FEATURE ARTICLE

FIRM-LEVEL RETURNS TO EMPLOYER-SPONSORED TRAINING

INTRODUCTION

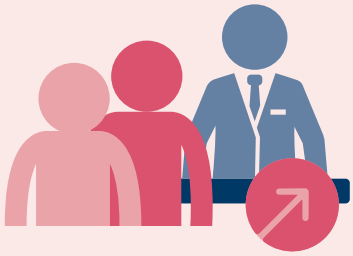
Between 2010 and 2018, the number of employer-sponsored training places with funding support from SkillsFuture Singapore (SSG) generally increased. This reflects part of the positive response from firms to the Government's ongoing efforts to encourage employers to support their employees for training. This article examines the impact of employer-sponsored training on firm-level outcomes.

FINDINGS

A 10 percentage-point increase in the proportion of local workers sponsored for training led to:

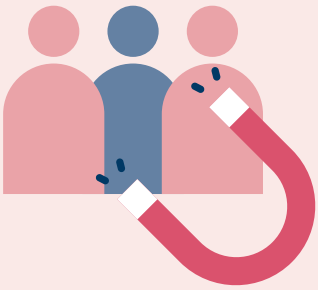
0.7
per cent
higher revenue
on average
over 4 years

0.5
per cent
larger local employment
on average
over 4 years



2.2
per cent
improvement in labour productivity
on average
over 2 years

0.6
percentage-point
improvement in the retention of local employees in the year of training



POLICY TAKEAWAY

Our findings suggest that employer-sponsored training is effective at improving firm-level outcomes. Under the Next Bound of SkillsFuture, the Government will continue to support enterprises to further develop their workforce through training. These measures will enable enterprises to transform and stay ahead of industry disruption, as part of the nation's workforce development strategy.

EXECUTIVE SUMMARY

- Since 2010, the number of employer-sponsored training places with funding support from SkillsFuture Singapore (SSG) has seen a general uptrend. This partly reflects the result of the Government's ongoing effort to encourage employers to support their employees for training.

- While previous studies have established positive returns to training for individuals in Singapore, this study represents our first attempt to examine the returns that accrue to firms from sponsoring their employees for training. Specifically, the study examines the impact of employer-sponsored training on firms' revenue, local employment, labour productivity and retention of local employees.

- Our results show that there are positive returns to firms from sponsoring their workers for training. In particular, we find that for a 10 percentage-point increase in the proportion of local workers sponsored for training by firms, firms' annual revenue was 0.7 per cent higher on average over a four-year period (i.e., in the year of training and three years after training), while their local workforce was 0.5 per cent larger on average over the four years. The increase in revenue and local employment could have come about because the training had enabled firms to expand the scale of their operations, possibly by improving the efficiency and capability of their workers. Reflecting the latter, we find evidence that even as the firms increased their local workforce, they also experienced improvements in labour productivity (2.2 per cent on average over two years). Meanwhile, investments in worker training was found to improve firms' retention of their local employees (0.6 percentage-point in the year of training).

- The positive returns from employer-sponsored training suggest that it will be beneficial for firms to invest in the training of their workers. On its part, the Government will continue to support employers in their workforce development journey

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.[1]

INTRODUCTION

In recent years, the Singapore Government has ramped up efforts to support Singaporeans in their pursuit of lifelong learning and skills mastery, notably through the launch of the SkillsFuture national movement in 2015. A key component of the movement is promoting greater involvement by employers in the upskilling of their workers and in recognising skills-based career progression. Strengthening the enterprise pillar of the skills ecosystem is also a major focus area under the Next Bound of SkillsFuture. Given the strong push for employers to support their workers for training, it is important to quantify the returns to employers from such investments. This study represents a first attempt to empirically examine the returns to employer-sponsored training on firm-level outcomes in Singapore.

LITERATURE REVIEW

From the academic literature, there are two main channels through which employer-sponsored training can benefit firms. First, such training could raise the productivity of the firms' workforce by equipping them with the relevant skillsets and enhancing their capabilities. With a more productive workforce, firms would be better able to expand into new activities. As the firms expand the scale of their operations, their revenue and employment would rise in tandem. Second, employer-sponsored training could improve the retention of workers, thereby leading to increased human capital accumulation at the firm. This is especially if the training is focused on firm-specific skills.

1 *We would like to thank Ms Yong Yik Wei, Mr Kuhan Harichandra, Mr Lau Zheng Yi and Mr Lee Zen Wea for their useful suggestions and comments, as well as the Department of Statistics for its invaluable statistical support. We are also grateful to the Enterprise Engagement Office at SkillsFuture Singapore for its inputs to this study. All errors belong to the authors.*

Empirical studies in other countries have largely focused on the impact of employer-sponsored training on firms' productivity, and generally found positive effects. For instance, Almeida and Carneiro (2009) found that among large manufacturing firms in Portugal, an increase in employer-sponsored training of 10 hours per employee per year raised firms' productivity in the same year by 0.6 per cent on average. Similarly, Colombo and Stanca (2008) found that in Italy, an increase in the share of trainees by 10 percentage-points raised firms' productivity by 0.7 per cent in the same year.

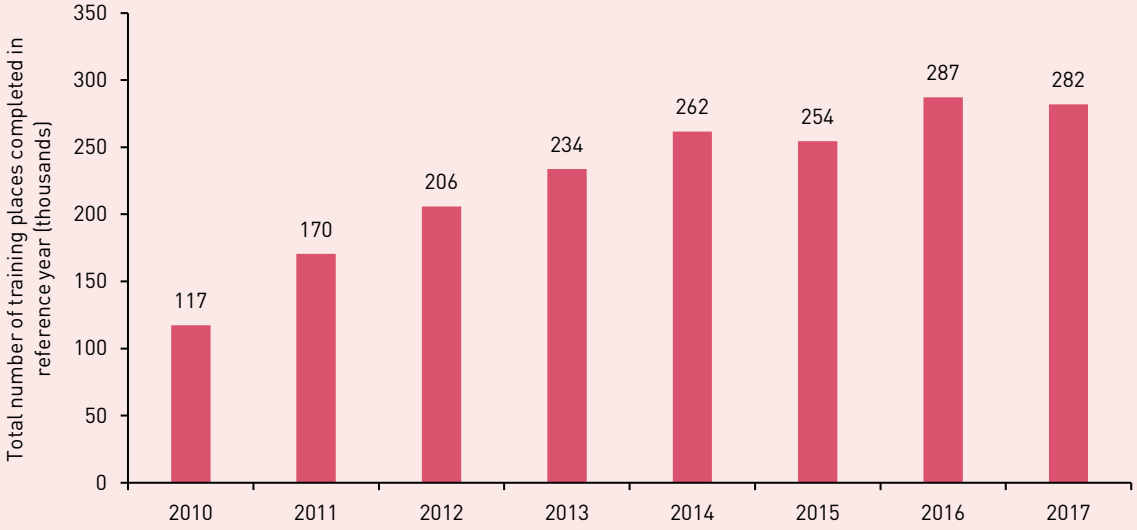
In Singapore's context, past studies have found positive returns to training at the individual level. For example, Lee (2013) found that low-wage workers who participated in structured training between 2007 and 2009 experienced an average real wage increase of 3.1 per cent. Other analyses of specific training programmes have also found positive individual-level returns. For instance, Teo and Wen (2018) found that participating in Workforce Skills Qualification (WSQ) training increased trainees' average real wages and their probability of employment in the year after training. Similarly, Suhaiemi and Ong (2019) found that the SkillsFuture Work-Study Post-Diploma programme for fresh and recent polytechnic graduates, previously known as the Earn and Learn Programme, had a positive effect on wages, with participants enjoying a wage premium over a comparable group of polytechnic graduates both during and after graduating from the programme.

DATA AND EMPIRICAL METHODOLOGY

To examine the firm-level returns to employer-sponsored training, this study uses data from SkillsFuture Singapore (SSG) on SSG-funded training completed by Singapore Citizens and Permanent Residents between 2010 and 2018.[2] This dataset includes information on the number of trainees sponsored by each firm. The training data is then merged with a firm-level longitudinal administrative dataset, which includes data on the key characteristics of firms such as their revenue, employment and labour productivity. The resulting firm-level dataset differentiates between employees who were sponsored for training by their main employer[3] (henceforth referred to as employer-sponsored trainees), and those who were sponsored for training by an employer that was not their main employer (i.e., non-main employer). For the purpose of this study, employer-sponsored training refers only to training that was sponsored by the worker's main employer.[4]

Between 2010 and 2017, the number of employer-sponsored training places has generally seen an increase (Exhibit 1).[5] At the firm-level, the share of employer-sponsored trainees among the local workforce of a firm was relatively stable during the period of analysis, with the median firm sponsoring around 13 per cent of its local workforce for training (Exhibit 2).

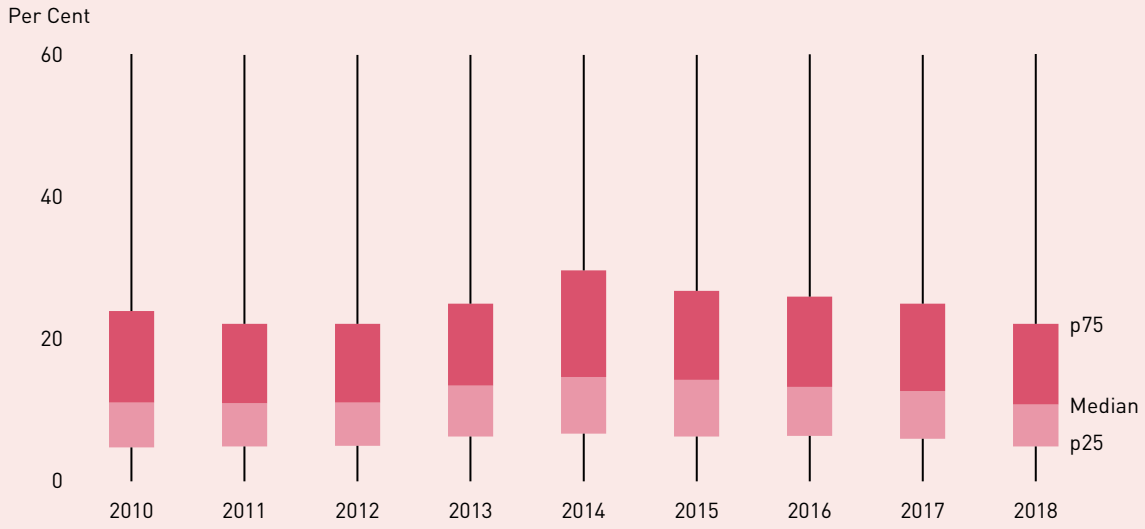
Exhibit 1: Number of Employer-Sponsored Training Places (Thousands), 2010-2017*



Source: Authors' calculation, based on data from SSG
* Data for 2018 is not shown as it was incomplete at the start of this study (refer to footnote 5).

2 *The data captures only courses funded by SSG. Individuals who attended non-SSG-funded training may also contribute positively to firm-level outcomes, but this cannot be examined in the study due to the lack of data on such training.*
3 *To construct the firm-level dataset, a worker is assigned to a firm based on his/her main employer, which refers to the firm at which the worker had worked the most number of months in a given year.*
4 *Workers are considered to be sponsored for training by a non-main employer if the main employer is not the firm that had sponsored the worker for training due to a job switch by the worker. Training sponsored by non-main employers is excluded from the definition of "employer-sponsored training", as this study focuses on the benefits of training that accrue to the sponsoring firms.*
5 *At the commencement of the study, the 2018 claims data for training that was completed in 2018 was incomplete due to the lag between the completion of training and the submission of claims by firms, i.e., not all of the training claims were submitted by the cut-off period of the study. Nonetheless, the available 2018 training records are included in the study sample for analysis as they increase the sample size and allow for more precise estimation of the shorter-term returns to employer-sponsored training.*

Exhibit 2: Distribution of Employer-Sponsored Trainee Share among Firms with at least One Employer-Sponsored Trainee (%), 2010-2018



Source: Authors' calculation, based on data from SSG and other administrative sources
Note: Data was compiled based on firms with available revenue and value-added (VA) data and had local employees in the reference year. Percentiles were computed based on firms with at least one employer-sponsored trainee.

In terms of the characteristics of firms, an examination of the data shows that firms with trained employees[6] (including employer-sponsored trainees) had higher revenue and labour productivity (as measured by VA per worker) as well as more local workers on average as compared to firms that never had trained employees (Exhibit 3).

Exhibit 3: Characteristics of Firms by Training Status, 2010-2018

	Firms with no trained employees in all years	Firms with at least one trained employee in at least one year
Panel A: Number of Firms		
Number of Unique Firms	145,500	88,600
Panel B: Firm-level Characteristics (Average in 2010 – 2018)		
Average Revenue ($'000)	12,594	85,135
Average VA per Worker ($'000)	76.9	79.7
Average Number of Local Workers	5	63

Source: Authors' calculation, based on data from SSG and other administrative sources
Note: Trained employees refer to local employees who had attended any form of training, including employer-sponsored training or training sponsored by a non-main employer.

6 *For the main analysis, we focus on firms with trained employees, which include both employer-sponsored trainees and trainees sponsored by their non-main employers, rather than on a narrower set of firms with at least one employer-sponsored trainee. This is because the number of unique firms in the latter sample is significantly smaller, and may hence result in less precise estimates in the regression analysis. Nonetheless, we have also repeated the analysis using the latter sample of firms as a robustness check, and find results that are similar to our main findings.*

Apart from such observable differences, there may also be unobservable differences across firms which could lead to selection bias. For example, firms which have better management quality – a factor not observed in the data – may systematically choose to sponsor their employees for training to improve the capability of their workforce. At the same time, firms with better management quality may have higher levels of worker engagement, which may in turn lead to an improvement in their outcomes (e.g., productivity). Consequently, a simple comparison of the outcomes of firms that sponsored training with those that did not, without accounting for management quality, would overstate the impact of employer-sponsored training since the differences in outcomes would also reflect the effect of management quality.

To mitigate such selection biases and derive the causal impact of employer-sponsored training on firm-level outcomes, we first restrict our analytical sample to the 88,600 firms which had trained employees in at least one of the years between 2010 and 2018 (see Exhibit 3). Next, we utilise the fixed effects regression specification to control for time-invariant firm-level characteristics (e.g., management quality of the firm), observable firm-level characteristics that change across time (e.g., educational qualification of the firm's local workforce), as well as sector-specific economic time trends (e.g., sector-specific demand conditions that affect firm-level outcomes). As the returns of employer-sponsored training to the firm may materialise with a time lag, we incorporate three lags in our regression to estimate the effect of employer-sponsored training for up to three years after training. Our regression specification is thus as follows:

$$Y_{it} = \sum_{j=0}^{3} \beta_{1j} \cdot EmpShare_{i,t-j} + X_{it} + \alpha_i + \delta_{st} + \epsilon_{it} \quad (1)$$

Where:

- Y_{it} denotes the log revenue, log VA per worker, log local employment or the one-year retention rate of local employees of firm i in year t;
- $EmpShare_{i,t-j}$ is the share of local employees who were sponsored for training by their main employer (firm i) in year $t-j$;
- X_{it} are the firm-level controls, including the firm's age, ownership status, average age of local employees, share of male local employees, share of local employees with degree qualifications, share of local employees sponsored for training by their non-main employers, and the log of the grant amount received in the previous year of firm i in year t;
- α_i denotes the firm fixed effects;
- δ_{st} denotes the sector-year fixed effects; and
- ϵ_{it} represents the error term capturing unobservable factors affecting Y_{it}.

To further investigate if the impact of employer-sponsored training varies across firms of different sizes, we run a regression specification where we interact the training variable with dummy variables that denote whether the firm was a small- and medium-sized enterprise (SME)[7]:

$$Y_{it} = \sum_{j=0}^{3} \beta_{1j} \cdot SME_{i,t-j} + \sum_{j=0}^{3} \beta_{2j} \cdot SME_{i,t-j} \times EmpShare_{i,t-j} + \sum_{j=0}^{3} \beta_{3j} \cdot nonSME_{i,t-j} \times EmpShare_{i,t-j} + X_{it} + \alpha_i + \delta_{st} + \epsilon_{it} \quad (2)$$

Where:

- $SME_{i,t-j}$ is an indicator for whether firm i was a SME in year t-j;
- $nonSME_{i,t-j}$ is an indicator for whether firm i was a non-SME in year t-j; and
- All other variables are as defined in equation (1).

7 *SMEs are defined as enterprises with operating receipts not more than $100 million or employment not more than 200 workers.*

FINDINGS

Our findings show that employer-sponsored training led to better outcomes for firms across all the outcomes studied. In addition, we find that the returns on revenue and local employment were sustained for up to three years after training (Exhibit 4).

Exhibit 4: Impact of 10 Percentage-Point Increase in Employer-Sponsored Trainee Share of Firms' Local Workforce

Note: Coloured bars indicate that the corresponding regression coefficients are statistically significant at the 5% level.

Specifically, we find that for every 10 percentage-point (pp) increase in the proportion of local workers sponsored for training, the firms' annual revenue was 0.7 per cent higher on average over a four-year period (i.e., in the year of training and three years after training). Similarly, the firms' local workforce was 0.5 per cent larger on average over the four-year period. These findings suggest that employer-sponsored training had enabled firms to expand the scale of their operations, possibly by improving the efficiency and capability of their workers. Reflecting the latter, we find evidence that even as firms increased their local workforce, they also experienced improvements in labour productivity. Specifically, labour productivity was found to be 2.2 per cent higher on average over two years (including in the year of training), likely because employer-sponsored training equipped the firms' workers with new skills or capabilities to perform their tasks more efficiently. Meanwhile, investments in worker training also helped firms to retain their workers. In particular, we find that for every 10pp increase in the employer-sponsored trainee share, the retention of local employees improved by 0.6pp in the year of training.

By firm size, our results show that SMEs saw strong positive returns to employer-sponsored training across all the outcomes studied (Exhibit 5). For the non-SMEs, while the estimates for most outcomes were positive, they were not statistically significant due to the small sample size.[8] Overall, our results suggest that it would be beneficial for firms, especially SMEs, to invest in the training of their local workers.

Exhibit 5: Impact of 10 Percentage-Point Increase in Employer-Sponsored Trainee Share of Firms' Local Workforce, by Firm Size

Firm Type	Revenue	Local Employment	Retention	VA per Worker
SMEs	+0.7% (over 4 years)	+0.5% (over 4 years)	+0.4pp (over 2 years)	+2.2% (over 2 years)
Non-SMEs	No statistically significant impact	No statistically significant impact	+0.8pp (in year of training)	No statistically significant impact

8 *There were 24,800 SMEs and 700 non-SMEs with at least one trained employee on average each year in 2010-2018.*

To ensure the robustness of our findings, we conduct three further checks. First, we introduce a firm-specific linear time trend to the fixed effects regression model to address concerns that there could be reverse causality (i.e., firms which are rapidly expanding their operations are more likely to sponsor training). Second, we employ a different empirical strategy by using propensity score matching to construct a control group from among firms that never had trained employees but are observably similar to firms that had trained employees (i.e., treated firms). We then run the fixed effects regression using the pooled sample of treated and matched control firms. Third, to address concerns that firms which sponsor training may be different from firms which recruit trained employees (e.g., from the open market), we restrict the sample to only firms that had sponsored at least one trainee (employer-sponsored training) in 2010-2018. The results from these three alternative samples or specifications are similar to our main results, indicating the robustness of our findings.

CONCLUSION

Our study finds that employer-sponsored training leads to positive returns for firms, especially SMEs. In particular, firms that sponsored workers for training benefitted from higher revenue, local employment, labour productivity and the retention of their local employees. Several of these positive outcomes were also found to be sustained for a few years after training. These results indicate that it would be beneficial for employers to invest in workforce training and development.

On its part, the Government will continue to support employers in their effort to develop their workforce. Under the Next Bound of SkillsFuture, the Government has rolled out new initiatives that are targeted at firms. For example, the SkillsFuture Enterprise Credit[9] provides additional funding support for enterprise and workforce transformation, while the SkillsFuture Queen Bee initiative establishes public-private sector partnerships to accelerate employer-initiated skills development efforts across firms, particularly SMEs. These measures will help enterprises to transform and stay ahead of industry disruptions, as well as play a more prominent role in the nation's workforce development strategy.

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9 *The SkillsFuture Enterprise Credit was announced in the Unity Budget Statement delivered in February 2020. The scheme provides eligible employers with a one-off $10,000 credit to cover up to 90% of out-of-pocket expenses on qualifying costs for supportable initiatives related to workforce development (e.g., course fee expenses for Professional Conversion Programmes and Rank-and-File Place-and-Train Programmes) and enterprise transformation (e.g., Enterprise Development Grant and Productivity Solutions Grant), over and above the prevailing support levels of existing schemes.*

REFERENCES

Almeida, R., & Carneiro, P. (2009). "The return to firm investments in human capital". Labour Economics (16), 97 – 106.

Colombo, E., & Stanca, L. (2008). "The impact of training on productivity: Evidence from a large panel of firms". International Journal of Manpower, 35(8).

Lee, Z. W. (2013). Low-wage Workers: Who are Likely to go for Training and Do They Benefit? In Economic Survey of Singapore Third Quarter 2013 (pp. 22-27). Singapore: Ministry of Trade and Industry.

Suhaiemi, A., & Ong, S. J. (2019). Evaluation of the SkillsFuture Earn and Learn Programme (ELP). In Economic Survey of Singapore Second Quarter 2019 (pp. 40-48). Singapore: Ministry of Trade and Industry.

Teo, M., & Wen, J. Y. (2019). Returns to Singapore Workforce Skills Qualifications (WSQ) Training: Does Training Raise Wages and Employability? In Economic Survey of Singapore 2018 (pp. 92-98). Singapore: Ministry of Trade and Industry.