FEATURE ARTICLE

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RETURNS TO EDUCATION FOR GRADUATES OF PRIVATE EDUCATION INSTITUTIONS
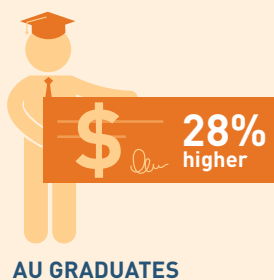
INTRODUCTION

The private education sector exists alongside the public education sector and provides education options to some Singaporeans. Private education institutions (PEIs) offer a diverse range of courses, some of which support workforce development, such as continuing education and training programmes for working adults, and these provisions may help to fulfil the educational aspirations of Singaporeans.

FINDINGS

▶ FINDING 1

AU graduates enjoy a wage premium over their PEI counterparts. AU graduates earn 28 per cent higher starting wages than PEI degree graduates after accounting for differences in academic abilities, demographic and socio-economic characteristics.

28% higher

AU GRADUATES

PEI GRADUATES

▶ FINDING 2

Comparing across courses of study, the largest wage gap is seen among Humanities graduates at 39%.

39%

Wage gap axis: 0, 5, 10, 15, 20, 25, 30, 35, 40

Categories: Architecture & Building, Arts, Health Sciences, Business, Sciences, IT, Mass Comm, Accountancy, Engineering, Humanities

WAGE GAP BETWEEN AU AND PEI DEGREE GRADUATES

POLICY TAKEAWAY

PEI

WORK

AU

Any decision to pursue a degree from either a PEI or AU would need to take into account other factors such as the course fees incurred, the opportunity cost in terms of the earnings foregone during studies, as well as any non-monetary benefits of education. Hence, each prospective student needs to weigh the benefits and costs, and make informed decisions regarding educational investments.
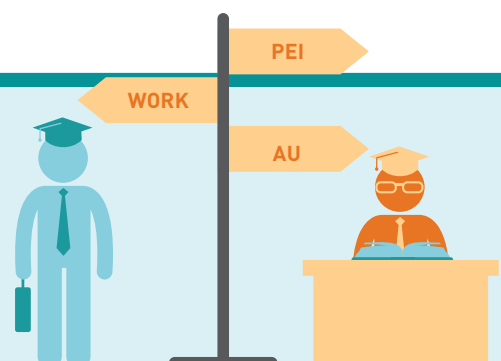
EXECUTIVE SUMMARY

▸ The private education sector exists alongside the public education sector, and provides education options to some Singaporeans. It offers diverse courses, some of which support workforce development. At the tertiary level, private education institutions (PEIs) offer an alternative route to a university degree. However, the returns to education in terms of earnings may differ between the graduates of PEIs and the local autonomous universities (AUs). For instance, a recent PEI graduate employment survey (GES) found that degree graduates from private schools lagged significantly behind their peers from the AUs in the job market.

▸ This study offers new insights on the monetary returns to PEI and AU degrees, using administrative data on earnings, and accounting for differences in graduates' academic ability, course choices, demographic and socio-economic characteristics when examining their wage outcomes. The findings suggest that AU graduates enjoyed, on average, a 28 per cent premium in starting wages compared to PEI degree graduates after controlling for differences in the characteristics of the PEI and AU graduates. Furthermore, the AU wage premium was observed for graduates across the 25th, 50th and 75th wage percentiles. Differences in institutional and course quality, as well as potential signalling effects and employers' perceptions of the degrees could have contributed to the wage gap between the graduates of PEIs and AUs who have the same observable characteristics.

▸ As this study only examines starting wages, an open question is whether the wage premium persists over a longer horizon. Furthermore, any decision to pursue a degree from either a PEI or AU would need to take into account other factors such as the amount of course fees to be paid, the opportunity cost in terms of the earnings foregone during studies, as well as any non-monetary benefits of education. Each prospective student will thus need to weigh the benefits and costs carefully in order to make a more informed decision regarding his or her own educational investments.

The views expressed in this paper are solely those of the authors and do not necessarily reflect those of the Ministry of Trade and Industry, the Ministry of Education (MOE) or the Government of Singapore.[1]

INTRODUCTION

While the public sector is the principal provider of education at the primary, secondary and tertiary levels in Singapore, the private education sector exists alongside the public sector and provides education options to some Singaporeans. In the tertiary education landscape in particular, private education institutions (PEIs) offer a diverse range of courses, some of which support workforce development through the provision of continuing education and training to working adults. Degrees and diplomas offered by the PEIs may also help to fulfil the educational aspirations of Singaporeans.

The PEI landscape is a diverse one. As of 2014 (the year of graduation of the PEI degree cohort covered in this study), there were over 300 registered PEIs, of which 65 offered degree courses. The industry is regulated by the Committee for Private Education (CPE), which is currently part of SkillsFuture Singapore (SSG).[2]

At the tertiary level, while the PEIs offer an alternative route to a university degree, the returns to education in terms of earnings may differ between the graduates of PEIs and those from the local autonomous universities (AUs). In the inaugural 2015/2016 PEI graduate employment survey (GES) conducted by the CPE, PEI degree graduates were found to lag significantly behind their peers from the AUs in the job market.[3]

In this study, we examine the difference in starting wages earned by PEI degree graduates and their AU counterparts using administrative data that cover PEI degree and AU graduates who graduated in 2014.[4] The rest of the article is organised as follows. We begin with a brief review of the academic literature, followed by a description of the data and summary statistics. Next, we discuss the empirical methodology used to estimate the returns to education. Finally, we present the results before concluding.

LITERATURE REVIEW

Several studies overseas have found that the quality of education institutions has an influence on the earnings of degree graduates. For instance, using longitudinal data in the US, Brewer et al (1999) find that students who attended a top quality university earned 26 to 39 per cent more than those who attended the lowest quality ones. Black and Smith (2004) and Hoekstra (2009) also find evidence that a wage premium exists among the graduates of better quality education institutions in the US. Similarly, Hussain et al (2012), Carroll et al (2014) and Li et al (2012) find positive quality premia in the UK, Australia and China, respectively.

Other studies, however, have found that the magnitude of the quality premium may depend on the measures of quality used (Black and Smith, 2006).[5] Furthermore, even within the same institution, the quality premium could vary for different students (Andrews et al, 2016).

In general, the methodological challenge that researchers face when undertaking such studies is the need to distinguish between the quality of the institutions and the self-selection of students attending them. As Dale and Krueger (2002, 2014) point out, better quality institutions may select students partly based on the applicants' earnings ability. If so, the positive association between institutional quality and graduates' earnings may simply reflect the ability of the students to command higher earnings, rather than the quality of the institutions they attended. To overcome this challenge and tease out the effect of the institution attended, the typical approach, which we also adopt in this study, is to statistically control for observable differences across students. These would include the students' academic ability, background characteristics and course of study.

DATA

The key dataset used in this study comprises data from MOE on all Singaporean Citizens (SC) and Permanent Residents (PR) who graduated with a degree from the PEIs and local AUs[6] in 2014. The data contains information on the student's year of enrolment and graduation, mode of study (i.e., part-time or full-time), L1B4 score[7], institution attended and course of study.

The PEI and AU student data is then merged with administrative data of a longitudinal nature, which include individual-level variables such as wages, age, gender and housing type.[8]

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3   According to the survey, which covered graduates who completed their full-time external degree programmes (EDPs) in PEIs between May 2015 and April 2016, six in 10 PEI degree graduates found full-time permanent jobs within six months after graduating and drew a median gross monthly salary of $2,550. By contrast, eight in 10 graduates from the AUs (including National University of Singapore, Nanyang Technological University, Singapore Management University, Singapore University of Technology and Design, and Singapore Institute of Technology) found full-time permanent jobs within six months after graduating and drew a median gross monthly salary of $3,325.

4   Using administrative data alleviates concerns that the PEI GES did not have sufficient coverage. 32 per cent of PEI degree graduates responded to the PEI GES, which is lower than the response rate of around 70 per cent for the GES survey of AU graduates.

5   Black and Smith (2006) examined university quality in the US using various indicators like SAT scores of students, expenditures per student and faculty-student ratios. They find that using a single proxy for quality is likely to underestimate the labour market effects of university quality.

6   The local AUs covered in the study are the National University of Singapore, Nanyang Technological University, Singapore Management University and the Singapore Institute of Technology.

7   The L1B4 score refers to the O-level subject grades of the first language and four best subjects, and serves as a proxy of academic ability.

8   94% of the SC/PR PEI degree and AU graduates from the 2014 graduating cohort had wage data (i.e., were employed) in 2015. They thus formed the sample for the wage analysis.

SUMMARY STATISTICS

Our sample consists of around 11,000 PEI degree graduates and 12,000 AU graduates from the 2014 graduating cohort [Exhibit 1]. Nearly all the AU graduates were full-time students, while 42 per cent of the PEI degree graduates studied part-time.
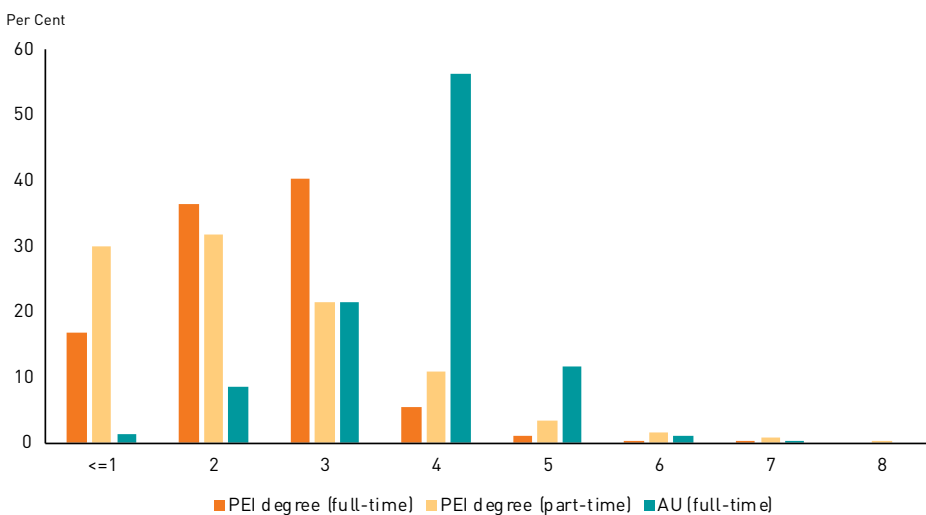
Exhibit 1: Degree Graduates by Mode of Study, Full-time/Part-time Status

Number

14,000

12,000

10,000

8,000

6,000

4,000

2,000

0

1%

99%

42%

58%

PEI degree   AU
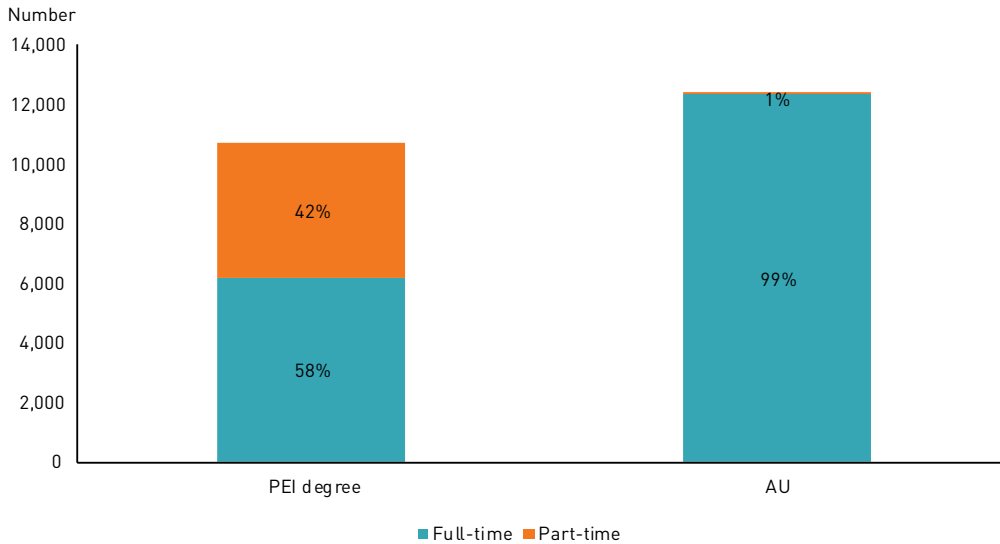
■ Full-time ■ Part-time

Source: CPE, MOE and authors' calculations.

Full-time AU graduates generally took a longer period of time to complete their studies compared to full-time and part-time PEI degree graduates [Exhibit 2]. The modal course duration for full-time AU graduates was four years, while most PEI degree graduates took three years or less to graduate.

Exhibit 2: Degree Graduates by Course Duration, in Years

Per Cent

60

50

40

30

20

10

0

<=1   2   3   4   5   6   7   8

■ PEI degree (full-time) ■ PEI degree (part-time) ■ AU (full-time)
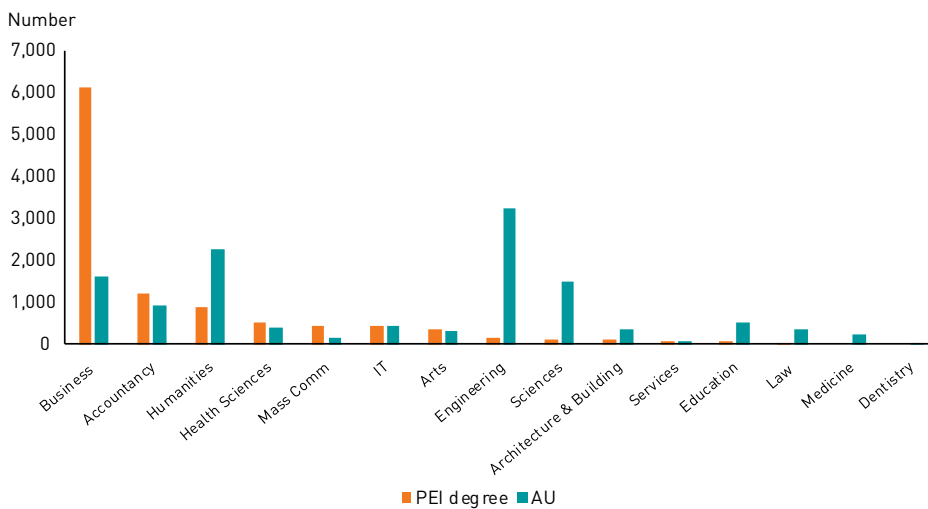
Source: CPE, MOE and authors' calculations.
Note: It is possible for a PEI degree course to take a year or less as there are graduates who "top-up" to obtain a degree after taking a full diploma course with the same PEI. The shorter duration AU courses are mostly Singapore Institute of Technology (SIT) programmes offered in collaboration with overseas universities and only admit students with relevant diplomas from the polytechnics. These programmes are expected to evolve into joint programmes (with a minimum duration of 3 or 4 years) or be phased out in favour of programmes designed by SIT.

A vast majority of the PEI degree graduates studied Business. This reflects a high level of demand from students who wished to obtain a business degree, as well as the multitude of business degree courses offered by PEIs with overseas university partners [Exhibit 3].

Exhibit 3: Degree Graduates by Course of Study

Source: CPE, MOE and authors' calculations.
Note: Medicine and Dentistry are only offered by AUs.

EMPIRICAL METHODOLOGY

PEI degree and AU graduates may have different inherent characteristics, some of which (e.g., academic ability) could have an influence on their starting wages regardless of the education institutions they attended. As such, to better capture the effect of the education institution (i.e., AU or PEI) on graduates' wage outcomes, we need to account for these individual-level differences in our analysis. To do so, we employ statistical regression analyses with the following baseline specification:

$$Y_i = \beta_0 + \beta_1 AU_i + \beta_2 Course_i + \gamma' X_i + \varepsilon_i \qquad (1)$$

Where:

Y_i is the starting monthly wage of individual i in calendar year 2015 (in logarithms);

AU_i is a dummy variable that takes on a value of 1 if the individual graduates from an AU, and 0 if he/she graduates from a PEI;

$Course_i$ is a set of dummy variables representing the individual's course of study;

X is a vector of individual-level controls (e.g. age, gender, race, marital status, housing type and L1B4 score); and

ε_i captures the unobservable factors that determine an individual's wages

Through this specification, we will be able to compare the starting wages of degree graduates from PEIs and AUs, after controlling for differences in the graduates' academic ability (proxied by L1B4 scores), demographics (e.g., age and gender) and socio-economic background (proxied by housing type). The coefficient of interest, β_1, measures the average percentage difference in the starting wages of AU graduates relative to PEI degree graduates in 2015.[9] Apart from looking at average differences in wages, we also examine the differences at the 25th, 50th and 75th percentiles of the wage distribution using quantile regressions.[10]

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  9 *The outcome variable, monthly wages, is in logarithms. Hence, the percentage difference in wages between AU and PEI degree graduates can be calculated as exp(β₁)-1.*

10 *See Koenker, R. & Hallock, K. F. (2001). Quantile Regression. Journal of Economic Perspectives, Vol. 15, No. 4, 143 – 156. Quantile regression is an extension of the method of least squares where the objective is to minimise the sum of absolute, rather than the sum of squared, error terms.*

In addition, to determine whether the wage differentials between PEI degree and AU graduates vary across the different courses of study, we also run the following regression:

$$Y_i = \beta_0 + \beta_1 AU_i + \beta_2 Course_i + \beta_3 AU_i \times Course_i + \gamma' X_i + \varepsilon_i \qquad (2)$$

Where the variables are as defined above.

The sum of the coefficients of interest, β_1 and β_3, measures the average percentage difference in the starting wages of AU graduates relative to PEI degree graduates in 2015 for each course type.[11]

RESULTS AND DISCUSSION

Exhibit 4 shows the results from the regression analyses using the baseline specification. The results suggest that AU graduates enjoy a significant wage premium over their PEI counterparts. In particular, Column (1) shows that AU graduates earned 33 per cent more than PEI degree graduates on average, after controlling for differences in the graduates' demographic and socio-economic characteristics.[12]

However, apart from demographic and socio-economic characteristics, students may have different academic abilities which may also influence their starting wages. In particular, AU students may have better academic abilities, as measured by L1B4 scores, and thus earn higher starting wages than PEI students even if they have the same demographic and socio-economic characteristics. As such, we further control for L1B4 scores and course choices in the regression analysis, with the results shown in Column (2). We find that while the AU wage premium dropped, it remained positive and statistically significant. Specifically, AU graduates earned starting wages that were 28 per cent higher compared to PEI degree graduates, after controlling for differences in their academic ability and course types, in addition to demographic and socio-economic characteristics.[13]

Using quantile regressions, we further find that the wage premium enjoyed by AU graduates was positive and significant across the 25th, 50th and 75th percentiles of the wage distribution (see Columns (3) to (5)). The premium was also relatively stable across the wage bands.

Exhibit 4: Regression Results

Dependent variable: Log(Monthly Wage)

	(1) OLS	(2) OLS	(3) Quantile (P25)	(4) Quantile (P50)	(5) Quantile (P75)
AU_i (β_1)	0.285***	0.246***	0.219***	0.186***	0.200***
Demographic and socio-economic controls	Yes	Yes	Yes	Yes	Yes
Academic ability and course-related controls	No	Yes	Yes	Yes	Yes
Number of observations	21,632	19,966	19,966	19,966	19,966

*** Statistically significant at the 1% level.
Notes:
1.   The monthly wage was computed by taking the annual income and dividing by the number of months worked.
2.   The set of demographic and socio-economic controls used are age, gender, race, marital status and housing type.
3.   The set of academic ability and course-related controls used are L1B4, course of study and mode of study i.e., full-time or part-time.

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11   As the outcome variable, monthly wages, is in logarithms, the percentage difference in wages between AU and PEI degree graduates for each course type can be calculated as $exp(\beta_1 + \beta_3) - 1$.

12   The outcome variable is in logarithms. Hence, a coefficient of 0.285 is equivalent to a 32.9 per cent difference in wages [exp(0.285) – 1 = 0.329].

13   In column (2), the coefficient of 0.246 is equivalent to a 27.8 per cent difference in wages [exp(0.246) – 1 = 0.278].

Comparing the results in Columns (1) and (2), we can surmise that differences in academic ability and course choices between PEI degree and AU graduates would only explain 5 percentage-points of the 33 per cent wage premium enjoyed by AU graduates. The remaining difference of 28 per cent could be due to many other reasons. While this study is unable to determine the exact reasons for the AU wage premium, differences in institutional and course quality, as well as potential signalling effects[14] and employers' perceptions of the degrees could have contributed to the wage gap between PEI degree and AU graduates who have the same observable characteristics.

Next, using regression specification (2), we find that the AU wage premium existed for graduates from all courses of study. The largest wage gap, at 39 per cent, was seen among the Humanities graduates [Exhibit 5]. For Business courses, which the majority of PEI degree graduates pursued, the AU graduates commanded a 24 per cent wage premium compared to the PEI degree graduates.

Exhibit 5: AU Wage Premium by Selected Course of Study
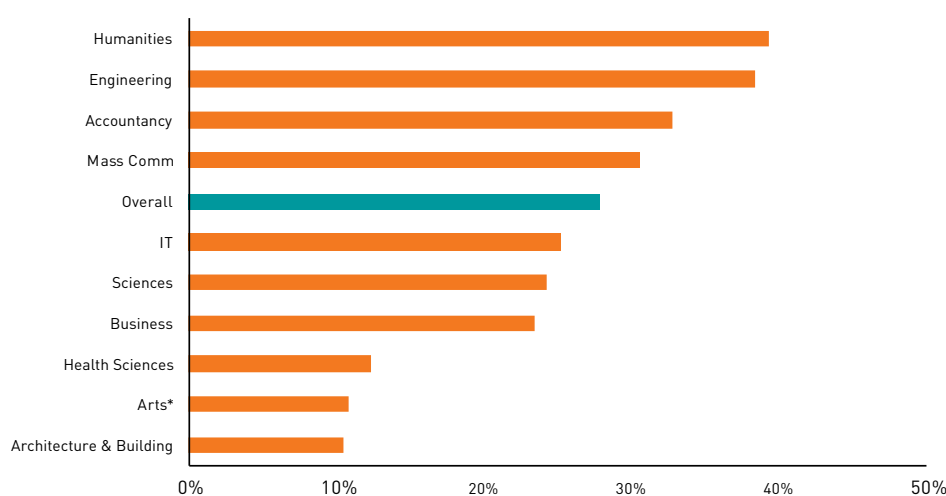
Notes:
1. For comparison, the "Overall" coefficients are plotted and are taken from Exhibit 4, column (2). The coefficients have been converted to percentages using the formula $\exp(\beta)-1$.
2. *Wage premium is statistically insignificant for AU Arts graduates.
3. Excludes Education and Services courses as the actual courses offered by PEIs and AUs are distinctly different. Excludes Law course due to small sample size.

CONCLUSION

This study finds that graduates from the local AUs enjoyed a significant starting wage premium over degree graduates from the PEIs, even after accounting for differences in their academic ability, course choices, demographics and socio-economic background. Specifically, we find that AU graduates earned a starting wage that was, on average, 28 per cent higher than the starting wages of PEI degree graduates. This is generally in line with the findings of the 2015/16 PEI Graduate Employment Survey, which showed that PEI degree graduates drew a lower average monthly starting pay compared to AU graduates, with the caveat that the dataset and methodology employed for both studies are different. We also find that the AU starting wage premium was present for all degree courses, and across wage bands.

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14 *In economics, signalling theory is the hypothesis that the attainment of a degree does not contribute significantly to a graduate's ability. Instead, students have different underlying abilities, and the attainment of a degree serves only to signal these abilities to employers.*

As this study only examines starting wages, an open question is whether the AU wage premium persists over a longer horizon. Furthermore, any decision to pursue a degree from either a PEI or AU would need to take into account other factors such as the amount of course fees to be paid, the opportunity cost in terms of the earnings foregone during studies, as well as any non-monetary benefits of education. Each prospective student will thus need to weigh the benefits and costs carefully in order to make a more informed decision regarding his or her own educational investments.

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