.592)
Higher managerial and professional		0.034 (0.293)	0.043 (0.292)
Lower managerial and professional		0.255 (0.272)	0.268 (0.272)
Intermediate occupations		- 0.107 (0.292)	- 0.094 (0.291)
Routine and semi-routine		0.600 ^{**} (0.305)	0.611 ^{**} (0.305)
EU		- 0.758 ^{**} (0.365)	- 0.725 ^{**} (0.365)
Constant	62.33 ^{***} (0.485)	34.51 ^{***} (1.908)	34.54 ^{***} (1.905)
No. of observations	2,785	2,785	2,785
Adj R^2	0.02	0.49	0.49

***, ** and * stand for 1%, 5% and 10% levels of significance in turn. Heteroskedasticity-robust standard errors are reported in the parentheses. The multicollinearity test is passed

The impact of social-economic status is generally insignificant with the exception of those students whose parents work in routine and semi-routine occupations. For those students, they perform 0.6 marks better on average than students from other social-economic classes. Prior university schooling has no statistically significant effect on final year average score. White students and Asian students tend to perform better, whereas other ethnic groups have no statistically significant effect on final year performance. It is interesting to see that final year performance is estimated to be 0.76 marks lower on average for EU students relative to UK students. As discussed previously, there is some evidence to support the conjecture that EU students may face language barriers or cultural differences which causes a small detrimental impact on their academic

performance. Overall, the estimated coefficients for the control variables do not vary much between column (2) and column (3).

Gender effects

In this section, we repeat the benchmark regression in columns (2) and (3) of Table 2 but split the sample to determine whether the impact of placement choice on final year performance differs between males and females. In columns (1) and (2) of Table 3, we provide results for a sample of females, and in columns (3) and (4), we provide results for a sample of males. As can be seen, the coefficient for the variable *Work* is positive and significant for both females and males, but the magnitude differs. Work placements imply a positive effect on performance compared to international study placements, but the positive effect is weaker for females compared to males. The same findings persist after taking into account the impact of the interaction between work and international study group (*Work* × *International study*).

This is an interesting empirical finding because it suggests that males, on average, may find work placements more beneficial compared to females, which is in line with Mansfield (2011). The results of Mansfield (2011) show that male students have a higher final year mark increase (3.46 marks on average, compared with 1.70 for non-placement students) than female students (2.25 marks for placement and 1.78 marks for non-placement). When we take a closer look at our data, there is an achievement gap between female and male groups before the placement year. On average, female marks are higher than males in terms of the second year average mark. So, male students enter into the placement in a less favourable position. Mansfield (2011) argues that students who scored poorly in their second year are more likely to increase their marks in their final year.

Furthermore, the existing literature suggests that gender affects some aspects of educational attainment in HE. Oberman et al. (2021) investigate the impact of internships on self-efficacy and find that gender plays a vital role in affecting the former relationship. They find that male students experienced a statistically significant increase in occupational self-efficacy through an internship experience, whereas the positive impact is not statistically significant for female students although feedback received from employers are equally good. Arsenis and Flores (2021) find female students tend to rate themselves with lower scores than their counterparts in transferable competencies and subject-specific expertise. To some extent, female students have low self-efficacy than male students in line with the finding of Torres-Guijarro and Bengoechea (2017) who conclude that females are more likely to underestimate the quality of their performance, whereas males are more likely to overestimate the performance in self-assessing. This may provide more insights for us to understand why male students benefit more from the work placement as female students lack self-confidence in the workplace.

Nevertheless, the difference between estimated effects for males and females is still quite small. Further research is needed to corroborate these findings at other institutions. In terms of the control variables, they work as expected and do not differ substantially compared to the benchmark regressions in Table 2.

Table 3 Estimation results by gender

Variable/specification	(1) Female	(2) Female	(3) Male	(4) Male
Work	0.975** (0.435)	1.045** (0.436)	1.791*** (0.610)	1.816*** (0.610)
Work \times International study		− 1.006* (0.527)		− 1.018 (0.880)
Y2	0.584*** (0.018)	0.582*** (0.018)	0.611*** (0.020)	0.611*** (0.020)
Age	− 0.493*** (0.067)	− 0.494*** (0.067)	− 0.376*** (0.116)	− 0.374*** (0.116)
White	0.722 (0.495)	0.738 (0.490)	1.148* (0.597)	1.139* (0.596)
Black	− 0.350 (0.627)	− 0.337 (0.622)	− 0.156 (0.879)	− 0.196 (0.880)
Asian	0.914* (0.532)	0.869* (0.524)	0.677 (0.643)	0.649 (0.643)
Mixed	0.259 (0.649)	0.275 (0.640)	0.904 (0.911)	0.866 (0.911)
Grammar school	− 0.694 (0.712)	− 0.693 (0.715)	− 0.280 (0.993)	− 0.297 (0.992)
Higher managerial and professional	− 0.301 (0.389)	− 0.284 (0.390)	0.361 (0.435)	0.358 (0.434)
Lower managerial and professional	0.231 (0.340)	0.248 (0.340)	0.274 (0.420)	0.281 (0.419)
Intermediate occupations	− 0.398 (0.366)	− 0.374 (0.364)	0.131 (0.443)	0.130 (0.443)
Routine and semi-routine	0.665 (0.406)	0.686* (0.404)	0.524 (0.454)	0.524 (0.454)
EU	− 0.708 (0.445)	− 0.653 (0.444)	− 0.792 (0.600)	− 0.790 (0.601)
Constant	38.25*** (1.847)	38.37*** (1.836)	32.28*** (2.830)	32.28*** (2.826)
No. of observations	1,352	1,352	1,433	1,433
No. of students of work placement	1,172		1,280	
No. of students of international study placement	101		123	
No. of students of combined placement	79		30	
Adj R^2	0.51	0.51	0.47	0.47

***, ** and * stand for 1%, 5% and 10% levels of significance in turn. Heteroskedasticity-robust standard errors are reported in the parentheses. The multicollinearity test is passed

Academic discipline effects

In this section, we analyse whether there is a differential placement effect on final year performance for students from different schools. If there is a work placement effect, it would suggest that the effects of placements may differ depending on the discipline. Indeed, recent literature (see Jones et al., 2017) is indicative of this.

As outlined above, Aston University has five different schools. However, because compulsory placements are generally a feature of programmes delivered by Aston Business

Table 4 Estimation results by academic discipline

Variable/specification	(1) ABS	(2) ABS	(3) LSS	(4) LSS
Work	1.403*** (0.426)	1.444*** (0.427)	0.984 (0.867)	1.015 (0.873)
Work \times International study		− 1.113** (0.551)		− 0.267 (0.785)
Y2	0.578*** (0.015)	0.577*** (0.015)	0.649*** (0.042)	0.649*** (0.042)
Age	− 0.557*** (0.081)	− 0.555*** (0.081)	− 0.099 (0.073)	− 0.099 (0.073)
Female	1.044*** (0.189)	1.068*** (0.189)	1.027** (0.437)	1.048** (0.442)
White	1.066*** (0.408)	1.060*** (0.405)	0.533 (1.347)	0.551 (1.355)
Black	0.163 (0.559)	0.164 (0.557)	− 2.507* (1.520)	− 2.513* (1.510)
Asian	0.894** (0.440)	0.873* (0.438)	− 0.522 (1.419)	− 0.543 (1.399)
Mixed	0.509 (0.629)	0.521 (0.625)	0.929 (1.553)	0.911 (1.537)
Grammar School	− 0.541 (0.612)	− 0.527 (0.612)	− 1.376 (1.270)	− 1.383 (1.270)
Higher managerial and professional	0.071 (0.321)	0.074 (0.321)	0.027 (0.654)	0.032 (0.656)
Lower managerial and professional	0.275 (0.298)	0.291 (0.297)	0.232 (0.616)	0.232 (0.617)
Intermediate occupations	0.034 (0.309)	0.038 (0.309)	− 0.822 (0.728)	− 0.809 (0.724)
Routine and semi-routine	0.493 (0.335)	0.486 (0.335)	0.882 (0.717)	0.902 (0.718)
EU	− 1.071*** (0.380)	− 1.042*** (0.380)	1.324 (1.326)	1.354 (1.337)
Constant	38.48*** (1.948)	38.47*** (1.947)	24.86*** (3.364)	24.83*** (3.384)
No. of observations	2,370	2,370	415	415
No. of students of work placement	2,125		327	
No. of students of international study placement	176		48	
No. of students of combined placement	69		40	
Adj R^2	0.50	0.50	0.49	0.49

***, ** and * stand for 1%, 5% and 10% levels of significance in turn. Heteroskedasticity-robust standard errors are reported in the parentheses. The multicollinearity test is passed

School (ABS) and the School of Languages and Social Sciences (LSS), we focus on running the benchmark regressions for these two schools separately. In total, from our overall sample, 2,370 students are from ABS, and 415 students are from LSS.

The results are very interesting. As can be seen in Table 4, the coefficient for the variable *Work* is positive and statistically significant for ABS students, but it is insignificant for students from LSS. This suggests that business school students perform better in the final year if they take work placements. In contrast, for the students from LSS, the work

placement versus international study placement effect is not statistically significant. In order to explain this discrepancy, we conjecture that the work placement, which takes place typically in a business environment, is better suited to business school students, whereas the international study placement is more aligned to students developing their language skills.⁷ Cardwell (2020) argues that students do not primarily undertake study abroad in the belief that it could help to achieve a better score but most see the opportunity to gain life-enhancing and career-strengthening prospects. In alignment with this, policies that promote study abroad stress increasing cultural awareness and employability rather than academic attainment (Relyea et al., 2008).

Robustness checks

In this section, we apply the propensity score matching method as a robustness check to control for self-selection bias. We suspect that the choice between the work option and international study option is not randomly assigned but may be strongly affected by individual preferences. As can be seen in Table 1, EU students are more likely to study abroad indicated by the highest subsample proportions (0.16); weaker students also have a tendency to pick the international study option specified by lowest first year and second year sample average marks (58.80 and 58.94) compared to the ones in full sample, work placement and combined placement samples. In the previous section, we attempted to correct for potential selection bias by including control variables. In this section, we go further in order to check the robustness of our model specification in Table 2.

We utilise the propensity score matching method commonly used in the economics literature (see Abadie & Imbens, 2006 and 2016) and also used in the placements literature (see Jones et al., 2017) to check the robustness of our model. The propensity score matching methodology has two stages. The first stage estimates the propensity scores by running a Probit model where the dependent variable is a 1/0 placement dummy, which is equal to 1 if a student does a work placement and zero if a student undertakes an international study placement or combined international study and work placement. The propensity scores are essentially the residuals from the regression which includes almost all of the control variables described above. The results of the Probit model are reported in the Appendix in Table A3.⁸

The second step is to use the propensity scores to match up the students. This is called nearest neighbourhood matching, and it allows a simple comparison between two groups: the control group and the treatment group. In this context, in Table A3, column 1, the control group is the set of students who went on an international study placement only or took the combined work and international study placement, whereas the treatment group is the set of students who went on a work placement. In Table A3, column 2, the control group is the set of students who went on an international study placement only; whereas the treatment group is the set of students who went on a work placement. Jones et al. (2017) give a detailed explanation as to how to apply the propensity matching method to correct for selection bias in an international study that estimates the impact of work placements on

⁷ As indicated in Table 4, a bigger proportion of LSS students took international study placement (26.91%) compared to those in ABS (11.53%).

⁸ We estimate the propensity score by using the full sample (column 1) and also a subsample excluding students chose combined work and international study placements (column 2).

student performance in HE. The propensity score matching allows us to calculate the average marginal effect for all matched groups, which gives us a coefficient similar to β_2 in Eq. (1).

Once we implement the matching algorithm we find for students who chose work placements, the estimated final year average mark is 1.072 marks higher on average for students who undertake a work placement relative to those students who choose an international study placement. The standard error is 0.529, which is computed by a bootstrap method. Overall, the effect is statistically significant at the 5% significance level. Furthermore, if we exclude those students who took combined work and international study placements, the estimated coefficient increases to 1.356 (standard error is 0.536). Hence, the estimated effect of work placements versus international study placements via the propensity score matching method is still positive, and the magnitude is similar to the estimates reported above using standard regression techniques. This suggests our robustness test works well. It would appear that even when controlling for selection bias, work placements are preferable to international study placements in terms of student performance.

Conclusion

This paper has investigated the impact upon student performance of students choosing a work-based placement year relative to an international study placement abroad. Both types of placements offer students new opportunities to broaden their skills. A work-based placement allows students to gain important insights into the workplace, whilst an international study placement gives students a new experience of living and studying in a different country. To some extent, students gain greater transferable skills during work placements, and hence they can apply those skills to their learning when they return to university. In particular, skills such as problem-solving, data analysis and time management are vitally important for final year's study. In the UK, curriculum and assessment design in the final year's modules is much more demanding than the first year and second year modules. Problem-solving and data analysis are important learning outcomes embedded into all final year modules, whereas international study placement may not emphasise these attributes to the same scale. Arguably, work placement provides an opportunity to help students develop and enhance their skills; it also enables students to apply their theoretical learning into a real-life setting, which enhances their understanding of the theory and more importantly encourages learning by doing. This valuable experience will benefit their future studies when they are back at university after their placement.

The current literature broadly indicates that work placements improve student performance relative to those students who do not choose a work placement (Gomez et al., 2004; Jones et al., 2017; Routon & Walker, 2019; Schonell & Macklin, 2019; Surridge, 2009). This paper however focuses on the students who choose the alternative placements but more specifically whether a work placement has better performance effects than an international study placement. As far as we know, no other studies in the literature focus upon this interesting question. Our results indicate that a work placement does improve final year performance relative to choosing to do an international study

placement (or a combination of the two). However, the coefficient estimate is relatively mild. This is perhaps not completely unexpected as many other confounding factors are also likely to impact upon student performance. Nevertheless, this mild impact is not out of line with other studies that look at the effects of work placements upon performance. Furthermore, our analysis is also important in that it rules out the possibility that choosing one route does not clearly have a dramatic impact upon performance compared to taking another route.

Additional findings of our research suggest that the impact of work placements versus international study placements is stronger for males compared to females and that there is a differential effect depending upon the discipline. Indeed, this latter area should be of particular interest to academics and administrators who manage placement programmes. Overall, females tend to perform better academically in our study regarding of discipline. However, male students gain more from work placements than their counterparts, which is consistent with the finding of Oberman et al. (2021) that male students experienced a statistically significant increase in occupational self-efficacy through work experience, whereas this is not the case for female students. Hence, how to help female students find the right work placements to stimulate their self-efficacies is a promising direction for future research. It is however possible that females are actually discriminated against by employers when applying for work placements.

Overall, therefore, our results provide interesting insights for policy makers in higher education. Student satisfaction and the quality of learning and teaching have an important impact upon published league tables. The decision to adopt placements into the curriculum has many challenges and is likely to have significant resource implications. Higher education providers around the world need to ensure that their students have the opportunity to attract the leading employers who can provide high quality placements as this will lead to higher performance and the opportunity to obtain all sorts of skills that a typical academic curriculum cannot provide for. Furthermore, if students choose the international study route, HE providers must ensure that they work closely with their international partners to ensure that their students maximise their experience abroad.

Future studies that look at work placements on student performance in this domain could determine whether the findings in this study are similar compared to other institutions in the UK or institutions in other countries, considering our results are drawn from one university in the UK. Furthermore, researchers could investigate in more detail the effectiveness of international study placements depending upon location. Given the availability of a larger sample size, it may be possible to distinguish between the locations of international study placements, such as America, Asia and EU. Unfortunately, we are not able to do this in this paper due to data availability and a loss in terms of the degrees of freedom. It might be the case that international study placements in locations with a significantly different culture may have greater performance effects compared to international study placements where the culture is similar to the student's country of origin. A similar idea can also apply to work placement by comparing domestic work placements with international work placements. Again, data constraints stop us from investigating this interesting issue. Lastly, more case study-based research is needed in this area as one pitfall of multiple regression analysis is that it may hide much of the important qualitative benefits of work placements. As higher education changes across the world, the employability dimension will continue to grow in importance. By integrating work and international study placements into their curriculum, higher education institutions across the world will be able to provide their students with the skills necessary to ensure that they are ready for a future economy that is likely to undergo significant change.

Appendix

Table A1 Variable descriptions and data statistics

Variables	Descriptions	Mean	Median	Std. Dev	Min	Max	Obs
YF	Final year average mark	65.28	65.59	6.57	25.58	87.46	2,785
Y2	Second year average mark	61.21	61.06	7.22	35.30	84.02	2,785
Work	Whether a student chose work only option in the placement year, yes = 1	0.920	1	0.272	0	1	2,785
Work × International Study	Whether a student chose combined work and international study options in the placement year, yes = 1	0.039	0	0.194	0	1	2,785
Female	Dummy variable: female = 1	0.49	0	0.50	0	1	2,785
Age	Student age when first entered the university	19.75	19	2.12	18	57	2,785
Higher managerial and professional	Whether a student's parents work in higher managerial and professional occupations, yes = 1	0.152	0	0.359	0	1	2,785
Lower managerial and professional	Whether a student's parents work in lower managerial and professional occupations, yes = 1	0.210	0	0.407	0	1	2,785
Intermediate occupations	Whether a student's parents work in intermediate occupations including lower supervisory, technical occupations and small self-employment, yes = 1	0.180	0	0.384	0	1	2,785
Routine and semi-routine	Whether a student's parents work in routine and semi-routine occupations, yes = 1	0.141	0	0.348	0	1	2,785
Grammar school	Whether a student studied in a Grammar school pre-university, yes = 1	0.018	0	0.134	0	1	2,785
EU	Whether a student is an EU student, yes = 1	0.079	0	0.270	0	1	2,785
White	Dummy variable: white = 1	0.51	1	0.50	0	1	2,785
Black	Dummy variable: black = 1	0.09	0	0.28	0	1	2,785
Asian	Dummy variable: Asian = 1	0.31	0	0.46	0	1	2,785
Mixed	Dummy variable: mixed blood = 1	0.04	0	0.19	0	1	2,785

Table A2 Correlation matrix

	YF	Y2	Work	Work × International Study	Age	Female	White	Black	Asian	Mixed	Grammar	Higher managerial & professional	Lower managerial & professional	Intermediate occupations	Routine & semi- routine	EU
YF	1															
Y2	0.6782	1														
Work	0.1328	0.0926	1													
Work × International Study	-0.0259	-0.0058	0.0597	1												
Age	-0.1823	-0.0494	-0.0515	0.0014	1											
Female	0.1171	0.0709	0.0205	0.0966	-0.0425	1										
White	0.1352	0.1675	0.0133	0.0685	0.0117	-0.0135	1									
Black	-0.1216	-0.1060	-0.0447	0.0100	0.1000	0.0727	-0.3142	1								
Asian	-0.0518	-0.1247	0.0392	-0.0860	-0.0971	-0.0336	-0.6773	-0.2052	1							
Mixed	-0.0215	-0.0188	-0.0220	-0.0025	0.0250	-0.0034	-0.2056	-0.0623	-0.1342	1						
Grammar	-0.0016	0.0053	0.0109	0.0001	-0.0090	0.0227	-0.0041	-0.0153	0.0277	0.0021	1					
Higher managerial & professional	0.0247	0.0218	0.0482	0.0072	-0.0400	0.0103	0.1082	-0.0243	-0.0607	0.0021	0.0539	1				
Lower managerial & professional	0.0253	0.0070	0.0067	0.0096	-0.0450	-0.0088	0.0443	0.0694	-0.0485	0.0368	0.0019	-0.2185	1			
Intermediate occupations	-0.0174	-0.0154	0.0285	0.0019	-0.0134	-0.0247	0.0073	-0.0250	0.0575	-0.0174	0.0058	-0.1985	-0.2415	1		
Routine & semi-routine	0.0058	-0.0461	0.0137	-0.0127	-0.0256	0.0004	-0.1405	0.0287	0.1800	-0.0286	0.0216	-0.1718	-0.2090	-0.1898	1	
EU	-0.0066	0.0583	-0.0896	0.0439	0.0205	0.0352	0.0745	-0.0667	-0.1688	-0.0316	-0.0400	-0.1093	-0.1379	-0.1268	-0.1111	1

Table A3 Propensity score matching: the first step (probit)

Variable/specification	(1) Full sample	(2) Subsample excluding work and international study students
Y2	0.025*** (0.005)	0.026*** (0.005)
Age	-0.022 (0.015)	-0.022 (0.016)
Female	0.064 (0.072)	0.039 (0.072)
White	0.023 (0.148)	0.022 (0.149)
Black	-0.181 (0.180)	-0.175 (0.182)
Asian	0.124 (0.160)	0.142 (0.162)
Mixed	-0.152 (0.216)	-0.147 (0.218)
Grammar school	0.057 (0.289)	0.059 (0.291)
Higher managerial and professional	0.318** (0.126)	0.314** (0.127)
Lower managerial and professional	0.117 (0.105)	0.111 (0.106)
Intermediate occupations	0.207* (0.113)	0.200* (0.114)
Routine and semi-routine	0.144 (0.120)	0.139 (0.121)
EU	-0.390*** (0.126)	-0.407*** (0.128)
Constant	0.193 (0.460)	0.157 (0.463)
No. of observations	2,785	2,676
Pseudo R^2	0.04	0.04

***, ** and * stand for 1%, 5% and 10% levels of significance in turn. All robust standard errors (taking into account that the propensity score is estimated) are reported in the parentheses

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Declarations

Conflict of interest The authors declare no competing interests.

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