

Feature Article

IMPACT OF SKILLSFUTURE WORK-STUDY PROGRAMME ON WAGE OUTCOMES OF PARTICIPANTS



OVERVIEW

The SkillsFuture (SSG) Work-Study Programme (WSP) (previously called the Earn and Learn Programme) offers graduates from polytechnics and the Institute of Technical Education (ITE) the opportunity to upgrade to a higher qualification, while working in a job role that is related to their field of study. In this study, we examine the wage outcomes of participants in the Work-Study Post-Diploma (WSPostDip) and Work-Study Certificate (WSCert) programmes against that of polytechnic or ITE graduates who transited straight into employment.

FINDINGS

WSPostDip and WSCert graduates from the 2018 to 2021 WSP graduating cohorts enjoyed a wage premium over their polytechnic and ITE peers who transited straight into employment after graduation.



Finding 1:

Compared to polytechnic graduates with similar profiles who went straight into employment, WSPostDip graduates enjoyed a wage premium of around 9 per cent one to two years after programme completion, and continued to see a premium of around 6 per cent in the subsequent two years.

WSPostDip Graduates Wage Premium

1 to 2 years after

9%

2 to 4 years after

6%

Finding 2:

Compared to ITE graduates with similar profiles who went straight into employment, WSCert graduates enjoyed a wage premium of around 11 per cent one to two years after programme completion, with the premium sustained over the subsequent two years.

WSCert Graduates Wage Premium

1 to 2 years after

11%

2 to 4 years after

11%

POLICY TAKEAWAY

This study finds that the SkillsFuture WSP has been useful in improving the wage outcomes of polytechnic and ITE graduates. Going forward, the Ministry of Education will continue to work with sector agencies and the Institutes of Higher Learning to expand and enhance the work-study pathway, especially for in-demand job roles and skillsets.



EXECUTIVE SUMMARY

- The SkillsFuture (SSG) Work-Study Programme (WSP) offers graduates from polytechnics and the Institute of Technical Education (ITE) the opportunity to upgrade to a higher qualification, while working in a job role that is related to their field of study. This is done through a combination of classroom learning and on-the-job training with participating employers. In this study, we examine the wage outcomes of participants in the Work-Study Post-Diploma (WSPostDip) and Work-Study Certificate (WSCert) programmes against that of polytechnic or ITE graduates who transited straight into employment.
- Our findings suggest that WSPostDip and WSCert graduates from the 2018 to 2021 WSP graduating cohorts enjoyed a wage premium over their polytechnic and ITE peers who transited straight into employment after graduation. Specifically, compared to polytechnic graduates with similar profiles who went straight into employment, WSPostDip graduates enjoyed a wage premium of around 9 per cent one to two years after programme completion, and continued to see a premium of around 6 per cent in the subsequent two years. Meanwhile, compared to ITE graduates with similar profiles who went straight into employment, WSCert graduates enjoyed a wage premium of around 11 per cent one to two years after programme completion, with the premium sustained over the subsequent two years. Taken together, these findings suggest that the WSPostDip and WSCert programmes helped participants to deepen their skills and accumulate human capital that employers valued.

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 (MTI), Ministry of Education (MOE), SkillsFuture Singapore (SSG), or the Government of Singapore.¹

INTRODUCTION

The SkillsFuture (SSG) Work-Study Programme (WSP), previously called the Earn and Learn Programme, is an alternative upskilling pathway that aims to give graduates from polytechnics and the Institute of Technical Education (ITE) a head-start in their careers. A place-and-train programme, WSP provides its participants with opportunities to deepen their skillsets and gain work experience while attaining industry-recognised qualifications. Under the WSP, individuals are placed with employers where they work full-time and draw a competitive salary even as they undergo on-the-job training and classroom learning. At the end of the WSP, individuals obtain a diploma or industry-recognised certification, depending on the WSP pathway and course of study chosen.

A key programme under the WSP is the Work-Study Post-Diploma (WSPostDip), which is a 12- to 18-month long programme introduced in 2015 that allows polytechnic graduates to obtain an advanced or specialist diploma. Another key programme is the Work-Study Certificate (WSCert), a 12- to 18-month long programme introduced in 2016 that enables ITE graduates² to obtain an industry-recognised certificate, which can subsequently count towards a part-time diploma if the WSCert participants choose to complete additional modules after WSCert completion.

WSP participation is voluntary for both individuals and employers. Individuals successfully placed on the WSP receive a sign-on incentive of \$5,000, while participating employers receive a grant of up to \$15,000 per emplaced WSP participant to defray training and wage costs. The WSP is typically available to fresh graduates within the first three years of their graduation from polytechnic or ITE for females, and within three years of completing National Service for males. Individuals are only eligible to take up a WSP in an area relevant to their prior polytechnic or ITE field of study.

This study compares the wage outcomes of participants in the WSPostDip and WSCert programmes against those of polytechnic and ITE graduates who chose to transit straight into employment after graduation.

The rest of the article is organised as follows. We first review the literature on the returns to education and firm-based training. We then describe the data and methodology used in the study before reporting the results. The last section concludes.

¹ We would like to thank Ms Yong Yik Wei, Dr Andy Feng, Mr Lee Zen Wea, Dr Gwee Yi Jie, Dr Tan Yi Jin, and Dr Siddharth George for their useful suggestions and comments, as well as MOE and SSG for their inputs to this study. All remaining errors belong to the authors.

² Although polytechnic graduates are eligible for the WSCert programme, this study was not able to examine the wage outcomes of polytechnic graduates who completed the WSCert programme due to the small sample size.

LITERATURE REVIEW

Firm-based place-and-train programmes such as the WSP may affect wages through various channels. A key channel is human capital accumulation. Specifically, trainees' improved skills through education and training could translate to better on-the-job productivity and consequently, a sustained rise in wages. A second channel is signalling (Spence, 1973; Weiss, 1995; Altonji & Pierret, 1996), which posits that higher levels of education are associated with higher starting wages because employers use education as a signal of applicants' initially unobservable characteristics such as ability and motivation. In line with this theory, firms may be willing to pay a premium for education credentials when workers are first hired. However, over time, as employers learn more about a worker's true productivity from his job performance, the signalling effect should attenuate. As such, a wage premium that is sustained over the longer term is likely to be driven by human capital accumulation rather than signalling effects.

The empirical literature consistently shows positive wage returns to education and firm-based training. For example, studies overseas have found positive wage premia from pursuing an undergraduate degree (Brewer et al., 1999; O'Leary & Sloane, 2005) and firm-based apprenticeships/training programmes (Vignoles et al., 2004; Monk et al., 2008). Studies in Singapore have found similar evidence. For instance, an earlier study by MTI (Lam et al., 2024) found a positive wage premium for graduates from the Autonomous Universities. A separate MTI study (Suhaiemi & Ong, 2019) on WSP (known then as the Earn and Learn programme) found that WSPPostDip participants earned higher wages both during and immediately after the programme compared to their polytechnic peers who transitioned directly into employment.

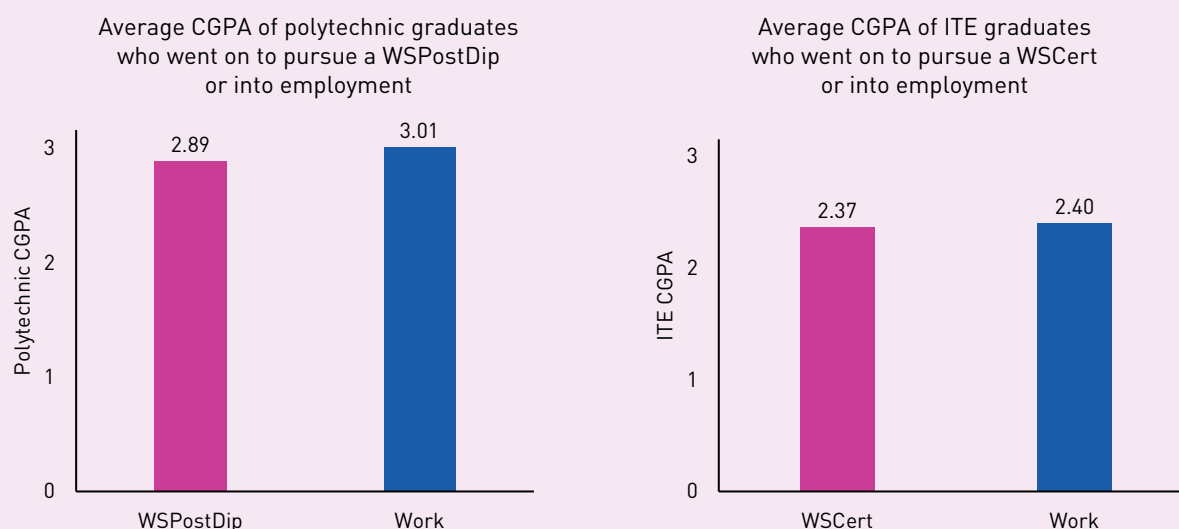
In this study, we extend the earlier MTI study on WSP in two ways. First, while the previous study examined WSPPostDip cohorts from 2016 and 2017 when the programme was still nascent³, this study focuses on the WSPPostDip cohorts from 2018 to 2021 and examines their outcomes over a longer post-WSP period. Second, this study examines the wage outcomes of ITE graduates who participated in the WSCert programme, which was not covered in the earlier study.

DATA

We merged WSP participant data from SSG with individual-level administrative data to conduct our analysis. The merged dataset contains demographic characteristics in addition to polytechnic and ITE graduation data for the WSP cohorts who graduated from 2018 to 2021.⁴ In total, the dataset includes 1,795 WSPPostDip and 749 WSCert participants.

Based on the data, WSP participants tended to take slightly over a year to complete the WSPPostDip and WSCert programmes, with an average duration of 13 and 15 months respectively. The data also showed that WSP participants and their peers who went straight into employment had broadly similar cumulative grade point averages (CGPA) in polytechnic/ITE prior to them embarking on their respective pathways (Exhibit 1).⁵

Exhibit 1: Prior CGPAs of WSP Participants and their Peers



Source: Authors' estimates, based on data from MOE and SSG

3 As a result, the earlier study had a much smaller sample size of about 480 WSPPostDip participants from the 2016 and 2017 cohorts.

4 This study excludes the WSPPostDip participants who were examined in the previous study.

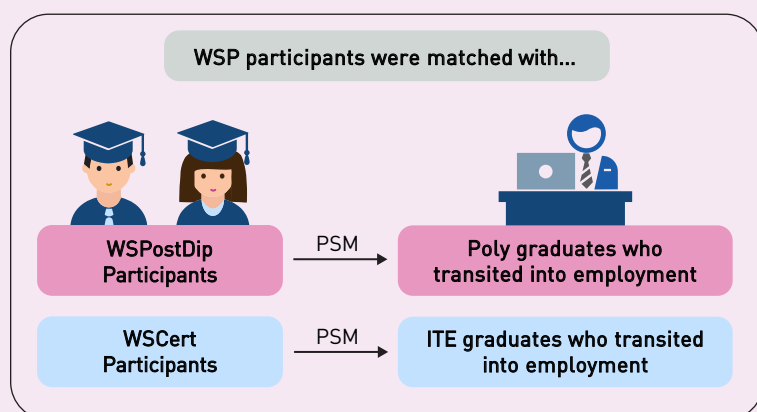
5 We did not compare WSP participants with polytechnic and ITE graduates who subsequently enrolled in an Autonomous University (AU) or polytechnic. This is because the average polytechnic CGPA of WSPPostDip participants was lower than the polytechnic CGPA of polytechnic students admitted into the AUs in 2022 and 2023 at the 10th percentile level, which made them less comparable to the polytechnic graduates who went on to AUs. In the same vein, the average ITE CGPA of WSCert participants generally did not meet the CGPA standards required for admission into local polytechnics. Specifically, the minimum ITE CGPA required to apply for a placement in a local polytechnic was 3.5 for Nitec holders and 2.0 for Higher Nitec qualification holders.

EMPIRICAL METHODOLOGY

Even though WSP participants and their peers who went straight into employment were similar in their average grades in polytechnic/ITE, they may still differ in terms of other characteristics. A naive post-programme comparison between the WSP participants and those who transited directly into employment may thus result in biased estimates of the impact of WSP on their wage outcomes.

To enable a more robust comparison of the wage outcomes, we employed one-to-one nearest neighbour propensity score matching (PSM) on the observable characteristics of the different groups of individuals to improve their comparability (Exhibit 2). These characteristics included individuals' prior CGPA, year of birth, polytechnic institution (if applicable), year of polytechnic/ITE enrolment and graduation, polytechnic/ITE course of study, and an indicator of whether they had worked when they were studying in polytechnic/ITE. PSM helped to reduce the observable differences between the WSP participants and those who went straight into employment.

Exhibit 2: Using PSM to Create Comparable Groups



For the WSPostDip programme, we estimated the wage returns of WSPostDip participants compared to the baseline group of PSM-matched polytechnic graduates who transited straight into employment using the following regression:

$$\ln(\text{wage}_{it}) = \beta_0 + \beta_1(\text{duringWSP}_{it} \times i.\text{period}_{it}) + \beta_2(\text{postWSP}_{it} \times i.\text{period}_{it}) + \alpha_i + \delta_{it} + \gamma_t + \varepsilon_{it}$$

Where:

- $\ln(\text{wage}_{it})$ is the log-transformed wage of individual i in time t ;
- duringWSP_{it} is a dummy variable that takes on a value of 1 in the year-months that individual i is participating in the WSPostDip programme, and 0 otherwise;
- postWSP_{it} is a dummy variable that takes on a value of 1 in the year-months after individual i has graduated from the WSPostDip programme, and 0 otherwise;
- $i.\text{period}_{it}$ is a vector of indicator variables for the number of months during- (or post-) WSP for individual i in time t ;
- α_i denotes a vector of time-invariant individual characteristics that affect the wages of individual i (i.e., gender, year of polytechnic graduation, polytechnic CGPA, and polytechnic course of study prior to WSP/work);
- δ_{it} denotes controls that affect the wages of individual i on a time-varying basis (i.e., age, year of polytechnic graduation dummies interacted with calendar time dummies, and separate indicators for private education institution (PEI) enrolment and graduation interacted with event time dummies⁶);
- γ_t denotes time-fixed effects which capture the changes in macroeconomic conditions that affect individuals' wages (i.e., calendar time dummies, and year dummies); and
- ε_{it} is the error term that captures the unobservable factors that affect individual wages.

⁶ We included PEI enrolment and graduation dummies to ensure that the wage effect from obtaining a PEI degree or PEI diploma by non-WSP participants would not confound our estimate of the WSP wage premium.

The coefficients of interest, β_1 and β_2 , reflect the estimated average monthly wage premium of WSP participants during- and post-WSP, relative to polytechnic graduates who transitioned straight into employment.

For the WSCert programme, we used the same regression specification with an appropriate change in variables (i.e., polytechnic control variables were replaced by ITE control variables) to estimate the wage returns of WSCert participants against the baseline group of PSM-matched ITE graduates who transitioned directly into employment.

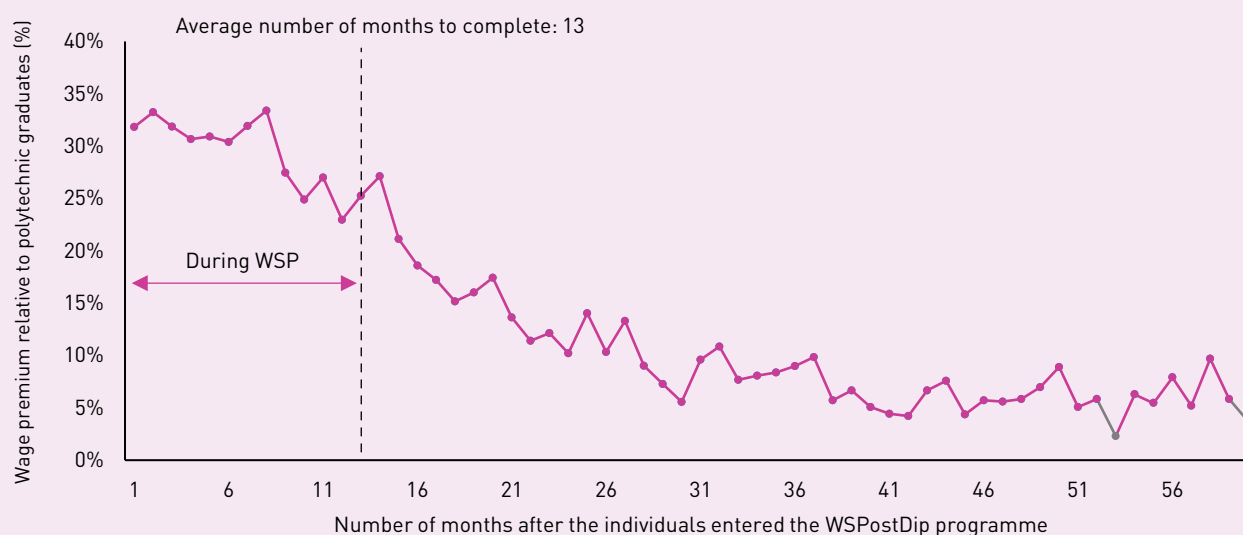
RESULTS AND DISCUSSION

Work-Study Post-Diploma Programme

The regression results show that WSPostDip participants enjoyed a wage premium relative to polytechnic graduates who went straight into employment after graduation (Exhibit 3). Over the course of the WSPostDip programme, WSPostDip participants earned 36 per cent more than their polytechnic graduate peers. The higher wages earned by WSPostDip participants during the programme could have been partly due to them being in full-time employment, whereas some of the polytechnic graduates who went straight into employment could have been engaged in temporary or part-time jobs that offered lower wages in the immediate months after graduation.

Upon completing the WSPostDip programme, WSPostDip graduates continued to earn higher wages compared to their polytechnic graduate peers. However, their wage premium decreased over time against a baseline of rising wages among the polytechnic graduate peers as more of the latter moved into full-time employment or found better job matches.⁷ Nevertheless, WSPostDip graduates still earned around 9 per cent more one to two years after programme completion and around 6 per cent more in the subsequent two years. This suggests that structured on-the-job training and the attainment of higher qualifications under the WSPostDip programme led to the accumulation of human capital, which in turn raised the productivity of the WSPostDip graduates and allowed them to command higher wages compared to their polytechnic graduate peers who went straight into employment.⁸

Exhibit 3: Estimated Wage Premium of WSPostDip Graduates Relative to Polytechnic Graduates of the Same Polytechnic Graduation Cohort Over Time



Note: The lines and markers in grey indicate that the wage premium for that month was statistically insignificant at the five per cent level.

⁷ In our sample, on average, polytechnic graduates who went straight into employment after graduation earned around \$1,200 in the immediate month after graduation. This rose to \$1,700 and \$1,900 by the sixth and twelfth month after graduation respectively. All figures presented are in 2019 dollars.

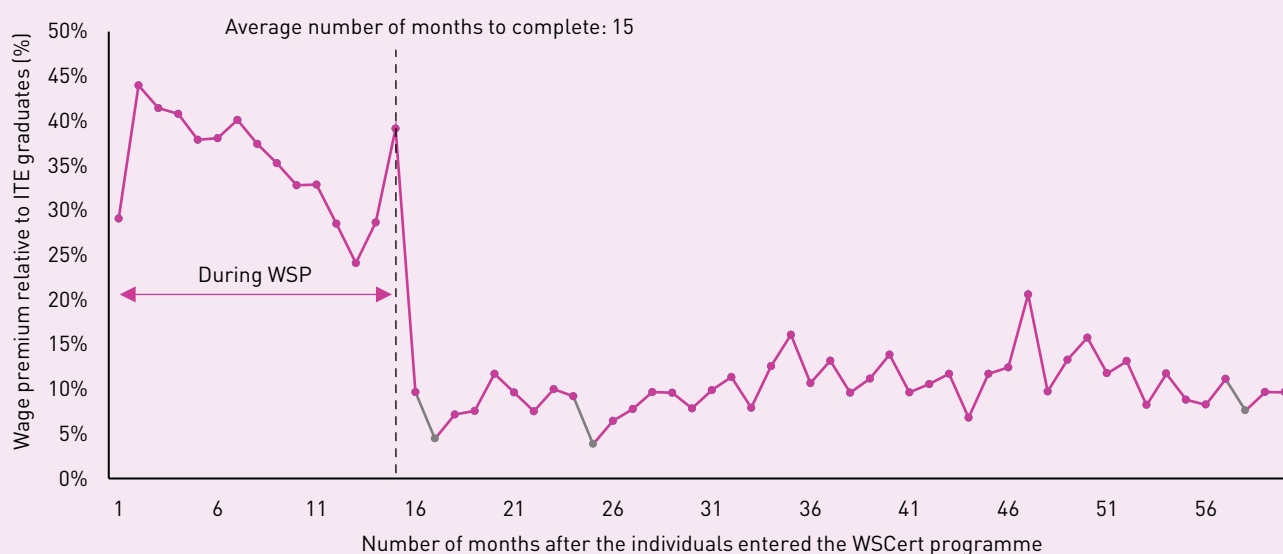
⁸ The initial wage premium after WSPostDip programme completion could also be partly due to signalling effects from the higher qualifications attained, as some participants had switched to a new employer after programme completion. However, the sustained wage premium found provides evidence of human capital accumulation from the WSP.

Work-Study Certificate Programme

For WSCert participants, the regression results also show that they earned a wage premium relative to ITE graduates who went straight into employment after graduation (Exhibit 4). Over the course of the WSCert programme, WSCert participants earned around 33 per cent more than their ITE graduate peers. Similar to the WSPostDip programme, this could be due to WSCert participants being in full-time employment, whereas some of the ITE graduates who entered employment shortly after graduation could have been engaged in temporary or part-time work in the initial months.⁹

After completing the WSCert programme, the wage premium for WSCert graduates dipped to around 8 per cent as most of them enrolled in additional modules to obtain a part-time diploma¹⁰ and perhaps also took on part-time work. Over time, as these WSCert graduates completed their part-time diplomas and entered full-time employment, the wage premium stabilised at around 11 per cent one to two years after programme completion. In the subsequent two years, the WSCert wage premium remained stable at around 11 per cent. Overall, the finding of a wage premium lasting several years after programme completion suggests that the WSCert programme had enduring human capital effects.

Exhibit 4: Estimated Wage Premium of WSCert Graduates Relative to ITE Graduates of the Same ITE Graduation Cohort Over Time



Note: The lines and markers in grey indicate that the wage premium for that month was statistically insignificant at the five per cent level.

⁹ In our sample, on average, ITE graduates who went straight into employment after graduation earned around \$600 in the immediate month after graduation. This rose to \$1,000 and \$1,300 by the sixth and twelfth month after graduation respectively. All figures presented are in 2019 dollars.

¹⁰ Based on administrative records, about 69 per cent of WSCert participants enrolled in additional modules, averaging 14 months long, to obtain a part-time diploma from the local polytechnics.

CONCLUSION

In summary, this study finds that the SkillsFuture WSP has been useful in improving the wage outcomes of polytechnic and ITE graduates. In particular, WSPostDip and WSCert participants from the 2018 to 2021 WSP graduating cohorts enjoyed a wage premium over their respective polytechnic and ITE graduate peers that was sustained over several years following programme emplacement. This suggests that the WSPostDip and WSCert programmes helped participants to deepen their skills and acquire human capital that were valued by employers.

Overall, our findings provide evidence that the WSPostDip and WSCert programmes are competitive pathways for polytechnic and ITE graduates to pursue after graduation. Going forward, the Ministry of Education will continue to work with sector agencies and the Institutes of Higher Learning to expand and enhance the work-study pathway, especially for in-demand job roles and skillsets.

As more data becomes available, future studies can evaluate the impact of other WSPs (e.g., the Work-Study Diploma and Work-Study Degree programmes) on individuals' wage outcomes. The wage returns associated with the WSPostDip and WSCert can also be updated regularly to help polytechnic and ITE graduates make more informed choices about the pathway to take.

Contributed by:

Ms Audrey Ling
Economist
Economics Division
Ministry of Trade and Industry
(formerly)

Mr Damian Allan Tan
Senior Economist
Economics Division
Ministry of Trade and Industry

REFERENCES

- Altonji, J. G., and Pierret, C. R. (1996). Employer Learning and the Signalling Value of Education. *NBER Working Paper 5438*.
- Brewer, D. J., Eide, E. R., and Ehrenberg, R. G. (1999). Does It Pay to Attend an Elite Private College? Cross-Cohort Evidence on the Effects of College Type on Earnings. *Journal of Human Resources*, 34(1), 104-123.
- Lam, N., Liu, S., Tan, Y. J., and Ting, J. (2024). Increase in Autonomous University Cohort Participation Rate and The Labour Market. Singapore: Ministry of Trade and Industry.
- Monk, C., Sandefur, J., and Teal, F. (2008). Does Doing an Apprenticeship Pay Off? Evidence from Ghana. *CSAE Working Paper Series 2008-08*. Oxford: Centre for the Study of African Economies, University of Oxford.
- O'Leary, N. C., and Sloane, P. J. (2005). The Return to a University Education in Great Britain. *National Institute Economic Review*, 193, 75-89.
- Spence, M. (1973). Job Market Signalling. *The Quarterly Journal of Economics*, 87(3), 355-374.
- Suhaiemi, A., and Ong, S. J. (2019). Evaluation of the SkillsFuture Earn and Learn Programme (ELP). Singapore: Ministry of Trade and Industry.
- Vignoles, A., Galindo-Rueda, F., and Feinstein, L. (2004). The Labour Market Impact of Adult Education and Training: A Cohort Analysis. *Scottish Journal of Political Economy*, 51(2), 266-280.
- Weiss, A. (1995). Human Capital vs. Signalling: Explanations of Wages. *Journal of Economic Perspectives*, 9(4), 133-154.