



**FEATURE
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RETURNS TO SINGAPORE WORKFORCE SKILLS QUALIFICATIONS (WSQ) TRAINING: Does Training Raise Wages and Employability?

INTRODUCTION

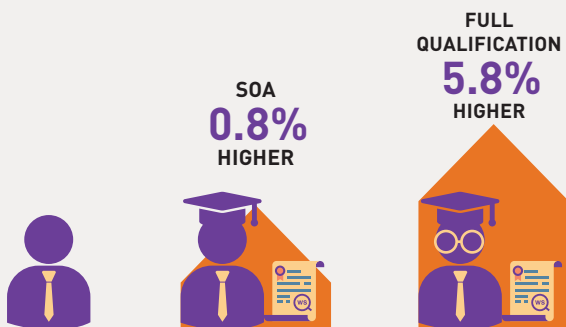
The Singapore Workforce Skills Qualification (WSQ) is a national credential system that trains, develops, assesses and certifies skills and competencies for the Singapore workforce. WSQ offers bite-sized training modules, at the end of which a Statement of Attainment (SOA) is awarded. Trainees can also accumulate relevant SOAs to achieve a WSQ full qualification.



FINDINGS

FINDING 1

There were positive wage returns to attaining WSQ SOAs and full qualifications. Specifically, we find that SOA trainees enjoyed real wages that were 0.8 per cent higher on average in the year after training compared to their control group, while WSQ full qualification trainees experienced a real wage premium of 5.8 per cent on average in the year after training.



FINDING 2

SOA and full qualification trainees who were non-employed in the year of training were also more likely to be employed in the following year.



On average, individuals who were non-employed and received an SOA were 3.5pp more likely than their control group to be employed in the year after training. Similarly, non-employed full qualification trainees were 2.6pp more likely than their control group to be employed in the year after training.

POLICY TAKEAWAY

WSQ training has been effective in increasing trainees' real wages and their probability of employment in the year after training. Going forward, as part of the wider national CET effort, SSG will continue to support individuals, through WSQ and other skills-related training programmes, to improve their skills and employability. Singaporeans are, in turn, encouraged to participate in training in order to build up their capabilities so that they can enhance their employability and benefit from higher wages over the longer term.



EXECUTIVE SUMMARY

- ▶ The Singapore Workforce Skills Qualification (WSQ) is a national credential system that trains, develops, assesses and certifies skills and competencies for the Singapore workforce. WSQ offers bite-sized training modules, at the end of which a Statement of Attainment (SOA) is awarded. Trainees can also accumulate relevant SOAs to achieve a WSQ full qualification. Given the importance of WSQ training in developing the skills and competencies of the Singapore workforce, this study investigates the benefits to individuals who participated in WSQ training by examining their wage and employability outcomes in the year after training.
- ▶ Our findings suggest that there are positive wage returns to attaining WSQ SOAs and full qualifications, with higher returns found for the attainment of full qualifications. Specifically, we find that SOA trainees enjoyed real wages that were 0.8 per cent higher on average in the year after training compared to their control group, while WSQ full qualification trainees experienced a real wage premium of 5.8 per cent on average in the year after training.
- ▶ SOA and full qualification trainees who were non-employed¹ in the year of training were also more likely to be employed in the following year. On average, individuals who were non-employed and received an SOA between 2011 and 2014 were 3.5 percentage-points (pp) more likely than their control group to be employed in the year after training. Similarly, non-employed full qualification trainees were 2.6pp more likely than their control group to be employed in the year after training.

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, SkillsFuture Singapore, or the Government of Singapore.²

INTRODUCTION

The Singapore Workforce Skills Qualification (WSQ) is a national credential system that trains, develops, assesses and certifies skills and competencies for the Singapore workforce. Supporting the national SkillsFuture movement, WSQ promotes the recognition of skills mastery and competencies to facilitate individuals' progression and mobility within and between jobs. To provide flexibility and cater to adult learners' schedules, WSQ offers bite-sized training modules, at the end of which a Statement of Attainment (SOA) is awarded. Trainees can also accumulate relevant SOAs to achieve a WSQ full qualification.

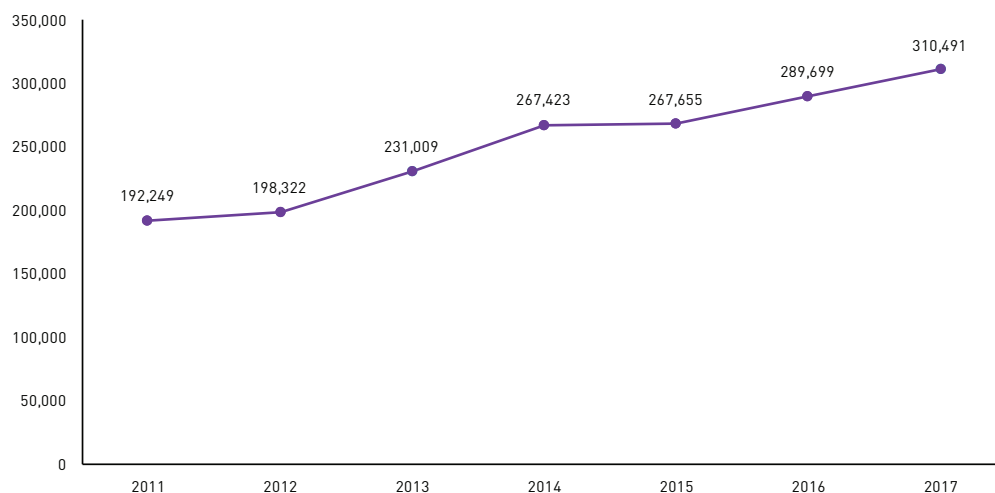
In recent years, the Singapore Government has rolled out numerous training-related measures targeted at both Professionals, Managers, Executives and Technicians (PMETs) as well as low-wage workers (LWWs). For instance, the Workfare Training Support Scheme was introduced in 2010 to incentivise LWWs to participate in WSQ training. In part due to these measures, the number of local trainees who attained at least one WSQ SOA increased by 62 per cent (from 192,249 to 310,491) between 2011 and 2017 (Exhibit 1).

Over the years, WSQ training has become a key feature of Singapore's continuing education and training (CET) system. Given its importance in developing the skills and competencies of the Singapore workforce, this study investigates the benefits that accrue to individuals who participated in WSQ training programmes. Specifically, the study empirically examines the impact of WSQ training on the wages and employability of WSQ trainees.

¹ Non-employed refers to individuals who are not working. They include the unemployed and those who are out of the labour force.

² We would like to thank Yong Yik Wei, Dr Kuan Ming Leong and Lee Zen Wea for their useful suggestions and comments, as well as the Department of Statistics' Strategic Resource and Population Division for its invaluable statistical support. We are also grateful to the Strategic Planning Division at SkillsFuture Singapore for its inputs to this study. All errors belong to the authors.

Exhibit 1: Number of Local Trainees with at least one WSQ SOA, 2011-2017



Source: SkillsFuture Singapore (SSG)

The rest of the article is organised as follows. We first conduct a brief review of the literature related to the impact of training on individuals' labour market outcomes. We then describe the data and methodology employed for our study, before reporting our findings. The final section concludes.

LITERATURE REVIEW

Theoretically, training has an ambiguous effect on wages in the short run. On the one hand, the human capital accumulated through training may raise workers' productivity and in turn, their wages as employers reward more productive employees. On the other hand, the productivity and wage gains from training may take time to materialise. In the short run, wages may be depressed due to the following factors. First, trainees who gain new skills and switch firms and industries may be willing to accept a pay cut in return for possible higher lifetime wages. Second, as a sizable part of a worker's skill is specific to his/her workplace, a switch to another job, firm and/or industry could reduce part of his/her human capital, thus affecting his/her wages in the short run (Kambourov et al., 2018). Third, trainees could temporarily withdraw from the labour market while in the training programme, thereby depressing short-run labour market outcomes (Card et al., 2015). In the longer run, however, human capital accumulation from the training could dominate, and the labour outcomes of the trainees could become more favourable.

Empirically, the literature suggests that training generally results in positive wage returns. For instance, Brunello et al. (2012) found that in Italy, an additional week of formal continuing vocational training increased monthly net earnings by 1.4 per cent. Similarly, Kambourov et al. (2018) found positive real wage returns to employer-sponsored and government-sponsored training of approximately 5 per cent and 8 per cent respectively for trainees who did not change jobs. Among trainees who switched jobs, the real wage returns to government-sponsored and employer-sponsored training were both found to be at around 10 per cent. Drawing on evidence accumulated from over two hundred active labour market policy evaluations, Card et al. (2015) concluded that training programmes that facilitated the re-entry of unemployed individuals into the labour market were relatively ineffective in the short term (i.e., less than a year after the end of the programme). However, in the medium term (i.e., two to three years after programme completion), training programmes were associated with positive impacts.

In Singapore's context, positive wage returns from training have also been found. For example, Lee (2013) found that LWWs who participated in structured training between 2007 and 2009 experienced an average real wage increase of 3.1 per cent relative to a control group. A previous longitudinal study commissioned by the then-Workforce Development Agency (WDA) which examined the wage impact of WSQ training in 2009 and 2010 found that trainees who attained SOAs and full qualifications enjoyed positive real wage returns of 1.3 per cent to 5.3 per cent.³

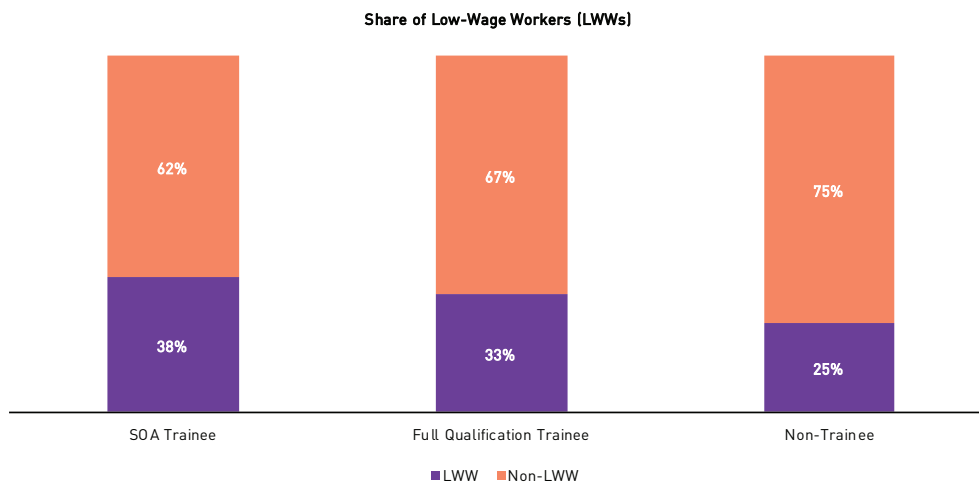
³ See then-Workforce Development Agency's media release, "New Study Reveals Positive Impact of WSQ Training on Wages", dated 6 June 2013. Accessed on 13 Jan 2019 at http://www.ssg-wsg.gov.sg/new-and-announcements/2013/5_Jun_2013.html

DATA AND EMPIRICAL METHODOLOGY

To estimate the returns to WSQ training, this study employs data from SkillsFuture Singapore (SSG) on all trainees who received an SOA or a full qualification from 2011 to 2016. The training data from SSG is merged with administrative data of a longitudinal nature which includes information on individuals' wages, demographic characteristics, educational attainment and workplace characteristics. Apart from WSQ trainees, the merged dataset also includes information on non-trainees.

An examination of the data shows that the observable characteristics of WSQ trainees differ systematically from that of non-trainees. Between 2011 and 2014, a larger share of WSQ trainees were LWWs⁴ compared to non-trainees⁵. In particular, 38 per cent of trainees who attained an SOA ('SOA trainees') and 33 per cent of trainees who attained a full qualification ('full qualification trainees') were LWWs compared to 25 per cent among non-trainees (Exhibit 2).

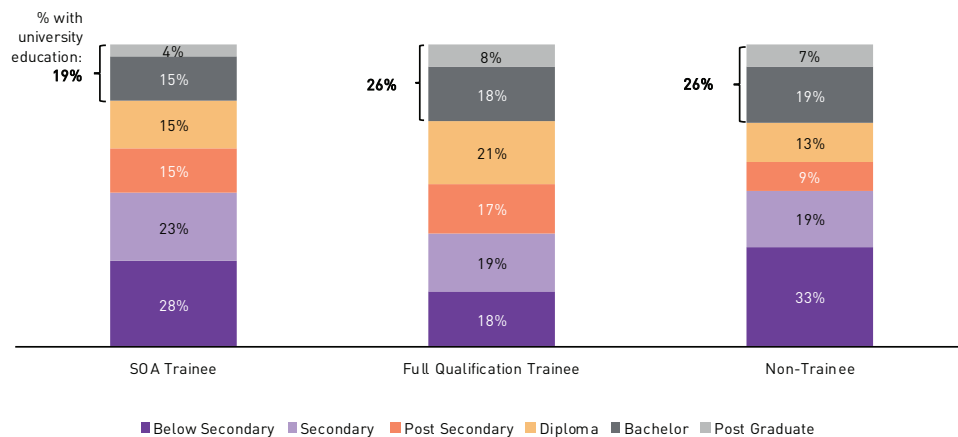
Exhibit 2: Trainees and Non-Trainees by Low-Wage Worker Status in Year before Training for 2011-2014 Cohorts



Source: Authors' calculation, based on data from SSG and other administrative sources

In terms of education profile, the data shows that SOA trainees tended to have lower educational attainment compared to full qualification trainees and non-trainees. Specifically, 19 per cent of SOA trainees had a university education as compared to 26 per cent for full qualification trainees and non-trainees (Exhibit 3).

Exhibit 3: Trainees and Non-Trainees by Highest Qualification Attained in Year before Training for 2011-2014 Cohorts



Source: Authors' calculation, based on data from SSG and other administrative sources

4 In this study, LWWs refer to individuals who earn nominal monthly income from employment that is at most \$2,000, possess property with annual value of at most \$13,000, and own at most one property.
5 Non-trainees consist of individuals who did not take WSQ or academic CET courses from 2011-2016.

Besides differences in observable characteristics, WSQ trainees are also likely to differ from non-trainees in terms of unobservable characteristics such as their intrinsic motivation. For example, workers who are more motivated – a factor not observed in the data – may systematically choose to participate in training to improve their skills. At the same time, this higher level of motivation may translate to higher remuneration at work. A simple comparison of the wage outcomes of trainees and non-trainees would then suffer from selection bias, and overstate the impact of WSQ training on wages.

To overcome this selection bias and estimate the causal returns to WSQ training, we select our control group from trainees who received WSQ training two years later. In other words, the control for an individual who underwent WSQ training in year t would be an individual who had not yet been trained but would receive training in year $t+2$. The labour market outcomes of these two individuals are then compared in year $t+1$. Unlike non-trainees, future trainees are arguably more similar to the trainees in year t , including in terms of their unobservable characteristics such as intrinsic motivation. By exploiting differences in the timing of training, we would be better able to control for these unobservable characteristics.

In order to remove confounding effects on labour market outcomes stemming from the workers' *observable* characteristics (e.g., demographic, work, firm and training characteristics), we next match the trainees to their control group based on these observable characteristics using coarsened exact matching (CEM). Any remaining imbalance in the matched data is addressed by including control variables in the regression analysis.

We choose to compare the outcomes of the trainees and their matched control group in year $t+1$ instead of year t as doing so would better allow us to capture any human capital accumulation effects, given that labour market outcomes may be depressed in the short run (Card et al., 2015). To ensure that we do not conflate the effect of multiple training programmes, we exclude trainees who received SOAs or full qualifications in multiple years, as well as individuals who attended academic CET courses (i.e., non-WSQ CET courses at polytechnics or autonomous universities) over the period of the study.⁶

The final matched sample for our analysis comprises WSQ trainees who received training in 2011 to 2014 and their matched controls who received training two years later (i.e., 2013 to 2016). The following regression was then performed on the matched sample to estimate the impact of WSQ training on trainees' labour market outcomes:

$$Y_i = \beta_0 + \beta_1 WSQ_i + \beta_2 Demographic_i + \beta_3 Work_i + \beta_4 Firm_i + \beta_5 Training_i + \alpha_t + \varepsilon_i \quad (1)$$

Where:

- Y_i denotes the log wage of individual i in time $t+1$ or the employment status of individual i in time $t+1$ for individuals who were non-employed in time t ;
- WSQ_i is a dummy variable that takes on a value of 1 in the year that the individual receives a WSQ SOA or full qualification, and 0 otherwise;
- $Demographic_i$ denotes the individual's demographic characteristics, including gender, age, race, marital status, number of children and residential status in time $t-1$;
- $Work_i$ denotes the individual's work characteristics, including the individual's number of months worked in time $t-1$ and income in time $t-2$;
- $Firm_i$ denotes the characteristics of the firm the individual is employed in, including the industry of the firm, the small and medium-sized enterprise (SME) status of the firm, the ownership of the firm, and whether the firm's productivity is above the industry's median productivity in time $t-1$;
- $Training_i$ denotes the characteristics related to the WSQ training undertaken by both the treatment and control groups, such as the type of WSQ framework, the level of the full qualification attained (e.g., certificate, higher certificate, etc.), and whether the training was company-sponsored;
- α_t is a vector of year dummies that captures effects common to all individuals in the specific year;
- ε_i is the error that captures the unobservable factors that determine Y_i .

⁶ Other treatments that were done on the data include the removal of individuals who had wage growth below the 2.5th percentile and above the 97.5th percentile from the sample. The sample was also further restricted to individuals who resided in Singapore two years before training and one year after training.

When analysing the wage outcome of WSQ training, the coefficient of interest (β_1) measures the average change in wages for trainees in the year after attaining an SOA or a full qualification. We report the average change in real wages by deflating the wages to account for inflation. When analysing the employability outcome, β_1 measures the average change in the probability of moving from non-employment to employment in the year after training. The next section reports our findings.

RESULTS

Our findings suggest that participation in WSQ training had a significant and positive impact on real wages and the probability of entering employment in the year after training (Exhibit 4).

Specifically, we find positive wage returns to the attainment of a WSQ SOA and also WSQ full qualification, with higher wage returns estimated for the attainment of a full qualification. On average, WSQ trainees who received an SOA between 2011 and 2014 enjoyed real wages that were 0.8 per cent higher in the year after training as compared to their control group, while WSQ trainees who received a full qualification during the same period experienced a real wage premium of 5.8 per cent.

Our study also found that individuals who were non-employed and received an SOA between 2011 and 2014 were 3.5 percentage-points (pp) more likely than their control group to be employed in the year after training. Similarly, non-employed full qualification trainees were 2.6pp more likely than their control group to be employed in the year after training. Based on these results, 6,100 SOA trainees and 400 full qualification trainees over the period of 2011 to 2014 were estimated to have moved from non-employment to employment as a result of the WSQ training.⁷

Exhibit 4: Regression Results

Dependent Variable	SOA	Full Qualification
Real wage in the year after training	0.8%***	5.8%***
Probability of moving from non-employment to employment	3.5pp***	2.6pp***

*** Statistically significant at the 1% level

CONCLUSION

In summary, our study finds that WSQ training has been effective in increasing trainees' real wages and their probability of employment in the year after training. The positive findings on wages are comparable to the findings of the longitudinal study by the then-WDA in 2013 for earlier WSQ cohorts. These studies provide strong evidence that individuals have benefitted from WSQ training aimed at upgrading their skills and enhancing their employability.

Going forward, as part of the wider national CET effort, SSG will continue to support individuals, through WSQ and other skills-related training programmes, to improve their skills and employability. Singaporeans are, in turn, encouraged to participate in training in order to build up their capabilities so that they can enhance their employability and benefit from higher wages over the longer term.

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⁷ Authors' calculation. To obtain the number of trainees who moved from non-employment to employment as a result of WSQ training, the regression coefficients were applied to the full training sample (i.e., including individuals who took multiple training courses during the study period).

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