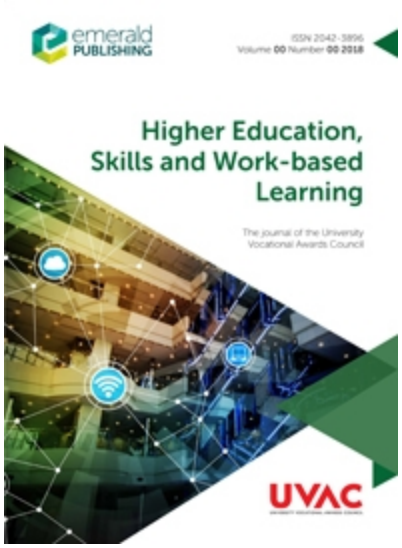

Academic Performance and Work Placements: Does Academic Performance influence the Decision to Complete a Work Placement?

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Abstract

Purpose: There is strong evidence that year-long work placements make students more employable and produces better academic performance. Despite this, UK participation rates remain stubbornly low. We examine the influence of academic performance on students' willingness and ability to complete work placements.

Originality: Our research adds to the literature investigating the influence of academic performance through academic self-concept on students' investment decisions to include a work placement in their degree study and in students' ability to secure a work placement.

Design: Our novel conceptual framework distinguishes students by their intentions regarding work placements indicated at enrolment as well as whether they completed a work placement. We use a sample of 226 business and economics students, employing propensity score weighted multiple regression to analyse the influence of academic performance.

Findings: Our results indicate that academic performance has a significant influence on the decision to include a work placement option at enrolment. For those students who do pursue work placements, first-year academic performance had a significantly positive impact on their ability to secure a placement job. Finally, completion of a work placement was beneficial to final year academic performance.

Practical implications: Work placements are beneficial. Since low academic performance deters students from pursuing such opportunities, universities may need to communicate the benefits better to encourage greater interest. Further, universities need to realistically manage the expectations of students with low academic performance who want to do work placements and provide targeted

support during the application process. Furthermore, alternatives to work placements should be provided.

Key Words: Career decision-making, Academic performance; academic support; work placements.

Introduction

Year-long work placements have long been a part of degree courses in UK Higher Education. Traditionally, such placements were a compulsory feature of vocational courses in Business, Health and the Sciences, providing students with an opportunity to apply their knowledge from academic study and develop skills, qualities and attributes which would be beneficial in future employment. With renewed interest in the employability of university graduates following the Wilson Review (2012), the range of courses offering such placements broadened from vocational courses to traditionally non-vocational disciplines such as History, English and Economics. Data published by the Higher Education Statistical Agency (HESA) show that the percentage enrolling on sandwich courses, typically a four-year course where a student spends the penultimate year on a work placement, rose by 26% between 2014/15 and 2018/19 (HESA, 2020). However, despite this expansion in the number of students enrolling on sandwich courses, the percentage completing a year-long work placement has not risen. Indeed, in the latest available data on graduate outcomes, the percentage of students completing placements fell to 7.3% in 2018/19 compared to 8.5% in 2014/15 (GOV.UK, 2019). Internationally, this participation rate compares unfavourably with many European countries (Arthur and Little, 2010).

Both the employment and academic benefits of completing work placements are well-established in the literature. Research on employment outcomes demonstrate that the completion of work

placements fosters career-related competencies which produces higher levels of employability (Brooks and Youngson, 2016). Work on academic outcomes highlight that many of these competencies acquired by students during work placements can be valuable during academic study in the final year (Auburn, 2007). Studies across a range of disciplines have shown evidence of superior academic performance among students who have completed work placements (see Duignan, 2002 and Green, 2011 for business students; Gomez, Lushman and Clements, 2004 for bioscience students; Mandilaras, 2004 for economics students; Mansfield, 2011 for surveying students; Surridge, 2009 and Crawford and Wang, 2016 for accounting and finance students).

There has been limited research investigating differences between those who complete work placements and those who do not. The studies which have been done focus on academic ability, using a range of measures of performance including university entry qualifications, first-year and second-year marks as proxies. In general, they find that students with higher academic performance are more likely to complete work placements (Brookes and Youngson, 2016; Naughton and Naughton, 2016; Jones et al., 2017).

On most degree courses, work placements tend to be a voluntary opportunity for students. Enrolment data suggests that there is still a significant percentage of students who do not enrol on sandwich degrees and have no intention of completing a work placement. To our knowledge, no research has been done regarding the decision to enrol on a sandwich study route – a route with a work placement. Therefore, drawing on Calsyn & Kenny (1977) and Brynin (2012), we add to knowledge by analysing the influence of prior academic performance through academic self-concept in the investment decision made at enrolment to spend an additional year pursuing a work placement option.

Further, the discrepancy in the percentage who enrol on sandwich degrees and the percentage who go on to complete work placements suggests that many who intend to complete a work placement do not. Little is known about their characteristics. Differentiating students by their preferences indicated

at enrolment as well as whether they completed a work placement enables our work to separate this group from their peers who successfully secure and complete year-long work placements. Consequently, our work can analyse the influence of academic performance on the competitive application process.

The paper addresses the following research questions:

a) Does academic performance influence the decision to apply for work placements?

b) Does academic performance influence a student's ability to secure a work placement?

c) Does completion of a work placement enhance final year academic performance?

To address these research questions, we analyse the preferences of a sample of business and economics students indicated at enrolment at a UK University.

Our results indicate that students who indicated a preference for work placements at enrolment demonstrated higher prior academic performance than students who did not. This suggests that academic performance is a significant influence on the investment decision to include a work placement in a programme of study. Further, students who indicated they wanted to do a work placement but did not secure one demonstrated significantly lower first year grades than their peers who completed work placements. This suggests that academic performance at that point influences the competitive application process involved in work placements. Finally, our results indicate that completion of a work placement has a significantly positive impact on final year performance.

Our findings have implications for the design of and support for work placement opportunities in universities in the UK to increase participation. The results support policies for including work placements opportunities in all degree programmes. However, a significant proportion of students indicated no intention of completing work placements at enrolment. Low academic performance is evident as an important criterion in that decision, and this suggests that these students may have low confidence in their ability to secure a work placement. Universities should do more to encourage and

support these students in pursuing work placement options. In addition, since first-year academic performance is an important factor in determining whether a placement is secured, its importance needs to be emphasised in messaging around work placements. Finally, there will still be a significant body of students who will be unable to complete work placements so, universities need to provide alternative ways for students to develop the skills, qualities and attributes normally gained during work placements to enhance their employment and academic outcomes.

The paper proceeds as follows. The next section reviews the literature and explains the research hypotheses. The following section describes the research design and methods used in the study. That is followed by the presentation of results. Then, the results are discussed. The final section is the conclusion, including suggestions for further research.

Literature Review and Hypotheses

Year-long work placements provide students with an opportunity to apply their knowledge from academic study and develop skills, qualities and attributes which will be beneficial in future employment. Therefore, one strand of research focuses on identifying whether the experience produces beneficial employment outcomes for students, while a second strand examines whether work placements have academic benefits in the final year.

Employment benefits of Completing a Work Placement

The completion of work placements should develop career-related skills, qualities and attributes which lead to better employment outcomes after graduation. Bridges (1993) highlights transferable or generic skills such as self-management, communication and problem-solving that can be enhanced in a work-based setting. Neill and Mulholland (2003) propose the work-based development of skills which enhances the commercial awareness of placement students. Bourner and Ellerker (1998) agree, suggesting that the effect of workplace learning can be further enhanced when integrated into studies.

Research shows that placement students are at a distinct advantage over non-placement students when applying for jobs after university. They have a substantial body of experience to draw upon and are better positioned to articulate their skills and abilities in relation to job roles (Raybould and Sheedy, 2005). Further, since graduate recruitment processes utilise similar techniques to the ones used to recruit students for a work placement, the successful experience of securing a placement give students more confidence when applying for graduate positions (Branine, 2008; Purdie et al., 2011).

The development of transferrable skills in the workplace and the confidence placement students gain from the experience improves their employment outcomes upon graduation. Students who have completed a year-long work placement are more likely to be in graduate employment within six months of completing their studies (Mason, Williams, and Cranmer, 2009). Brooks and Youngson (2016) find that placement students' employment outcomes are better as they are more likely to work full-time in an appropriate level graduate role, with a higher starting salary compared to non-placement students.

Academic Benefits of Completing a Work placement

In addition to positive employment outcomes for placement students Auburn (2007) highlights a range of knowledge, skills and attributes acquired during work placements which can be valuable to students during academic study in their final year, improving their performance. These include better personal and intellectual development, greater confidence and motivation. Anecdotal observations of the behaviour of students who had completed work placements support this (Little and Harvey, 2007).

Across a range of subject areas, research has investigated the relationship between completion of work placements and academic performance in the final year. An early study by Duignan (2002) conducted a statistical analysis of the examination results of a sample of business undergraduates across two cohorts finding a significant difference in the final year academic performance of

placement students and non-placement students. The study is limited by its failure to control for academic ability and other characteristics such as socio-economic background.

Other literature which control for such factors, suggest that completion of a work placement enhances academic performance. Gomez, Lushman and Clements (2004) used multivariate regression analysis to study the impact of work placements on the academic performance of biosciences students reporting that placement students exhibited improved final year academic performance. Similarly, Surridge (2009) using regression analysis for three cohorts of accounting and finance students found that placement students perform significantly better in the final year. In an analysis of economics students, Mandilaras (2004) found that those who completed a placement year had a significantly higher probability of obtaining an upper-second class degree. Mansfield (2011) using analysis of covariance for five cohorts on a surveying degree found a statistically significant improvement in final year marks for students who completed a sandwich degree incorporating a placement. Analysing one cohort of business students, Green (2011) found significantly higher mean marks for placement students compared to those who do not go on placement. Crawford and Wang (2016) found that work placements improved the performance of both UK and international students on an accounting and finance degree. Interestingly, it is the former group which derive the greatest benefit. Brooks and Youngson (2016) conduct an analysis across six subject areas - creative arts and design, business, mathematics and computer sciences, engineering, physical sciences and biological sciences. They found that students who complete a work placement tend to see an increase in their final year grade relative to the 2nd year. Non-placement students who continued straight into the final year do not. Jones et al., (2017) analyse a large sample of students across subject disciplines at Aston University and business at the University of Ulster. They find that the effect of undertaking a sandwich work placement on final year academic performance was positive and significant. In their sample, business and engineering students reaped the greatest benefits in terms of improved final year performance. They propose that work placements that are aligned to academic disciplines are more likely to

produce superior performance, suggesting an ability to apply theory to practice adds to the experiential skills developed. Therefore, studies suggest that across a range of disciplines, participation in a work placement improves academic performance in the final year.

Prior Academic Performance and the completion of Work Placements

The evidence above suggests that work placements create a gap in both employment outcomes and academic achievement between placement and non-placement students. In addition, studies which have investigated the impact of work placements on final-year academic performance find that students who complete work placements have higher prior academical performance. Mansfield (2011) plus Naughton and Naughton (2016) used solely second year marks to measure academic performance. Brooks and Youngson (2016) used first and second-year grades. Surridge (2009), Green (2011) plus Crawford and Wang (2016) all used entry qualifications and first-year or second-year scores. Mansfield (2011), Surridge (2009) and Green (2011) did not find that that previous academic performance was significant in explaining the observed differences in final year performance between placement and non-placement students. In contrast, Crawford and Wang (2016), Brooks and Youngson (2016) plus Naughton and Naughton (2016) found that placement students had higher academic performance compared to their non-placement counterparts prior to the placement year. Jones et al., (2017) highlight endogeneity problems with the methodology used by the above literature which can result in biased estimates. Instead, they use propensity score matching to avoid the need to construct valid instruments. Students are matched for characteristics and differentiated solely on whether they went on placement or not. Their results show that students with better academic performance are more likely to complete work placements. In summary, these results suggest that a gap in academic performance between placement and non-placement students already exists and that this gap is widened by the experience of the work placement.

Given the proposed benefits, it is surprising that participation has not increased as the percentage of students enrolled on sandwich degrees has risen. There has been little investigation of this. This paper contributes to the literature by addressing two aspects of participation. Firstly, we investigate the impact of prior academic performance on the decision to include a work placement in a programme of study. Secondly, we investigate whether academic performance influences whether a student secures a placement role.

Since a significant proportion of students enrol on full-time degrees many students do not even consider completing a year-long work placement. However, little work has analysed the reasons for this. Given the evidence that students with better academic performance tend to secure work placement jobs, we propose that prior academic performance may influence the decision to enrol on a sandwich route (with a work placement) or full-time route (without a work placement).

Prior academic performance can influence the decision through the theory of academic self-concept. These are self-perceptions about one's ability formed through experience with and interpretation of the surrounding environment (Shavelson et al., 1976). From the skills development model, academic self-concept emerges from academic performance (Calsyn and Kenny, 1977). Better academic performance enhances academic self-concept enhancing students' sense of worthiness and competence and making them feel more confident (Marsh and Martin, 2011). For instance, Mohammad (2010) found that pre-university students who get higher grades developed higher levels of confidence.

We propose that it is the influence of academic performance on confidence which influences the decision to pursue work placement opportunities. Brynin (2012) highlighted that university study is an investment decision and suggests that completing a placement raises the amount of investment through additional fees, living costs and the opportunity costs of delaying employment. Further, there are time and effort involved in applying for placement jobs. Given the evidence that students with

worse academic performance are less likely to secure placements, low academic self-conception may make such students less confident in their ability to do so. Therefore, they may consider the investment in time and effort applying to be a waste and be more likely to enrol on full-time routes instead. We add to previous work by relating academic performance to the investment decision to pursue work placement opportunities through its influence on students' academic self-concept. Our first hypothesis derives from this:

Hypothesis 1: Students with higher academic performance are more likely to choose to complete work placements.

In most degrees, completion of a work placement is not guaranteed. It is an optional feature of degrees where students compete for a position through an application process. Little is known about the academic performance of students who enrol on a sandwich route of study, apply for placement positions but fail to secure one. Graduate outcomes surveys indicate that these represent a substantial percentage of the student body. In previous analysis, these students are included in the group which do not complete work placements. Yet, as Jones et al., (2017) acknowledge, such students may have higher academic performance who lose out in the competitive process in applying for placement jobs. The influence can work in several ways. Firstly, employers may use measures of academic performance as a way of distinguishing candidates in the application process. Secondly, students with higher academic self-concept may be more confident in their abilities and perform better in certain stages of an application process such as assessment centres and final interview. We aim to address this gap by testing the influence of prior academic performance in the competitive application process for work placement opportunities. Therefore, we test this using the following hypothesis:

Hypothesis 2: Students with higher academic performance are more likely to successfully secure work placements.

Finally, we test whether the completion of a work placement has a significant impact on final year performance with the following hypothesis:

Hypothesis 3: Completion of a work placement has a positive influence on final year academic performance.

Research Design

Data and Sample

We sourced data routinely collected at enrolment and for measuring progression and performance for one full cohort of students from two undergraduate degree courses (economics and business) at a UK university. We gained ethical approval from the University for the use of this data for the purpose of the research project. In doing the work, we complied with the Institution's ethical policy. After student data were sourced from University databases and checked for any errors or omissions, the data were anonymised on a spreadsheet for the process of analysis. Once the anonymised spreadsheet was created, the source files were deleted.

At the University work placements are an optional feature of business and economics degrees. However, when enrolling students choose either a sandwich (with a work placement) or full-time (no work placement) study route. Therefore, they signal an intention to complete a work placement at that time. However, during their degree students can transfer to the alternative route. Some students may intend to complete a work placement but do not. Consequently, they transfer to the full-time route. Others who started on the full-time route can transfer to the sandwich route if they pursue and secure a work placement.

The record of these intentions enables our work to distinguish the impact of academic performance on the decision to complete a work placement at enrolment and the impact of academic performance on the competitive application process. We distinguish different groups of students based on (i) the route selected on entry – sandwich (placement) or full time (no placement) - and (ii) the actual route – dependent on whether a student completed a work placement. The paths of the different groups of students and the related hypotheses are outlined in figure 1.

Insert figure 1 here

On entry the students who indicated they did not want to do a work placement are denoted FT, and the students who indicated that they intended to do a work placement are denoted SW. Analysing differences in the academic performance evident at enrolment between those who enrol on the full-time route and those who enrol of the sandwich route enables the research to assess its influence on the decision to apply for work placements and test hypothesis 1. If hypothesis 1 is correct, the SW group should have significantly superior prior academic performance than the FT group.

Thereafter, we distinguish three separate groups:

1. Students who indicated they did not want to do a work placement and did not (denoted as FT-FT in our analysis).
2. Students who indicated they wanted to do a work placement but did not secure one (denoted SW-FT).
3. Students who indicated they wanted to do a work placement and completed one (SW-SW).

Analysing differences in the academic performance between the SW-FT group and the SW-SW group enables the research to assess its influence on the competitive process involved in applying for placement positions and test hypothesis 2. If there is evidence to support hypothesis 2, the SW-SW group should have significantly higher academic performance than the SW-FT group. Analysing differences in final-year academic performance between the three groups enables the research to test hypothesis 3. The completion of a work placement should have a significant impact on final year academic performance. The SW-SW group should exhibit significantly higher academic performance compared to both the SW-FT and FT-FT groups.

A very small number of students initially on the full-time route secured a year-long work placement and transferred from the full time to sandwich route. However, the small number means that it is

impossible to make meaningful comparisons so the data from these students are not included in analyses reported here.

Measures of academic performance and independent variables

In our analysis we use several measures of academic performance. For hypothesis 1, we measure academic performance evident at enrolment using the UCAS points (UCAS, 2022) gained by a student. For hypothesis 2, we measure academic performance prior to the completion of a work placement using average marks attained in the first year (recorded on a percentage scale from 0 to 100). Specifically, the mean score of all summative assessments (i.e., a mix of coursework and exam grades) taken by each student during their first year. To measure academic performance after the completion of work placements we use average marks attained in the final year (recorded through a percentage scale from 0 to 100). That is, the mean score of all summative assessments (i.e., a mix of coursework and exam grades) taken by each student during their final year. In the regression model to test hypothesis 3, first year marks and second year marks are included as controls reflecting prior academic performance. This is consistent with the existing literature (Surridge; 2009; Green, 2011; Crawford and Wang; 2016).

We also distinguish students using other characteristics which have been identified as important explanations of differences in academic ability between students. The following variables were all obtained from routinely collected application and enrolment data. For Age, we used a binary variable denoted as 0 for students aged 18-20 at enrolment and 1 for those aged above that. For Gender, we used a binary variable denoted as 0 for male and 1 for female indicated at enrolment. For Ethnicity, we used a binary variable denoted as 0 for students with a white ethnicity and 1 for students recorded as ethnic minority groups. For residency, we used a binary variable denoted as 0 for UK students and 1 otherwise. We distinguish entry qualifications using a binary variable with 0 denoting students with A-level entry qualifications and 1 denoting alternative or mixed entry

qualifications (combination of A-levels and alternatives). Intention to undertake a placement or not was indicated by each student on application to the course i.e., application to the Sandwich or Full-time route. Finally, we use a binary variable to indicate whether a student is deemed part of a disadvantaged group underrepresented in higher education. Some of the main indicators include Participation of Local Area (POLAR) indices of Multiple Deprivation (IMD), ACORN demographics and household income data (Gorard et al., 2019).

Methods of Analysis

Multiple regression analysis was used to assess the three hypotheses. A propensity scoring methodology was adopted to overcome the problem of selection bias. This is beneficial for our small sample since it allowed all the student observations to be included in the regression analysis. The Toolkit for Weighting and Analysis of Non-equivalent Groups (TWANG) Shiny application (for two groups see Griffin et al., 2020 and for three groups see Stelzner et al., 2020) was used to estimate propensity score weights (PSWs) for the observational data in the different treatment groups as shown in Figure 1. The propensity score weights were assessed to determine if the weighting then balances the distributions of covariates between the treatment groups being compared. The absolute effect size (ES) differences (also called the absolute standardized mean difference or standardized bias [SB]) and the Kolmogorov-Smirnov (KS) statistic were used to assess balancing (details given in MaCaffrey et al., 2013). The propensity scores are used as weights in linear regression models to balance the influence of the different groups of students. To assess the success of the propensity scores as weights for removing selection bias, appropriate diagnostic tests were employed (see MaCaffrey et al., 2013).

Propensity score weights were calculated using the TWANG packages. Descriptive statistics and treatment effect estimates using weighted multiple linear regression were calculated using the Minitab

software package (Minitab 19 Statistical Software, 2020). The data from students on the two courses (Business and Economics) were analysed separately and pooled. The findings were similar for each course when analysed separately and so the pooled analyses are presented here.

In testing hypothesis 1, the average treatment effect (ATE) is the comparison of UCAS points had the entire population been observed as the SW group versus had the entire population been observed as the FT group.

In testing hypothesis 2, the average treatment effect (ATE) is the comparison of first year had the population of students who enrolled on the sandwich route been observed as the SW-SW group versus had they been observed as the FT-SW group.

In testing hypothesis 3, the average treatment effect (ATE) is the comparison of final year mark had the entire population of students been observed as the SW-SW group versus had they been observed as the FT-SW group or FT-FT group.

Results

This section presents the summary descriptive statistics of the variables, and the propensity score adjusted linear multiple regression analyses to test the stated hypotheses.

Descriptive statistics

Table 1 shows the descriptive statistics for the academic performance of the sample of students and the control variables. The demographic variables reflect the typical characteristics of business-school students at UK universities (Education Policy Institute, 2020); a large majority of young, white, male students with home residency. Thirteen percentage were classified as having widening participation status. A large minority (29%) had studied a variety of pre-entry qualifications such as BTEC or A-level/BTEC mix. Only 3% of the students had commenced their course as 'mature' students. Table 1

also shows that mean mark for all students increased over the 3 years of academic study. This is consistent with previous studies (e.g., Jones et al., 2017).

Insert table 1 here

A total of nine students (3.8% of the total number available) had missing first year grades and were omitted from the analyses. These students had joined their course at the University after having studied the first year of a degree elsewhere. Analysis of these students' data showed that they reflected the average characteristics of the main cohort, and so very minimal or no bias was expected by excluding their data from the main analyses. Two other students commenced their studies on the full-time route and completed on the sandwich route. These data are also excluded from the analyses. This left a total of 226 students to be included in the empirical analysis.

Table 2 shows the routes taken by the students on their courses. It is of note that almost half of the students that enrolled on their courses intending to include a work placement, did not complete one. These students transferred to the full-time route (notation SW-FT). As the results illustrates, this is a sizable proportion of those who enrolled on the sandwich route and justifies hypothesis 2.

Insert table 2 here

Multiple linear regression results

a) Does academic performance influence the decision to apply for work placements?

Hypothesis 1: Students with higher academic performance are more likely to choose to complete work placements.

The results of a propensity score weighted multiple linear regression analysis with UCAS points as the dependent variable are presented in Table 3. UCAS points are not available for international students and so these observations were excluded from the analysis (n=3 for SW and n=6 for FT).

Insert Table 3 here

The analysis shows that there is a significant difference in academic performance measured by UCAS points between SW and FT students, on average 22.9 percentage points higher for the SW students. Hence there is evidence to support hypotheses 1. Students with higher performance on entry were more likely to select the SW route – with the work placement option. One of the additional covariates is significant and suggests that on average, students with a mix of entry qualifications have significantly higher UCAS points than students that completed only A levels (by 55.2 percentage points).

Overall, the coefficient of determination (R^2adjusted) is 17.1%. That is, the model and its linear associations predicts 17.1% of the variation in UCAS points. None of the covariates in the regression model were overly collinear. An analysis of the residuals showed a normal distribution and constant variance and indicate the regression method is valid.

b) Does academic performance influence a student's ability to secure a work placement?

Hypothesis 2: Students with higher academic performance are more likely to successfully secure work placements.

The results of a propensity score weighted multiple linear regression analysis with average first year mark as the dependent variable is presented in Table 4. The treatment is the study route, coded zero for students that start on the SW route but did not secure a placement (SW-FT) versus the students that start on the SW route and did secure a placement (SW-SW),

Insert Table 4 here

The coefficients in the regression table are average treatment effects (ATE). That is, the comparison of mean outcomes (first year mark) had the entire population been observed under treatment SW-SW, versus had the entire population been observed under treatment SW-FT. The ATE of treatment SW-SW relative to treatment SW-FT equals 2.85 percentage points, and this is significant at the 5 % level. Thus, there is evidence to support hypothesis 2. Students with higher academic performance at the end of the first year of university study are more likely to secure a placement position.

Overall, the coefficient of determination (R^2adjusted) is 5.9%. That is, the model and its linear associations predicts 5.9% of the variation in first year grade. None of the covariates in the regression model were overly collinear. An analysis of the residuals showed a normal distribution but with some non-constant variance and so partially meeting the assumptions of the regression method.

c) Does completion of a work placement enhance final year academic performance?

Hypothesis 3: Completion of a work placement has a positive influence on final year academic performance.

The results of a propensity score weighted multiple linear regression analysis with average Final year mark as the dependent variable are presented in Table 5. The ATE of treatment the SW-SW group relative to treatment FT-FT equals 4.60 percentage points, and is the comparison of mean outcomes (average final mark) had the entire population been observed under treatment SW-SW, versus had the entire population been observed under treatment FT-FT. This is significant at the 1% level.

Insert Table 5 here

The ATE for SW-SW versus SW-FT is 3.38 percentage points. This difference is also significant. The mean difference between SW-FT and FT-FT is 1.08, and not significant. Therefore, the results indicate that placement (SW-SW) students on average attained significantly higher average marks than the students that completed the FT-FT and the SW-FT routes of study. This supports hypothesis 3. Therefore, completion of a work placement has a significantly positive impact on final year academic performance. Interestingly, the gender covariate is significant, indicating that female students, on average, attained higher marks in the final year.

Overall, the coefficient of determination (R^2adjusted) is 44.0%. That is, the model and its linear associations predicts 44.0% of the variation in final year grade. None of the covariates in the regression model were overly collinear (first and second-year marks were both significant predictors in the model and were moderately collinear but did not significantly change the model if one or other were removed). An analysis of the residuals showed a normal distribution and constant variance, and so meet the assumptions of the regression method.

Robustness checks of the propensity score weightings

The absolute effect size differences and the Kolmogorov-Smirnov (KS) statistics were calculated for all pairwise differences between the groups being compared. For brevity, instead of presenting all the statistics for all pairwise differences analysed above we present the collapsed covariate summary. This shows the maximum standardized effect size, maximum KS statistic and minimum KS p-value for each covariate and is sufficient to assess overall balance. Table 6 presents the statistics before weighting and Table 7 after weighting.

Insert table 6 here

Insert table 7 here

Before weighting, the covariates were very different across the groups for all variables to a greater or less degree, indicating imbalance. Significant differences between groups indicated by the KS p-value included First year grade, Ethnicity and Entry qualifications. After weighting, all KS values were attenuated (values below 0.2, considered to be small and desirable; McCaffrey et al., 2013) and there were no significant differences between the groups for any of the covariates. In summary, the propensity score weightings achieved a good balance of the covariate values over the three treatment groups.

The second check examines overlap of the distributions of the estimated propensity scores across the treatment groups. Comparative boxplots (not shown) of the propensity scores by treatment group for each one of the treatments, for each observation in the sample. The method produced generally very good levels of overlap which is the desired property. Based on the quality checks it is concluded that the groups are sufficiently similar to support causal estimation of the treatment estimates.

Discussion

Our results provide support for the hypothesis that students with better prior academic performance are more likely to choose a work placement option as part of their degree. This is consistent with self-concept theory and the findings of Mohammad (2010). This suggests that students with low academic self-concept have less confidence that they will gain a work placement and think that the investment in time and effort pursuing one will not be worth it. The significance of academic performance is echoed in the results regarding the competitive application process for year-long work placement opportunities. Students with higher first year grades were more likely to secure placement jobs. This is consistent with the findings of several previous studies (cf. Brooks & Youngson, 2016; Jones et al., 2017). While companies may use this information as part of screening involved in the selection process, the results also support self-concept theory. The academic self-concept of those students who have higher first year grades may be raised giving them greater confidence when applying for

placement jobs during the second year. This greater confidence means they perform better during the application process. Finally, our results indicate that completion of a work placement has a significantly positive effect on final year academic performance. This supports hypothesis 3. Our results are consistent with previous studies (Surridge, 2009; Mansfield, 2011; Green, 2011)). Therefore, students who complete a work placement gain skills, qualities and attributes which helps their academic study during the final year.

These results have important implications for universities' policies around work placements specifically and experiential learning generally. In general, work placements produce positive academic and employment outcomes for students who complete them. Our results suggest several areas where universities could do more to raise participation rates.

Firstly, universities could provide better information at enrolment about the positive employment and academic outcomes associated with the completion of one. This may encourage more students to determine the investment is worthwhile and enrol on sandwich degrees. However, at the same time, universities will need to be aware that many students may be still reticent to pursue work placement opportunities because they lack self-confidence. Targeted programmes around self-confidence may encourage some of these students to consider work placements.

Secondly, if more students can be encouraged onto a sandwich route, our findings imply that appropriate messaging during the first year could highlight the importance of academic performance in that year to the probability of successfully securing a work placement. Since, in many institutions, average first year marks are not used when determining final degree classification, this information could provide the motivation for students to devote greater effort to studies in that year. This may raise average academic performance. Further, integrating this messaging with the programme of support for students with low academic self-concept may induce better academic performance and

raise their self-confidence. This should increase the percentage of students securing year-long placement positions.

In addition, during the second year, universities could target their support during the application process. For instance, self-concept theory suggests that students who achieved lower first-year grades will have lower self-confidence. Such students could be given exclusive formal support through workshops which may help (i) identify the positions they are more likely to obtain, (ii) successfully negotiate the application process and (iii) make earlier and greater numbers of applications.

However, it must be accepted that there will always be students who are unwilling / unable to make the commitment involved in an extra year of study for financial or other personal reasons. Further, in a competitive market for placements, there will be students who do not gain a work placement. Therefore, alternatives to year-long work placements may be required to provide these students with experiential learning opportunities (Bates and Gamble, 2011). This includes short internships, consultancy projects or work-like experiences. Part of the difficulty with these approaches is identifying what sort of activities completed in these alternatives will replicate the skills, qualities and attributes which students gain during an extended work placement. However, attempts at doing so will also help address the widening participation agenda by improving the academic and employment outcomes for all students.

Conclusion

This paper analyses the influence of academic performance on decisions around work placements using a sample of 226 students who successfully completed economics and business courses at a UK University between 2015 and 2019. We distinguish between groups of students through their intentions regarding the completion of a work placement on entry as well as whether they completed one by the end of their degree. This enables our work to add to the literature in several ways. Firstly,

we assess the role of academic self-concept through prior academic performance on the investment decision regarding whether to include a work placement in a degree. Secondly, we assess the significance of academic self-concept through academic performance on success in securing a work placement. Finally, after accounting for prior academic performance, we analyse the impact of work placements on final year academic performance.

We find that academic performance did have a significant impact on students' decisions to include a year-long work placement in their programme of study. This indicates that students with greater academic self-concept are more confident about their ability to secure work placements. Additional research could investigate additional factors which influence self-confidence and their role in the investment decision around degree study. This would help universities provide better guidance and support for students. We find that better first-year academic performance had a significantly positive influence on the likelihood of gaining a placement job. Again, this is consistent with self-concept theory. Better performance improves students' self-confidence which improves their likelihood of securing a work placement. Information about the importance of first-year academic performance needs to be communicated to students. Further, during the second year, support provided by universities during the application process may need to be targeted to those with lower first-year grades. Additional research in this area could investigate how the signals and support given by universities around placements influences students' expectations and how the impact of failure to gain a work placement affects self-confidence, and hence, motivation and effort levels during the final year of study.

Finally, our results show that the completion of a work placement makes a significant contribution to academic performance in the final year. This work adds to the growing literature that the completion of a work placement develops skills, qualities and attributes which are beneficial in final year study. However, as our study shows, there are groups of students who are unwilling or unable to complete a structured work placement. Therefore, course designers, while offering the opportunity

for a structured work placement may need to provide alternative ways of imbuing the skills, qualities and attributes gained in a work placement to students who do not complete one. By doing so, universities will improve academic performance across all student groups while also developing more employable graduates.

Declaration of Interest

There are no potential competing interests in the production of this research.

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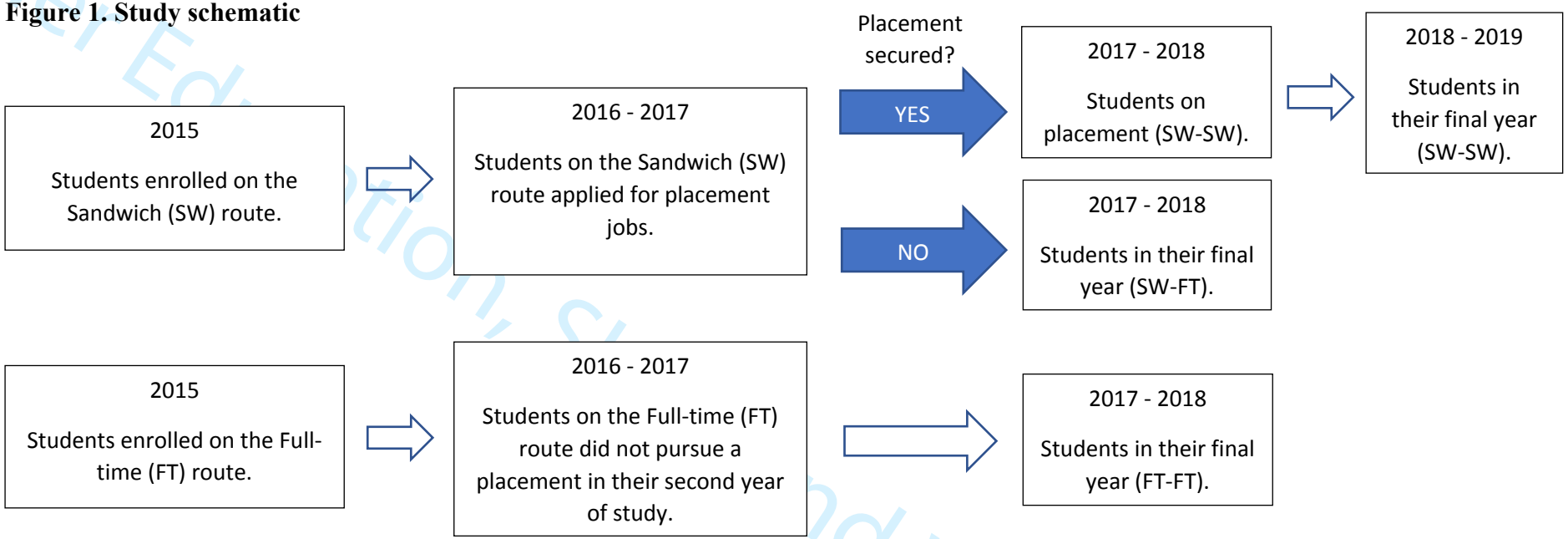
Figure 1. Study schematic



H1: Students with higher academic performance are more likely to choose to complete work placements.

Dependent variable: UCAS points
Treatment: Route selected at entry (SW vs FT)
Covariates: Table 1 excluding residency first year, second year and final year grade)

H2: Students with higher academic performance are more likely to successfully secure work placements.

Dependent variable: First year grade
Treatment: Study Route (SW-SW vs SW-FT)
Covariates: Table 1 (excluding UCAS points, second and final year grade)

H3: Completion of a work placement has a positive influence on final year academic performance.

Dependent variable: Final year grade
Treatment: Study Route (SW-SW, FT-SW, FT-FT)
Covariates: Table 1 (excluding UCAS points)

Table 1. Descriptive analyses of the data set.

Variable	Total Count	Mean	Standard Deviation
UCAS points (mean)	217	306.13	62.10
First year mark (mean)	226	59.84	8.44
Second year mark (mean)	226	61.42	8.04
Final year mark (mean)	226	63.90	8.53

		Percentage
Age at entry	226	97% 18-20, 3% 21-25
Gender	226	76% Male, 24% Female
Ethnicity	226	75% White, 25% Ethnic Minority
Residency	226	96% Home, 4% Overseas
Widening participation	226	87% No, 13% Yes
Entry qualification	226	71% A-levels, 29% Others/mix

Table 2. Number and percentage of students on the three routes.

Route	Count	Percent
FT-FT	73	32.30
SW-FT	75	33.19
SW-SW	78	34.51
N=	226	

Key

FT-FT: Students who indicated they did not want to do a work placement at enrolment and did not.

SW-FT: Students who indicated they wanted to do a work placement at enrolment but did not secure one.

SW-SW: Students who indicated they wanted to do a work placement at enrolment and completed one.

Table 3. Hypothesis 1: Multiple linear regression analysis weighted by propensity scores

Variable	Coefficient	Standard Error	p-value	95% Confidence Interval
(Intercept)	326.0	12.4	<0.01	(301.0, 350.0)
Route (SW, reference FT)	22.9	10.2	<0.05	(2.95, 42.9)
Gender	15.1	16.9	0.37	(-18.0, 48.1)
Age	0.16	22.8	0.99	(-44.6, 44.9)
Ethnic origin	2.20	9.6	0.82	(-16.6, 21.0)
Widening participation	4.90	11.0	0.66	(-66.6, 26.4)
Entry qualification type	-55.2	12.1	<0.01	(-78.8, -31.5)
n= 217				

Table 4. Hypothesis 2: Multiple linear regression analysis weighted by propensity scores

Variable	Coefficient	Standard Error	p-value	95% Confidence Interval
(Intercept)	58.14	1.62	<0.01	(54.93, 61.34)
Route (SW-SW, reference SW-FT)	2.85	1.29	<0.05	(0.30, 5.39)
Gender	2.71	1.47	0.06	(-0.18, 5.61)
Age	-7.00	10.30	0.46	(-27.40, 13.30)
Ethnic origin	-2.81	1.79	0.12	(-6.34, 0.72)
Widening participation	-1.48	2.18	0.50	(-5.79, 2.82)
Entry qualification type	2.15	1.60	0.18	(-5.34, 17.17)
Residency	5.92	5.70	0.30	(-3.18, 15.00)
n= 226				

Table 5. Hypothesis 3: Multiple linear regression analysis weighted by propensity scores

Variable	Coefficient	Standard Error	p-value	95% Confidence Interval
(Intercept)	24.48	3.70	<0.01	(17.20, 31.77)
Route (SW-SW, reference FT-FT)	4.60	1.06	<0.01	(2.51, 6.68)
Route (SW-SW, reference SW-FT)	3.38	1.09	<0.01	(1.25, 5.51)
Route (SW-FT, reference FT-FT)	1.08	0.99	0.28	(-0.86, 3.02)
First year grade	0.24	0.07	<0.01	(0.09, 0.39)
Second year grade	0.38	0.08	<0.01	(0.22, 0.54)
Gender	3.66	0.99	<0.01	(1.70, 5.61)
Age	0.88	3.18	0.78	(-5.39, 7.15)
Ethnic origin	0.19	1.09	0.86	(-1.96, 2.34)
Widening participation	-1.40	1.27	0.27	(-3.91, 1.11)
Entry qualification type	-1.25	0.98	0.20	(-3.19, 0.69)
Residency	3.58	2.70	0.19	(-8.89, 1.73)
n= 226				

Table 6. Maximum standardized effect size, maximum KS statistic and minimum KS p-value for each covariate before weighting.

Coavariate	Maximum standardized effect size	Maximum KS	Minimum KS p-value
Gender	0.237	0.102	0.785
First year grade	0.669	0.330	<0.01
Second year grade	0.662	0.309	0.001
Age	0.425	0.068	0.986
Ethnicity	0.620	0.268	0.007
Residency	0.354	0.069	0.985
Widening participation	0.182	0.062	0.996
Entry qualifications	0.653	0.296	0.002

Table 7. Maximum standardized effect size, maximum KS statistic and minimum KS p-value for each covariate after weighting.

Covariate	Maximum standardized effect size	Maximum KS	Minimum KS p-value
Gender	0.133	0.057	1.000
First year grade	0.201	0.141	0.546
Second year grade	0.200	0.107	0.844
Age	0.261	0.042	1.000
Ethnicity	0.269	0.116	0.749
Residency	0.208	0.041	1.000
Widening participation	0.075	0.026	1.000
Entry qualifications	0.307	0.139	0.556