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Who Benefits from Dual Training Systems?

Evidence from the Philippines

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Abstract

Rising youth unemployment rates have been increasingly recognized as a serious challenge in developing and advanced economies, as the trend indicates a potential skills gap between the demands of the workforce and recent graduates. Effective dual education programs utilizing a combination of classroom instruction and practical skill training present an approach to developing a skilled workforce and meeting workforce demands. To evaluate the impact of the Philippine Dual Training System on labor market outcomes, this paper analyzes data from a recent survey tracking graduates from the Dual Training System and regular vocational training programs provided by technical vocational training institutes. The data analysis reveals that the Dual Training System has a significantly higher rate of return on labor market earnings compared with regular, classroom-only vocational training programs, particularly among high school graduates who did not perform well academically during basic education. The magnitude of the impact of the Dual Training System is also likely to increase in correlation with the intensity of the on-the-job component.

Produced by the Research Support Team

Who Benefits from Dual Training Systems? Evidence from the Philippines

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I. Introduction[1]

Rising youth unemployment rates have been increasingly recognized as a serious challenge in both developing and advanced economies, as the trend indicates a potential skills gap between workforce demands and recent graduates. Youth idleness, a term referring to young people who are neither employed, nor enrolled in education, nor in a training program, describes one in every four persons ages 15–24 in the Philippines.[2] Meanwhile, the number of employers reporting difficulties hiring workers with relevant workforce skills has increased by 30 percent in the past six years, particularly among growing, innovative, and large-scale firms in the country.[3]

While education contributes to the accumulation of general human capital, training in the workplace is designed to equip workers with specific job competencies.[4] Transitioning from school and vocational training to the work force often requires developing appropriate hard and soft skills, which can take place through on-the-job training (OJT), apprenticeships, and other vocational programs. These transitional programs are typically implemented in companies where new employees can acquire critical skills, knowledge, and behaviors by working alongside experienced workers or trainees. When particularly skilled workers are not readily available from the labor market, companies must train current employees and source trainable new hires to develop their own human capital specific to their needs.

In Germany and other European countries, governments and firms have been jointly delivering a highly effective vocational training system, known as the dual training system (DTS) or dual education, as a way to develop employment skills. In the DTS, trainees build practical skills through OJT at companies while acquiring relevant theoretical knowledge at vocational training institutions. Many developing countries, including the Philippines, have shown an increasing interest in these types of systems. As dual training programs are relatively new in developing countries, their outcomes and challenges are still being defined.

The DTS was institutionalized in the Philippines in 1994 through the enactment of Republic Act No. 7686 (also known as the Dual Training System Act of 1994). Originally adopted from the German model, the Philippine DTS was introduced in the 1980s through a joint project of the Southeast Asian Science Foundation and the Hans Seidel Foundation. After its debut in the Dualteach Training Center, the program's success led to a nationwide expansion in 1991. The

[2] Rutkowski et al., 2016.
[3] Acosta et al., 2017.
[4] Becker 1962; Mincer 1962.

Technical Education and Skills Development Authority (TESDA) is mandated to promote, coordinate, and administer the DTS as a form of enterprise-based technical and vocational education training (TVET).

Globally, studies demonstrate generally high returns to OJT in private firms.[5] While firm-level (or enterprise-based) training appears critical for industrial development in developing countries, identifying returns to such training is rare in country contexts.[6] Recent studies suggest significant premiums for enterprise-based training, including the DTS, in the Philippines. The employment rate of enterprise-based training graduates has been consistently highest among all training modalities under TESDA.[7] A cost-benefit study found net benefits for firms offering the DTS programs relative to the direct costs incurred from program implementation. The same study also suggested differences in long-term productivity between the DTS-trained workers and non-DTS-trained workers.[8]

Labor market returns to the DTS are affected by skill gaps in the market as well as the scale of the DTS operation. The share of enrollees and graduates of enterprise-based training programs has remained small, accounting for 3 percent of the total TVET enrollment and graduates, which may represent a suboptimal scale of operation. Earlier studies present mixed conclusions regarding the economic viability of the DTS in the Republic of Korea; after analyzing the economic internal rate of return (EIRR) for Meister High School, the EIRR was found to be no higher than ordinary vocational training programs due to its costly structure.[9]

This study summarizes the analysis of labor market returns to the DTS programs by using tracking survey data provided by technical and vocational institutes (TVIs) in the Philippines.[10] This allows for the comparison of labor market outcomes between the DTS and regular program (RP) graduates from the same TVIs. Based on initial results, the EIRR of the DTS is estimated based on the lifetime earning profiles of high school (HS) graduates, vocational training institution graduates, and college graduates in the Philippines.

This report is divided into seven sections. Following the introduction, the second section provides an overview on the Philippine DTS. The third section describes the analytical approach used to estimate the rate of private returns to the DTS and the EIRR. The fourth section details the tracking survey and samples. The fifth and sixth sections examine the results of returns to the DTS and the EIRR, and the seventh section presents the conclusions of the report.

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[5] Bartel 1995; Blundell and Meghir 1996; Booth and Brian 2002; Booth and Zoega 2003; Loewenstein 1998; Loewenstein and Spletzer 1999; Lynch 1992; and Veum 1995.

[6] Schaffner 2001; Sekkat 2011; Yamauchi and Srianant 2009.

[7] di Gropello, Tan, and Tandon 2010 and Orbeta 2016.

[8] Mapa, Almeda, and Abis 2016.

[9] Lee, Kim, and Kyeong Lee (2016).

[10] Due to methodological limitations, the survey results are conditional based on graduation from vocational programs. While the dropout rate has remained low, the study did not analyze the characteristics of those who did not graduate.

II. Dual Training System in the Philippines

TESDA was established in 1994 and mandated by law to formulate coordinated and fully-integrated technical education and skills development policies, plans, and programs.[11] TESDA administers competency assessments and certifications with the intent of professionalizing mid-skilled workers. It develops competency standards and qualifications, coupled with training standards and assessment instruments, which serve as a foundation for the registration, accreditation, and delivery of various programs. TESDA also provides equitable access and provision of programs to the growing number of TVET clients (Figure 1). It funds programs and projects for technical education and skills development and supports TVET institutions (TVIs) through trainer development programs, curriculum and materials development, career guidance and placement, and scholarship programs.

The vocational training programs are delivered in three modes of training, namely (a) institution-based (school-based and center-based), (b) enterprise-based, and (c) community-based. Among the three modes, the enterprise-based mode comprises the smallest share (Table 1). The composition of enrollment and graduation in 2016 demonstrates that institution-based training (delivered by schools and TVIs) accounted for 51 percent and 49 percent of the total enrollment and graduates, respectively. Enrollment figures from 2010 to 2016 indicate an uptick in enrollees and graduates of the institution-based mode, which may be attributed to a 57 percent increase in the number of TVIs (TVIs totaled 4,733 in 2013 and a majority were private). The enterprise-based mode broadly maintained a relatively low share of approximately 3 percent.

There are three distinct program types within the enterprise-based mode: (a) apprenticeship, (b) learnership, and (c) the DTS. The DTS uniquely involves theoretical instruction and is jointly implemented by TVIs and companies, while apprenticeship and learnership programs predominantly provide skills training in TESDA-approved partner companies for a maximum of six or three months, respectively. In the DTS, schools and partnering companies share the responsibility of delivering well-coordinated learning experiences. Trainees spend about 40 percent of the total learning time in school and 60 percent in companies for hands-on training. The duration of the program varies depending on the complexity of training content. On average, the DTS programs span a total of 1.5 to 2 years, consisting of about six months of in-school learning and 10 months of in-company training. Trainees also receive an allowance of up to 75 percent of the minimum wage rate. Available statistics on the enterprise-based mode are limited, but the DTS accounts for about 40 percent of all enterprise-based programs regulated by TESDA, with apprenticeship and learnership programs accounting for 25 percent and 35 percent respectively.[12]

The Philippine government offers tax incentives to encourage the participation of companies in the DTS. Per the Republic Act No. 7986, "they shall be allowed to deduct from their taxable income the amount of fifty percent (50%) of the actual system expenses paid to the Accredited Dual Training System Educational Institution for the establishment's trainees, provided that such expenses shall not exceed five percent (5%) of their total direct labor expenses but in no case to exceed twenty-five million pesos (P25 million) a year." In 2015, 706 TESDA-accredited partner

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[11] Republic Act No. 7796, also known as the TESDA Act of 1994.
[12] Orbeta 2016.

companies and 108 TVIs/schools were involved in delivering the DTS program.[13] In addition to tax breaks, companies can reduce recruitment and training costs as well as maintenance costs. The rationale for the DTS is that skills gaps in training can be avoided as training investments respond directly to the needs of employers. Expected advantages for trainees include access to advanced technologies in industries as well as earnings during training.

Some TVIs assert that the DTS provides a smoother transition from training to employment. Absorption rates have ranged from 80 percent to 90 percent, with graduates often being employed by the companies where they received OJT.[14] This employment rate is exceedingly high compared to the overall employment of TVET graduates, which has remained around 65 percent with a trend of improvement in the last several years.[15]

III. Analytical Approach

The analytical approach employed by this study includes (a) the estimation of the rate of private returns to the DTS and other regular programs (RPs) and (b) a case study to estimate EIRRs of the DTS relative to those of RPs and four-year tertiary education.

In order to estimate the rate of private returns, the labor market outcomes of graduates from the DTS and other RPs are estimated and compared. The analysis is based on a standard Mincerian model to estimate the labor market returns to the DTS as a function of salary and employment opportunities after graduation from these specific vocational training programs. The study was conducted in the Philippines prior to the recent expansion of basic education to Grade 12, so TVI trainees are HS graduates who completed Grade 10 (or four years of junior HS).

Associations between the natural log of labor earnings and characteristics, such as different modes of vocational programs and individual characteristics of graduates (such as years of schooling, work experience, final high school grades, and maternal education) are analyzed. To account for variations across different training programs offered through the DTS or RPs, variables for the enrollment year and TVIs are controlled in the equation. The specific equation applied is as follows:

$$Y_i = \alpha + \beta_1 DTS_i + \beta_2 X_i + \varepsilon_i \qquad (1),$$

where Y_i is a labor market outcome (such as wage), DTS_i is a controlled variable for enrolling in either the DTS (=1) or RPs (=0), and X_i is a set of other factors that may affect Y_i (for example,

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[13] Mapa, Almeda, and Abis 2016.
[14] Based on communications with TVIs such as MERALCO Foundation Institution (MFI), Dualtech, Don Bosco Tech, and Jacobo Z. Gonzales Memorial School of Arts and Trades.
[15] Mapa, Almeda, and Abis 2016.

general average HS grade,[16] years of schooling, work experience, enrollment year, and a controlled variable for TVI).

In an alternative specification, the potential impact of general human capital on the DTS was also tested using a general average HS grade. The average HS grade is transformed into a standardized value[17] for analysis. This conditional hypothesis can be tested with an interaction term using the first equation and can be regarded as an adjustment to the slope coefficient on the HS grade for the DTS graduates.

$$Y_i = \alpha + \beta_1 DTS_i \times HSG_i + \beta_2 X_i + \varepsilon_i \qquad (2)$$

These calculations are estimated using ordinary least squares for wages or logit regressions for discrete labor market outcomes, such as employment incidence or whether a person was working for pay. The employment incidence is analyzed at two stages: (a) immediately after graduation from a vocational training program and (b) at the time of tracking survey completion, which occurred several years after graduation from vocational training programs.

Subsequently, the DTS graduate sample is analyzed in isolation to determine whether different aspects of the DTS program delivery are related to their labor market outcomes. The DTS programs are highly heterogeneous as a result of being offered in various industrial sectors with the purpose of addressing occupation-specific skills. Since the TVIs partner with different companies, factors such as time allocation for in-school learning and in-company training (OJT), the intensity of OJT training, and the application of learning methods can vary.

A methodological challenge acknowledged by the study is the participants' selective enrollment in the DTS programs. Those trainees who enter the DTS-specialized institutions are a select group that do not represent the population of vocational trainees in general. Only institutions that offer both the DTS and RPs are used in the survey sample so that comparison is feasible within an institution. Results should be taken with caution and interpreted as conditional associations rather than direct influences.

The second analysis entails evaluating the costs and benefits of implementing the DTS programs. The rate of return and the rate of the present value of lifetime benefits of the program are examined and compared with the RPs and college education.

Initially, three types of costs are analyzed for the DTS, including (a) opportunity costs of time for trainees to participate in vocational training; (b) institutional costs incurred by training institutions (the TVIs offering both the DTS and RPs); and (c) training costs by firms that accept the DTS trainees. The cost data related to the TVIs only represent two particular institutions due to

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[16] The average HS grade is a measure observable to all at the final stage of HS.
[17] The average HS grades (in raw score) take values of 0 to 100. By converting them into standardized z-scores, the observed values are expressed in terms of standard deviations from their means. They have a distribution with a mean of 0 and a standard deviation of 1. If the average HS scores are above the mean, the standardized value is positive. Scores below the mean result in negative standard scores.

challenges in collecting reliable cost data. As a result, the results should be considered with caution and interpreted as a case study based on a small sample.

The benefits of receiving training are defined solely by lifetime labor market earnings for the purpose of this study. Upon the completion of HS, people choose either to (a) finish schooling and start working, (b) pursue post-secondary TVET, or (c) pursue tertiary education. The base case includes HS graduates who completed Grade 10 (or four years of junior HS).[18] The Labor Force Survey (LFS) administrated by the Philippine Statistics Authority enables the grouping of workers into (a) HS, (b) HS and vocational training, and (c) HS and college, and combines educational attainment and earnings data for these categories.

Despite the limitations, the estimation of an EIRR provides additional information for policy makers. An estimated EIRR can help determine whether the DTS should be scaled up to increase the economic welfare of individual beneficiaries (trainees) net of institutional and training costs.[19]

IV.   Data Used for Analysis and Descriptive Statistics

A tracking survey was conducted to collect information regarding the impact of the DTS on labor market outcomes. The survey was conducted from January to March 2016 in Region III, Region IV-A, and the National Capital Region (NCR). Participants included 958 respondents who enrolled in the DTS or RPs in nine TVIs from the specified regions beginning from 2008. All participants subsequently completed the program.[20] Clustered random sampling was applied to randomly select former trainees from each of the chosen clusters or the TVIs.

The following four criteria are met by the selected TVIs: (a) both the DTS and RPs are in operation within the same institution, (b) trainees are assessed objectively when selected for the DTS, (c) records are maintained under good conditions for several years, and (d) they are located in Region III, Region IV-A, or the NCR.[21] The first condition is essential because the impact of the DTS relative to the RPs is estimated after controlling for institution-specific factors. Careful investigations identified nine TVIs that satisfy the four criteria (Table 2).[22]

Any trainees who did not graduate from their program were randomly replaced in the sample. The sampling randomly chose 20 trainees from the DTS and 20 trainees from the RPs within each TVI/enrollment cohort cell. Since the sample excluded those who did not complete their program for various reasons, the findings are conditional on having graduated from a program. As noted

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[18] The impact evaluation study was conducted prior to the implementation of the K-12 Basic Education System in the Philippines. Secondary education in the former system consisted of four years of HS with no distinction between junior (lower) or senior (upper) levels in HS.

[19] Net subsidies to firms and wages paid to trainees under the DTS are not included in the analysis.

[20] Those who did not complete the programs in which they initially enrolled were randomly replaced in the sample.

[21] Historically the DTS was first adopted in Regions 3 and 4A, which accounts for a relatively high number of TVIs that implement the DTS in those regions.

[22] The survey included the National College of Science and Technology (NCST) in Cavite, but the analysis dropped observations from the NCST because it was later found that the institution only has the DTS. Non-DTS courses were part of their college program, which are not comparable to the DTS.

earlier, the graduation rate for TVET remained around 90 percent with a relatively low drop-out rate in recent years. The completion rate was slightly higher for enterprise-based training programs compared to other programs.

The survey tracked individuals who graduated from vocational training programs several years prior and were already in the labor market. As a result, tracking activities involved a substantial amount of effort in contacting, locating and interviewing the trainees in the sample.[23] Simultaneously, an institution survey was conducted to collect information from the sample TVIs on enrollment records, programs, and institutional costs.

The sample was screened and filtered based on the consistency between actual and reported programs in which trainees enrolled. The number of trainees from the Provincial Training Center, Mariveles in Bataan was substantially reduced from 194 to 140 due to survey implementation challenges and poorly maintained institutional records. The resulting effective sample size was 833 with 362 trainees from the DTS and 471 trainees from the RPs. A look at yearly enrollment numbers highlights a relatively stable balance between the DTS and RPs across the survey period (Table 3).

The survey asked sampled graduates of both the DTS and RPs for their impression of various benefits related to the training they received from TESDA. Graduates of the DTS reported higher levels of employment opportunities and earnings compared to graduates of the RPs. The DTS graduates also reported that their skills, confidence levels, attitudes relevant to work, and earned trust from their employers and colleagues were effectively enhanced. The reported impacts were consistently higher among the DTS graduates compared with the RPs graduates (Figure 2).

While both current salary and employment status figures appear higher for the DTS graduates, the differences are not significant between the two groups in the survey data (Table 4). However, there are greater employment opportunities after training completion among the DTS graduates compared to the RPs graduates. The employment rate of the DTS graduates in the survey is high, which corresponds with the employment rate officially reported by TESDA.

Basic characteristics of former trainees between the DTS and RPs were compared in order to assess the potential impact of alternative factors (Table 5). The data demonstrate a higher average age and a greater number of males among the RPs graduates compared to the DTS graduates. Years of schooling (the total number of years spent in formal elementary and high schools), post-secondary vocational training, and tertiary education is nearly the same between graduates of both programs.

The general average grade at HS graduation (Grade 10) is also nearly the same between the DTS and RPs graduates. The distribution of the raw general average HS grades of the survey sample is comparable among the two groups (Figure 3). The general average grade, reported from 1 to 100-point scores, is computed by dividing the sum of all final grades by the number of learning areas. Students with final grades of at least 75 in all learning areas can earn high school certificates and be promoted to the next level. For example, a general average HS grade of close to full point (100 points) is necessary to enter the most prestigious universities in the country.

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[23] The selected TVIs provided lists and contact information for the graduates who were randomly chosen for the survey sample.

Academic qualification prior to completing vocational training is generally higher among the RP trainees compared to the DTS trainees, and this difference is statistically significant. Among former trainees in the RPs, one out of four has enrolled in college but stopped, and one out of three graduated from college before starting their vocational training.

Finally, the manner in which the DTS programs are implemented in schools and companies was evaluated (Table 6). The data demonstrate that the total duration to complete TVI-based learning and in-company training is about 1.4 years, which is substantially longer than the average duration of the RPs training. About 70 percent of the DTS trainees were supervised during their in-company training and benefitted from support in mastering work processes, while a smaller proportion learned independently or from peer trainees. At graduation, about 70 percent of trainees had obtained the National Certificate (NC)[24] level 2 or above while 6 percent earned the NC level 1 or Certificate of Competency (COC)[25] distinction. The higher level NCs generally have certificate credentials in the labor market while the other certificates have limited values by themselves. About one-third did not earn any certificate.

V. Estimation Results on Labor Market Outcomes of DTS

Labor market outcomes of the DTS compared to the RPs were estimated using the survey data. Figures 4 through 7 present estimated coefficients in the labor wage or employment equations with selected independent variables of interest (see the previous section for the detailed analytical approach). In the specified figures, bars in solid colors and faded colors correspond with statistical significance or insignificance, respectively. Tables 1.1 to 1.6 in the annex include detailed estimation results.

A simple linear regression model was adopted by changing key control variables such as enrollment year, the TVIs, or both, and supposing substantial effects on the outcomes. This reflects the programs' possible heterogeneity. The same regression was estimated by including the interaction term to assess the relationship between the standardized general average HS scores in the DTS versus other RPs. Additional characteristics such as gender, work experience, and years of schooling are also included in the specification.

The heterogeneity of TVIs and programs affects the estimation results of returns to the DTS. Estimates on labor earnings were assessed by calculating the log of graduates' latest monthly salary (Figure 4). The results highlight that the coefficient on the DTS programs is positive and significant in the simplest specification, in which neither the controlled TVI variable nor enrollment year is included (see Column 2 in Table 1.1). The result becomes insignificant when the controlled TVI variable and enrollment year are included in the specification, taking different school-specific characteristics into account (see Columns 3 and 4 in Table 1.1). Different schools

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[24] The NC is issued when a candidate has demonstrated competence in all units of competency that comprise a qualification (TESDA).
[25] The COC is issued to individuals who have satisfactorily demonstrated competence on a single or cluster of units of competency (TESDA).

work with different employers, resulting in distinctly different OJT programs across the years, and this variation has an impact on the estimation results.

The findings suggest that the DTS programs have a stronger positive relationship to labor earning among trainees with lower general average HS grades as compared to trainees with higher grades. The coefficient of the interaction term between the average general HS grade and the DTS shows significant and negative effects, while neither of the parameters of the DTS and average HS grade are statistically significant (see Column 5 in Table 1.1). A standardized HS score of −1 will yield an interaction term coefficient 0.082, which means an 8.2 percent increase in salaries (relative to the RPs) can be expected if trainees were among the lower academic end of basic education and could graduate from the DTS programs. For comparison, the average rate of return to an additional year of schooling is 5 percent per year.

Practical skills training through OJT appears effective in developing human capital, particularly among those who did not perform well academically during basic education. Holding other variables constant, this translates to a difference in labor earnings of at least PHP 955 per month, or approximately USD 240 per year, between the DTS trainees in the bottom or top 16 percent of post-secondary trainees overall. By the same standards, if lower HS academic achievers choose the DTS instead of the RPs, they can gain an additional PHP 497 per month or an equivalent of USD 120 per year. Such increases are not insignificant in the context of today's labor market conditions in the Philippines.

The relationship between the DTS and graduates' employment opportunities was compared with that of RPs and their graduates. The DTS graduates were more likely to be employed, especially right after completing the program, compared to graduates of the RPs (Figure 5). The employment incidence immediately after completing training was consistently 7 percentage points higher among the DTS trainees. This positive impact on employment probability diminishes over time. When accounting for variations across the TVIs and enrollment years, the employment probability among DTS graduates does not significantly differ from vocational programs several years after graduation.

The general average HS grade is also strongly associated with employment. However, the coefficient of the interaction term between the DTS and general average HS grade is not statistically significant for employment probability.

The sample of graduates from the DTS was analyzed exclusively in order to estimate returns to different aspects of the program. As previously noted, the DTS programs are broadly defined by TESDA and each program design differs depending on the participating TVIs and companies. This exercise focused on different aspects of the DTS program design and delivery to assess possible correlations with greater returns in the labor market.

The analysis suggests higher intensity in-company training during the DTS is positively related to employment incidence (Figure 6). While an increase in the overall duration of in-company training projects negligible benefits, an additional hour of in-company training per week can increase the employment rate by 2–3 percentage points. Monitoring visits by instructional trainers from TVIs were also found to potentially increase employment probability. Other aspects of program design

and delivery did not show significant association with earning and employment outcomes (Figure 7).

Although the overall impact of completing training in the DTS was not confirmed after controlling for heterogeneity across TVIs or programs, the results show that high rewards are strongly associated with the DTS trainees who had weaker academic performance in basic education. Those students without a strong academic performance in high school can still expect better earnings prospects by pursuing a path to build practical skills through vocational training programs such as the DTS. This result suggests that OJT transforms trainees, allowing their vocational training outcome to be affected by factors other than academic skills. This relationship was not confirmed among the sampled graduates of the RPs, who consistently showed a positive link between grade and labor market returns after vocational training. While graduates with weaker academic performance fare better compared to others in DTS, it is important to acknowledge that the effect is minimal and the results are conditional on graduation. The proportion of dropouts has remained low, but this study does not address the characteristics of those who do not graduate from vocational training programs.

The intensity of in-company training, as opposed to the length of in-company training, was another critical factor that supported higher returns to the DTS graduates. Monitoring visits by TVI instructors during in-company training also suggest important outcomes in the labor market, even when controlling for different TVIs and programs. In order to promote program quality, increasing the intensity of in-company training experiences and implementing frequent supervision could be effective strategies for companies participating in the DTS and TVIs.

VI.   DTS Economic Internal Rate of Return

A case study[26] analyzing the economic viability of the DTS was conducted by estimating its EIRR based on the lifetime earning profiles for HS graduates, vocational training institution graduates, and college graduates in the Philippines. Utilizing data from the LFS, the earning figures for Filipinos are differentiated by education attainment and age group (Figure 8). The data compare HS graduates without vocational or tertiary education, HS graduates with non-tertiary post-secondary TVET, and college graduates. Returns to schooling increase dramatically from HS to college, a finding which is consistent with existing studies. Earnings figures for college graduates ages 40-44 are nearly 2.5 times greater than those for HS graduates. Interestingly, the gap between HS graduates who had vocational training and those without training is relatively small, which suggests that returns to vocational training in general are low.

Daily wages for HS graduates with vocational training are used as the basis for computing the earnings of regular vocational program graduates. This is a reasonable assumption as the proportion and actual number of the DTS trainees is small compared to the other RP trainees. An

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[26] Note that the data only represent two TVIs because of challenges in collecting cost data after careful validation of the survey results. Both TVIs are similar in operational size, located in the Greater Manila area and offer the DTS and RPs. They differ in the type of operation as one is a public TVI while the other is private. The results should be taken with caution and interpreted as a case study based on a small sample, which supplements the findings from estimating the labor market outcomes of the DTS (compared with that of RPs).

employment rate of 65 percent was assumed for HS graduates and those who had vocational training. If employed, it was assumed that a total of 25 days were worked each month for a period of five years in each age range. An employment rate of 100 percent was assumed for college graduates.

The linear regression method renders insignificant estimates of returns to the DTS when controlling for TVIs and enrollment year, but a significant and negative relationship was found between the general average HS grade and the DTS when the same controls were applied. While it is not possible to compute the EIRR in the former case, this may be attributed to: (a) those students who were weak academic performers (with a −1 standard deviation in the standardized general average HS score) and (b) those students who were strong academic performers (with a +1 standard deviation in the standardized general average HS score).

The cost structure of the DTS program is defined by three components: (a) the opportunity cost of time spent by trainees, (b) institutional costs incurred by training institutions (TVIs), and (c) training costs by firms that accept DTS trainees. The opportunity cost of time to complete vocational training or college education is based on the average daily wages of HS graduates in the age group 15–19. For both the RP and DTS trainees, one year is assumed for their foregone earnings,[27] while four years of foregone earnings are assumed for college students. Since the opportunity cost is based on the earnings of HS graduates who work after graduation, all assumptions are anchored to the HS completion level. The tracking survey data sample reveals average monthly earnings of PHP 11,408, which is an average including both the DTS and RP graduates. A daily wage of PHP 456 is derived if the graduates work for 25 days per month. This value falls between the average daily wages available to HS graduates ages 20-40 with vocational training, which confirms that the average daily earnings from the impact evaluation sample resemble that of the LFS.

Information collected from the sample TVIs is used to evaluate the costs incurred by training institutions. Although the survey attempted to collect cost data from graduates of nine TVIs in Region 3, Region 4A, and the NCR, institutional cost data for only two TVIs were found to be complete and reliable after careful data validation (see Table 1.7 and Table 1.8 in the annex). Both institutions are similar in size and are located in the Greater Manila Area, which constitutes the largest industrial zone covering Metro Manila as well as parts of the neighboring provinces. They offer two distinct institutional environments as one is private and the other is public. The distinction between public and private institutions can be arbitrary due to the small sample of this study, but the specified difference provides a sense of variation in the cost structure among the DTS-implementing institutions.

The DTS program is less costly on average for TVIs, but the cost is higher for the private institution. While actual costs per trainee changed yearly due to fluctuations in the number of enrolled trainees, the average of per-trainee institutional cost from 2010–2014 was used in the

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[27] The DTS trainees have OJT for one year. They receive 75 percent of the minimum wage during the DTS OJT period, but since the wage payment is a transfer from firms to trainees this part is cancelled out. Similarly, enrollment fees are cancelled out between beneficiaries (trainees and students) and the TVIs.

analysis.[28] For comparison with university education, annual per-student per-unit public costs are used.[29] Based on the assumption that in-person company training lasts over a year of the DTS OJT period, the training cost is assumed to be approximately 25 percent of the minimum wage earned by HS graduates ages 15–19.

The EIRR analysis focuses on the three options available after HS completion. Any investments prior to that stage are not included. This strategy necessitates the calculations of benefits and costs net of those available to HS graduates who work after graduation. Based on the estimates of returns to the DTS, two scenarios are presented for the DTS, which include (a) those who were achievers of low grades (who had −1 standard deviation in the standardized general average HS score) and (b) those who were achievers of higher grades (who had +1 standard deviation in the standardized general average HS score).

The estimated EIRR for the DTS among lower HS academic performers is the highest at 23.3 percent and 20.5 percent in public and private TVIs respectively (Figure 9). The advantage of the DTS over the RPs is mainly attributed to the DTS premium in the labor market. A reduction of the premium may be assumed when the government successfully scales up the program. These results highlight that the EIRR among lower HS academic performers is comparable to other options.

VII. Conclusion

This report focused on the DTS as one of various vocational training programs which offer plenty of opportunity for on-the-job training and work experience in the Philippines. Completing vocational training in the DTS garners significant benefits in the Philippines' labor market, particularly among those who did not demonstrate strong academic performance during basic education. The magnitude of the program's impact is likely to increase with the intensity of the in-company training component or OJT, which provides corroborating evidence that practical skill development is a critical factor for success. Furthermore, a case study comparing the cost-benefit of the DTS with other options suggests potentially high returns for individuals who struggled academically prior to the DTS programs.

Practical training through OJT can be a key policy solution for reducing the rate of youth unemployment in the Philippines, particularly after the completion of vocational training or HS graduation. While the conclusions of the study are drawn through reasonable data analysis, due to methodological limitations, the results are conditional on graduation from vocational programs. The study also did not analyze the characteristics of those who drop out from vocational programs. Further investigation may be necessary in order to maximize the efficiency of practical training opportunities.

The study highlights the importance of career counseling to support students in their transition from school to employment. Improved counseling support can help students identify a path to skill

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[28] Without the shadow exchange rate factor adjustment, the per-training costs in the DTS and RPs in a large, public TVI are PHP 5,455 and PHP 6,619, while the same costs in a large, private TVI are PHP 19,490 and PHP 24,351, respectively.
[29] Tullao et al., 2014. The study employed the sample average of 108 state and local universities. The average of 40 units per student translates into PHP 30,573 per year.

development while completing basic education. General average grades granted at the completion of basic education are not a complete measurement to demonstrate skills, particularly soft skills and motivations, yet academic grades are widely used to advise career paths, admit applicants to vocational institutions, and grant public scholarships. Alternative measures to assess these skills are scarce. Scholars of government assistance programs for TVET often include a larger proportion of those who completed tertiary education instead of those with high school diplomas, and the general average HS grade is often used as a criterion for selecting scholars at the TVIs.[30] Teachers and school counselors lack effective training to advise and support students as they prepare to graduate from high school and enter the workforce.

On the supply side, policies are needed to encourage the availability of enterprise-based training such as the DTS. The DTS has favorable labor market returns compared to other types of training modalities, and greater impacts in terms of labor market and skills enhancement compared to other school-based vocational training programs. Despite this, only 3 percent of TESDA vocational training provisions follows the DTS modality. This percentage has remained broadly consistent over the years.

Effective policies to control the eligibility of participating firms and ensure the delivery of quality OJT should be implemented as the DTS scales up. As the program expands, the share of participating firms that primarily employ low-skilled labor may also increase. Thus, closely monitoring program quality and ensuring the skill intensity of OJT can support the successful implementation of the DTS.

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[30] Orbeta and Abrigo (2012).

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Figure 1: Trend of TVET Enrollment, Graduates, Assessed, and Certified (1995–2016)
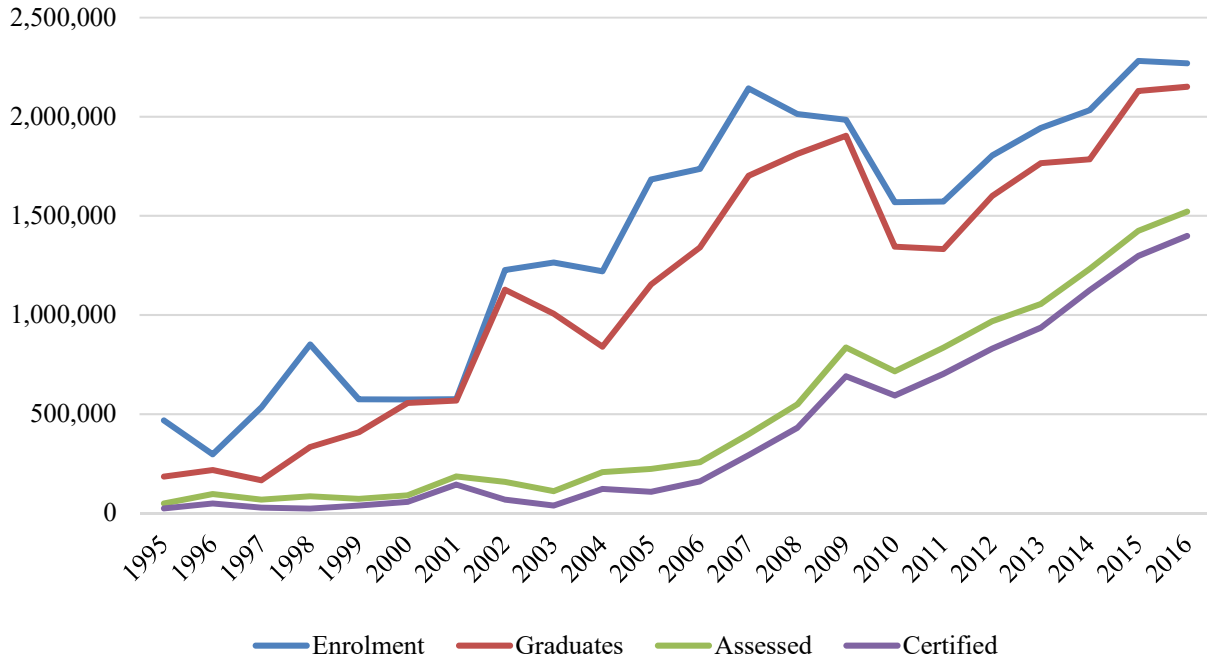
Source: *Administrative data, many years, TESDA*

Figure 2: Self-evaluation about the impacts of training received from TESDA
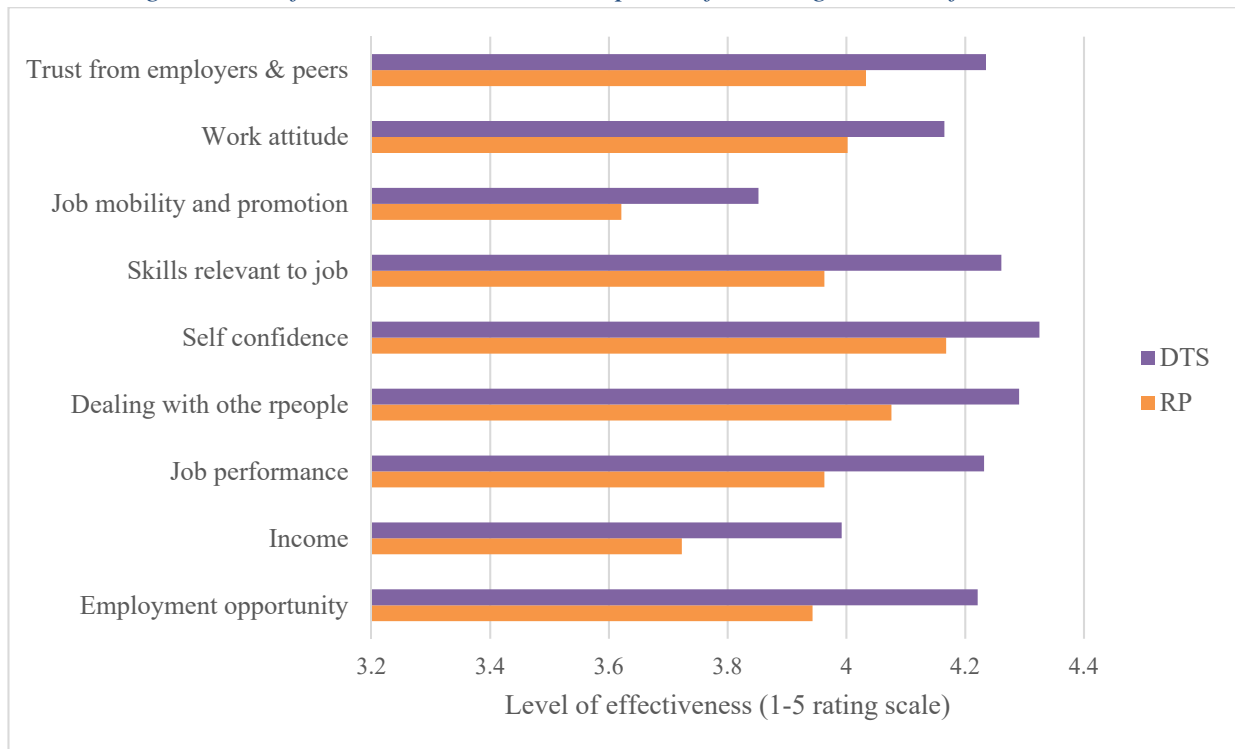
Source: *DTS Tracking Survey Data, 2015, World Bank; World Bank calculations.*
Note: *These self-evaluated impacts were reported in a 5 scale of effectiveness and these differences between DTS and RP graduates are all statistically significant at 5%.*

Figure 3: Distribution of the RP and DTS trainees by general average HS grade
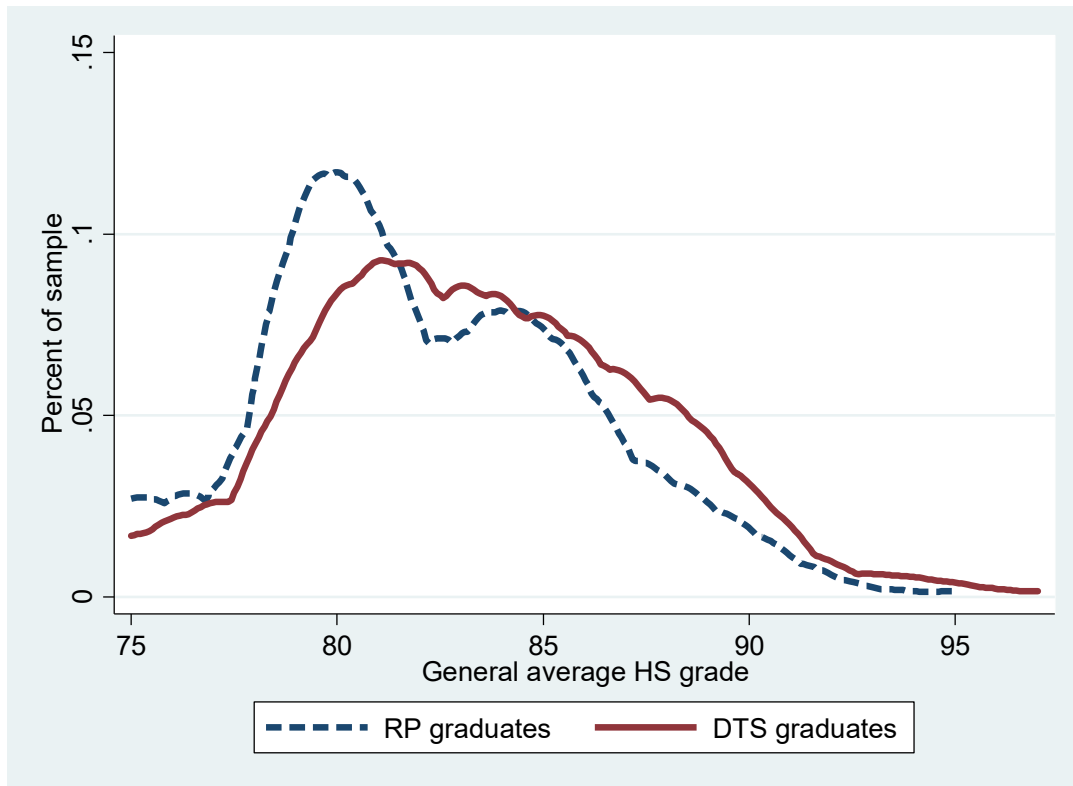
Source: *DTS Tracking Survey Data, 2015, World Bank; World Bank calculations.*

Figure 4: Estimation Results – Change in the Labor Earning (%) for Graduating from the DTS, Education, Work Experience, and HS Grade
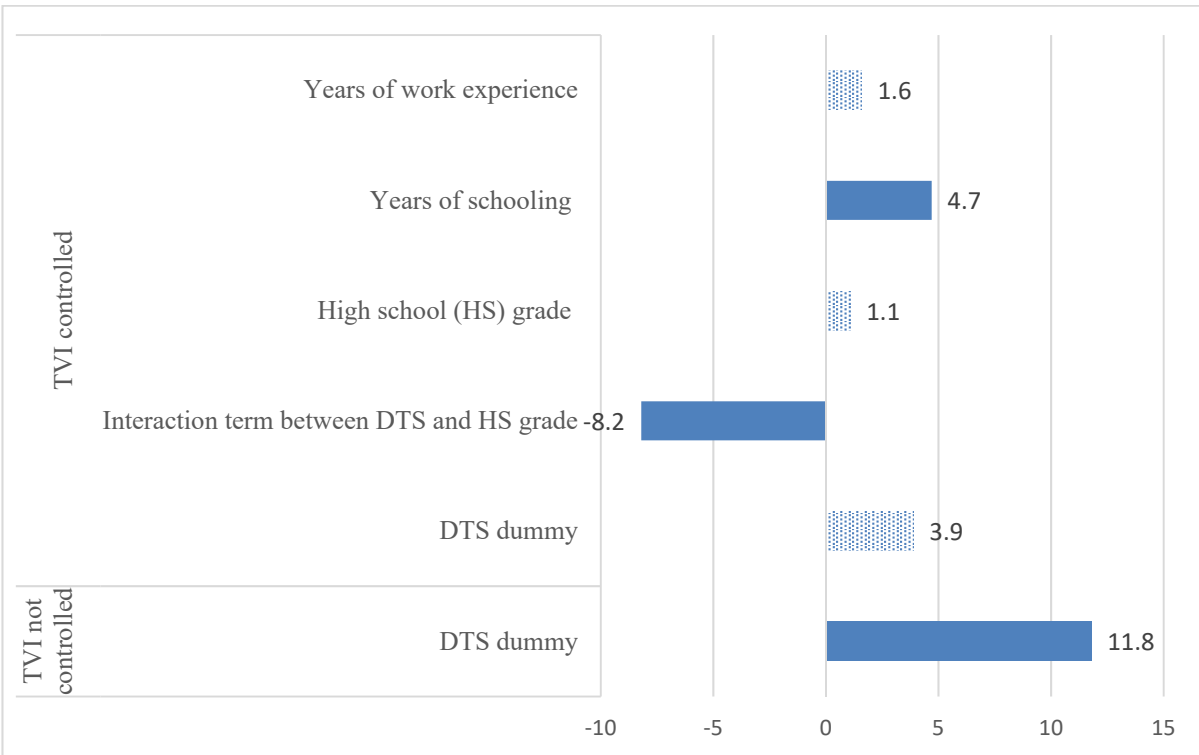
Source: *DTS Tracking Survey Data, 2015, World Bank; World Bank calculations.*
Note: *Wage premium (%), percentage increase or decrease to the monthly earning with one unit change to the listed controls, is computed from an OLS estimation. The estimation controls for gender, education, years of work experience and squared term, maternal education level, TVI dummies, and enrollment year dummies. (See Table 1.1 for regression results in detail)*

Figure 5: Estimation Results - Additional Employment Probability (%) at the Time of Tracking Survey and Right after Completing Training
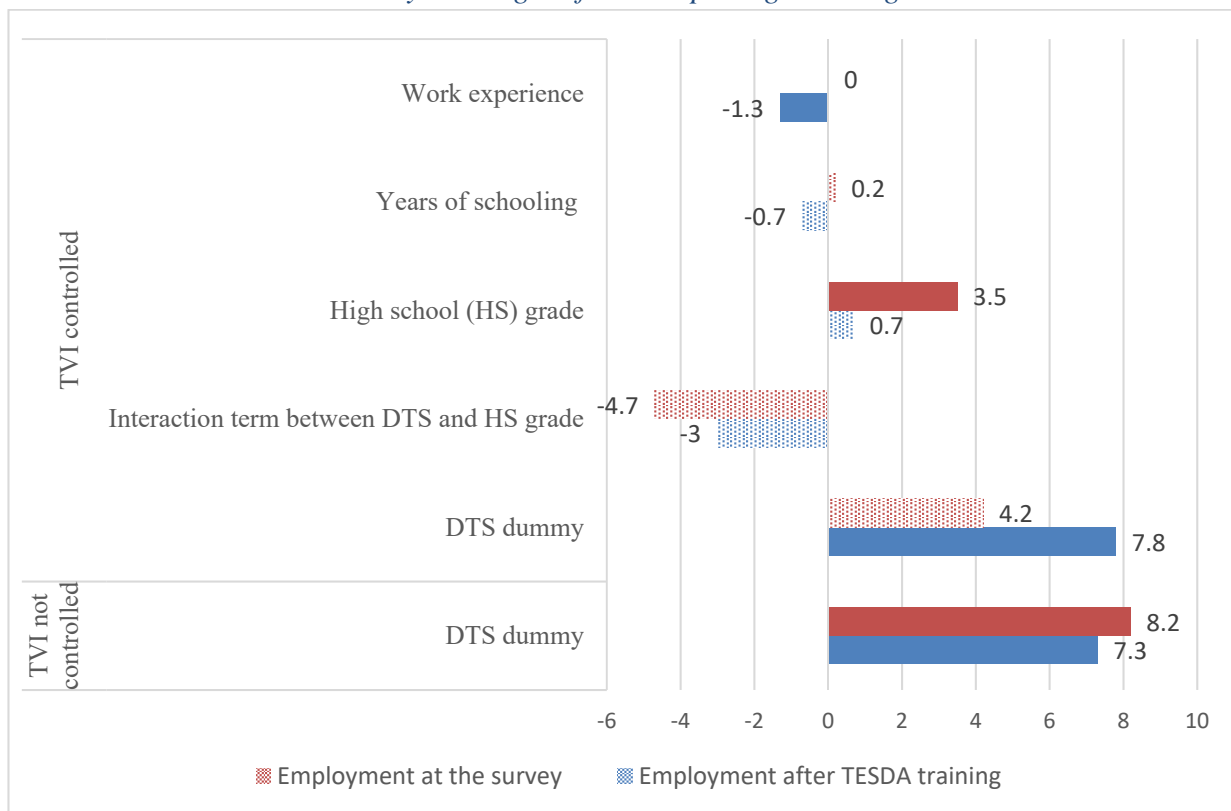
Source: *DTS Tracking Survey Data, 2015, World Bank; World Bank calculations.*
Note: *Marginal effects on the employment probability, percentage point increase or decrease to the probability of being employed with one unit change to the listed controls are computed from a Probit estimation. The estimation controls for gender, education, years of work experience and squared term, maternal education level, TVI dummies, and enrollment year dummies. (See Table 1.2 for regression results in detail)*

Figure 6: Estimation Results - Wage Premium (%) for Various Aspects in the DTS Implementation
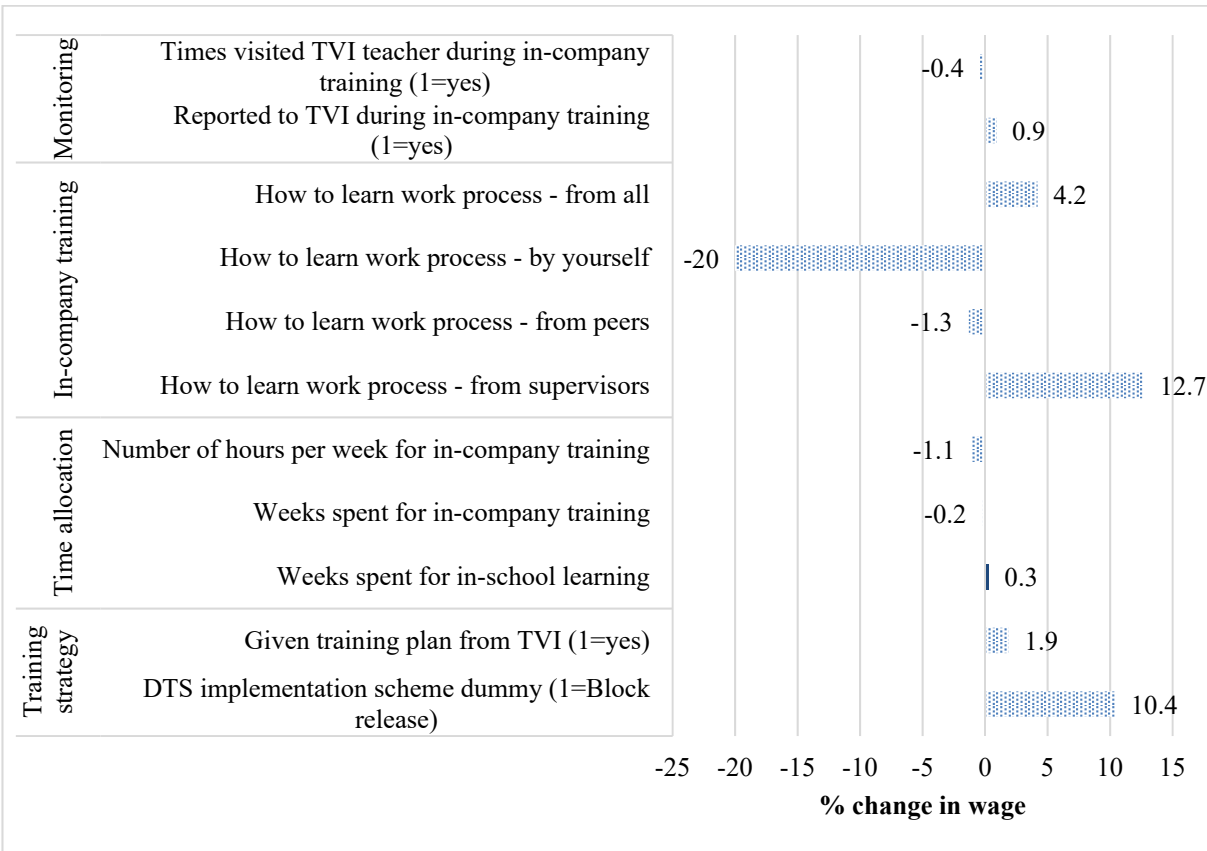
Source: *DTS Tracking Survey Data, 2015, World Bank; World Bank calculations.*

Note: *Wage premium (%) rate, percentage increase or decrease to the monthly earning with one unit change to the listed controls, is computed from an OLS estimation. The estimation controls for gender, years of work experience and squared term, maternal education level, TVI dummies, and enrollment year dummies. (See Table 1.3 for regression results in detail)*

Figure 7: Estimation Results - Additional Employment Probability (%) Based on the Various DTS Implementation Aspects
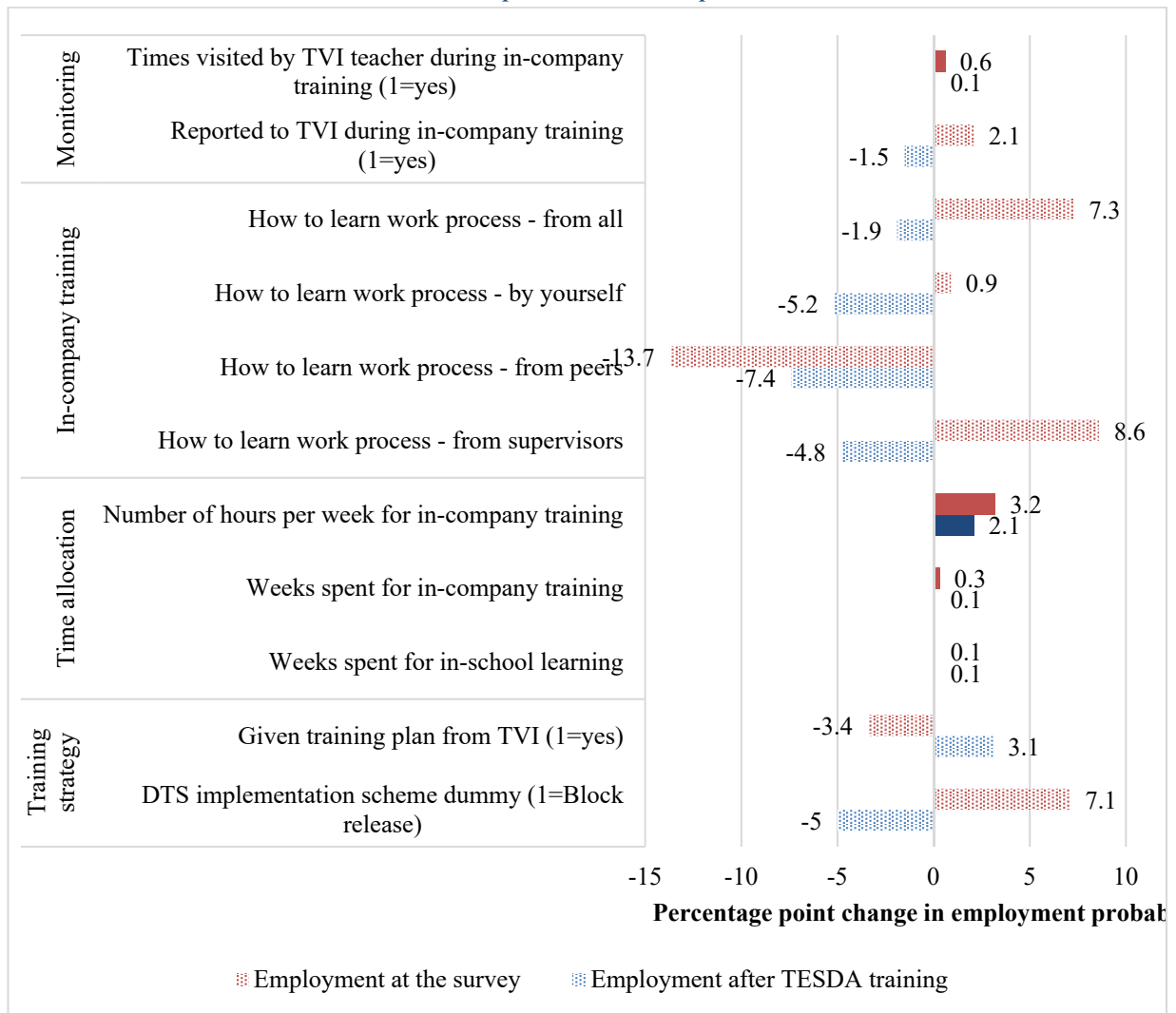
Source: *DTS Tracking Survey Data, 2015, World Bank; World Bank calculations.*
Note: *Marginal effects on the employment probability, percentage point increase or decrease to the probability of being employed with one unit change to the listed controls, are computed from a Probit estimation. The estimation controls for gender, years of work experience and squared term, maternal education level, TVI dummies, and enrollment year dummies. (See Table 1.4 for regression results in detail).*

Figure 8: Daily Wage by Education Attainment and Age Group
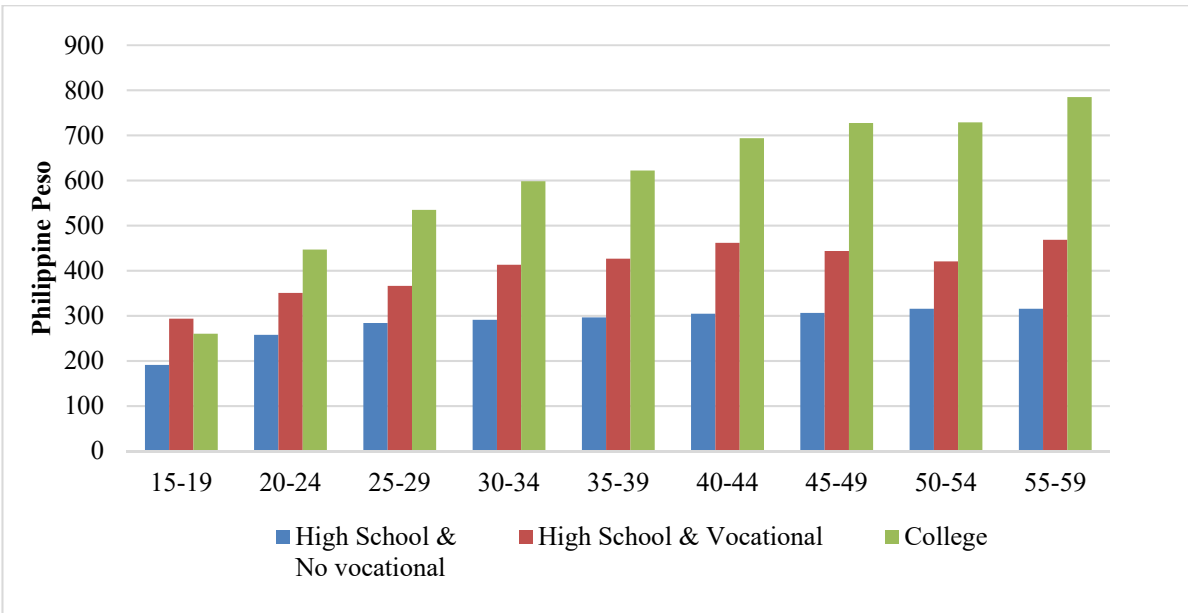
Source: *LFS, October 2015, PSA*

Figure 9: Economic Internal Rate of Return (%)

	Achievers of higher HS grades	Achiever of lower HS grades	RP	College
Public	11.9	23.3	19.6	
Private	10.3	20.5	16.5	18.9
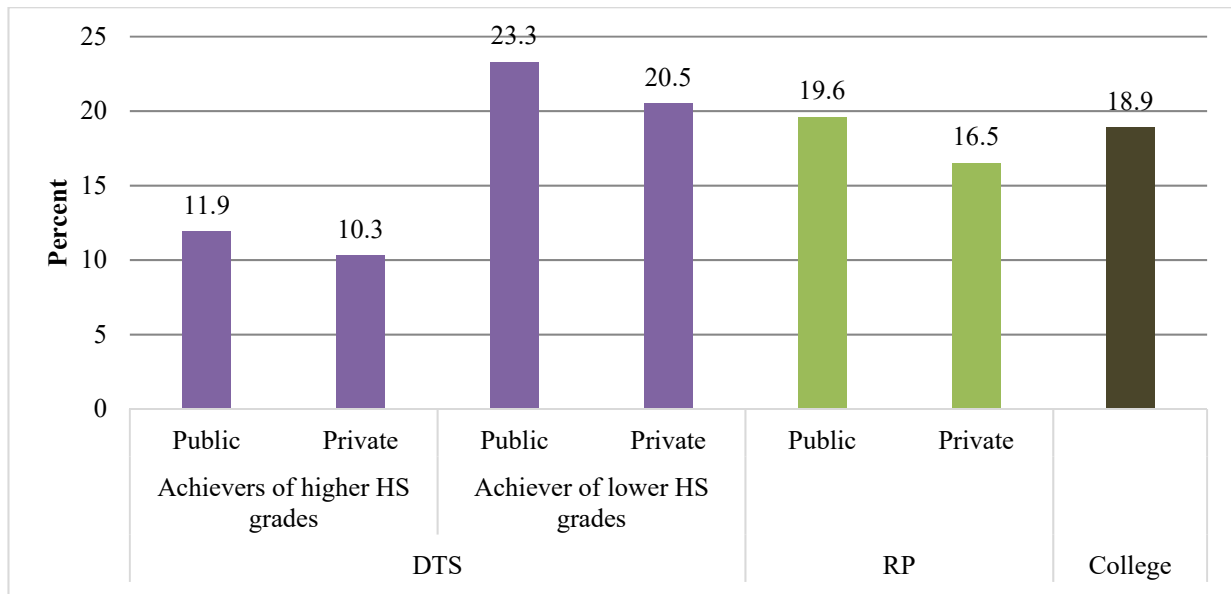
Source: DTS Tracking Survey, 2015, World Bank. World Bank calculations.

Table 1: TVET Enrollment and Graduates by Delivery Mode (2010–2016)

Delivery Mode	2010		2013		2016	
	Number	Share	Number	Share	Number	Share
Enrollees	1,568,617	100	1,572,131	100	2,269,665	100
Institution-based	860,919	55	875,848	56	1,151,644	51
Enterprise-based	86,978	6	80,309	5	72,458	3
Community-based	620,720	40	615,974	39	1,045,563	46
Graduates	1,344,371	100	1,332,751	100	2,151,236	100
Institution-based	671,488	50	679,306	51	1,057,574	49
Enterprise-based	73,352	5	72,082	5	67,080	3
Community-based	599,531	45	581,363	44	1,026,582	48

Source: *Administrative data, many years, TESDA*

Table 2: Sample TVIs, Type, and Sample Size

Region	Name of TVI	Type	Size of TVI	Sampled former trainees	
				Original	After trimming
III	Gonzalo Puyat School of Arts and Trade	Private	Small	29	28
III	Jocson College	Private	Small	49	43
III	Provincial Training Center - Orion	Public	Large	160	150
III	Provincial Training Center - Tarlac	Public	Large	112	106
III	Regional Training Center - Mariveles	Public	Large	194	140
IV-A	Jacobo Z. Gonzales Memorial School	Public	Large	150	134
IV-A	Provincial Training Center Rosario	Public	Medium	85	80
IV-A	Quenas National Agricultural School	Public	Medium	18	10
NCR	MFI	Private	Large	145	142
Total				942	833

Source: *DTS Tracking Survey Data, 2015, World Bank*

Table 3: Sample Former Trainees by Enrollment Year

Program type	Enrollment Year									
	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
RP	1	12	28	30	50	113	131	97	9	471
DTS	2	18	30	37	53	79	93	47	3	362
Total	3	30	58	67	103	192	224	144	12	833

Source: *DTS Tracking Survey Data, 2015, World Bank*

Table 4: Comparing of Wages and Employment Incidence of Former Trainees by the DTS and RPs

	All		RP		DTS		Difference
Variables	N	Mean	N	Mean (a)	N	Mean (b)	(a)−(b)
Latest monthly salary	456	11,408	212	11,044	195	12,199	−1,155
Currently employed	833	68%	471	68%	362	69%	−0.8%
Currently employed as wage earner	833	59%	471	57%	362	62%	−5%
Employed right after TESDA training	833	74%	471	70%	362	82%	−11.8%***

Source: *DTS Tracking Survey Data, 2015, World Bank.*

Note: **** Statistically significant at 1% level.*

Table 5: Comparing Basic Characteristics of the DTS and RP graduates

	All		RP		DTS		Difference
Variables	N	Mean	N	Mean (a)	N	Mean (b)	(a)−(b)
Age	833	26.6	471	28.6	362	23.9	4.7***
Gender (% female)	833	34%	471	22%	362	50%	−28%***
Formal education (no. of years)	833	12.1	471	12.0	362	12.3	−0.2*
General average grade at HS graduation	833	82.6	471	82.1	362	83.3	−1.2***
TVET (no. of years)	833	0.7	471	0.3	362	1.4	−1.1***
College enrollment - before TVET (%)	833	17%	471	25%	362	8%	17%***
College completion - before TVET (%)	833	24%	471	35%	362	11%	24%***
College enrollment - after TVET (%)	833	9%	471	12%	362	5%	8%***
College completion - after TVET (%)	833	1%	471	1%	362	1%	0%
Work experience (no. of years)	833	9.4	471	11.6	362	6.6	5.0***
Years since graduating TVET	833	3.3	471	3.5	362	2.9	0.6***

Source: *DTS Tracking Survey Data, 2015, World Bank.*

Note: *** *Statistically significant at 1% level; * Statistically significant at 10% level.*

Table 6: Delivery Aspect of the DTS Programs

Implementation Aspects	Description	Average Among DTS Trainees
DTS implementation scheme (%)	Block release (scheme=1)	91.0
	Day release (scheme=2)	9.0
How work processes were learned during OJT (%)	Adequate guidance from supervisors	23.0
	Learned from peers	5.0
	Learned by doing it yourself	6.0
	All above	48.0
Certification upon graduation (%)	Higher level (NC2–NC5)	71.0
	Lower level (NC1 or COC)	6.0
	No certificate	27.0
Actual length for in-TVI training and in-plant training	Total number of weeks spent in school/TVIs	26.7
	Total number of weeks spent in company/plant	40.7
	Weekly total number of hours spent for OJT	45.2

Source: *DTS Tracking Survey Data, 2015, World Bank.*
Note: *a. Block release refers to a schedule where students/trainees complete 40 percent of their training full-time in a TVI, then complete the remaining 60 percent of their training full-time in a plant. (TESDA Circular No. 31 s.2012)*
b. Day release refers to a schedule where trainees spend two days per week in a school and the remaining work days in a plant. (TESDA Circular No. 31 s.2012)

Annex 1: Estimation Results

Table 1.1: Wage Premium (%) for the DTS, General Average HS Grade - OLS Estimate on Latest Salary

VARIABLES	(1) RP and DTS	(2) RP and DTS	(3) RP and DTS	(4) RP and DTS	(5) RP and DTS
DTS dummy (=1, RP=0)		0.118**	0.081	0.047	0.039
		(1.996)	(1.260)	(0.715)	(0.711)
Standardized HS grade	0.032	0.027	0.027	−0.029	0.011
	(1.081)	(0.856)	(0.846)	(-0.923)	(0.249)
DTS* std. HS grade					-0.082***
					(-3.698)
Years of schooling	0.072***	0.082***	0.072***	0.051**	0.047*
	(3.708)	(3.813)	(3.175)	(2.178)	(2.046)
Work experience	0.008	0.011	0.009	0.017	0.016
	(0.827)	(1.047)	(0.842)	(1.613)	(1.155)
Work experience (squared)					-0.000
	−0.000	−0.000	−0.000	−0.000**	(-1.500)
	(−1.227)	(−1.482)	(−1.239)	(−2.118)	
Female	0.011	0.019	0.044	0.032	0.036
	(0.206)	(0.320)	(0.737)	(0.504)	(0.661)
Mother's education level	0.001	0.001	0.001	0.001[a]	0.001*
	(1.104)	(1.357)	(1.369)	(1.752)	(2.005)
Constant	8.215***	8.024***	8.120***	8.689***	8.669***
	(31.719)	(27.156)	(24.868)	(19.895)	(24.815)
Observations	399	356	354	356	354
R-squared	0.051	0.068	0.087	0.145	0.157
Enrollment Year controlled	NO	NO	YES	NO	YES
TVI controlled	NO	NO	NO	YES	YES

Source: *DTS Tracking Survey, 2015, World Bank. World Bank calculations.*
Note: *Robust t-statistics in parentheses. * p<0.1; ** p<0.05; *** p<0.01*

Table 1.2 Additional Employment Probability for the DTS, General Average HS Grade - Probit Estimate on Current Employment

VARIABLES	(1) Total	(2) Total	(3) Total	(4) Total	(5) Total
DTS dummy (=1, RP=0)		0.082**	0.062	0.042	0.039
		(2.053)	(1.539)	(1.014)	(0.934)
Standardized HS grade	0.039**	0.038**	0.042**	0.035*	0.121
	(2.165)	(2.043)	(2.225)	(1.792)	(1.255)
DTS * std. HS grade					−0.047
					(−1.183)
Years of schooling	0.003	0.002	0.002	−0.003	0.002
	(0.255)	(0.203)	(0.205)	(−0.236)	(0.137)
Work experience	0.000	0.002	0.001	0.005	0.006
	(0.071)	(0.503)	(0.291)	(1.191)	(1.240)
Work experience (squared)	−0.000	−0.000	−0.000	−0.000	−0.000
	(−0.183)	(−0.500)	(−0.343)	(−1.231)	(−1.231)
Female	−0.118***	−0.140***	−0.124***	−0.106**	−0.105**
	(−3.381)	(−3.599)	(−3.163)	(−2.465)	(−2.437)
Mother's education level	−0.002	−0.002*	−0.002**	−0.002**	−0.003**
	(−1.530)	(−1.836)	(−2.195)	(−1.994)	(−2.409)
Observations	840	745	742	745	742
Enrollment Year dummy	NO	NO	YES	NO	YES
TVI dummy	NO	NO	NO	YES	YES

Source: DTS Tracking Survey, 2015, World Bank. World Bank calculations.
*Note: z-statistics in parentheses. * p<0.1; ** p<0.05; *** p<0.01*

Table 1.3: Additional Employment Probability for the DTS, General Average HS grade - Probit Estimate on Employment Right after TVET

VARIABLES	(1) Total	(2) Total	(3) Total	(4) Total	(5) Total
DTS dummy (=1, RP=0)		0.073**	0.062*	0.078**	0.058
		(2.079)	(1.845)	(2.086)	(1.597)
Standardized HS grade	0.008	0.008	0.010	0.007	0.119
	(0.481)	(0.485)	(0.641)	(0.386)	(1.402)
DTS * std. HS grade					−0.030
					(−0.864)
Years of schooling	−0.005	−0.004	−0.021**	−0.007	−0.014
	(−0.521)	(−0.404)	(−2.251)	(−0.628)	(−1.340)
Work experience	−0.016***	−0.015***	−0.014***	−0.014***	−0.016***
	(−4.908)	(−4.269)	(−4.168)	(−3.785)	(−4.156)
Work experience (squared)	0.000***	0.000***	0.000***	0.000***	0.000***
	(3.069)	(2.840)	(2.758)	(2.598)	(2.655)
Female	−0.010	−0.047	−0.050	−0.059	−0.042
	(−0.308)	(−1.344)	(−1.558)	(−1.541)	(−1.131)
Mother's education level	−0.001	−0.001	−0.001	−0.001	−0.001
	(−1.257)	(−1.301)	(−1.407)	(−1.391)	(−1.233)
Observations	840	745	830	745	742
Enrollment Year dummy	NO	NO	YES	NO	YES
TVI dummy	NO	NO	NO	YES	YES

Source: DTS Tracking Survey, 2015, World Bank. World Bank calculations.
*Note: z-statistics in parentheses. * $p<0.1$; ** $p<0.05$; *** $p<0.01$.*

Table 1.4: Wage Premium (%) for the DTS, General Average HS Grade - OLS Estimate on Latest Salary

VARIABLES	(1) DTS	(3) DTS	(4) DTS	(5) DTS	(6) DTS	(7) DTS
Years of schooling	0.062**	0.045	0.052	0.057	0.049	0.049
	(2.331)	(0.799)	(1.164)	(1.173)	(0.872)	(1.106)
Standardized HS grade	0.029	0.027	−0.013	0.027	0.029	−0.006
	(0.667)	(0.542)	(−0.291)	(0.663)	(0.616)	(−0.120)
Work experience	0.007	0.008	0.018	0.011	0.012	0.022**
	(0.604)	(0.702)	(1.679)	(1.064)	(1.199)	(2.699)
Work experience (squared)	−0.000	−0.000	−0.000*	−0.000	−0.000	−0.000**
	(−0.960)	(−0.782)	(−1.933)	(−1.235)	(−1.288)	(−3.254)
Female	0.022	−0.113	0.008	−0.114	−0.124	−0.022
	(0.223)	(−1.281)	(0.076)	(−1.281)	(−1.817)	(−0.223)
Mother's educational level	0.001	0.001	0.001	0.001	0.001	0.001
	(1.030)	(1.547)	(1.268)	(1.849)	(1.532)	(1.257)
DTS implementation scheme dummy (1=Block release)		0.104				0.060
		(1.734)				(1.566)
Given training plan from TVI (1=yes)		0.019				0.049
		(0.257)				(0.803)
Weeks spent for in-school learning			0.003**			0.004**
			(3.391)			(3.119)
Weeks spent for in-company training			−0.002			−0.002
			(−1.235)			(−1.440)
Number of hours per week for in-company training			−0.011			−0.005
			(−0.447)			(−0.232)
Number of hours per week for in-company training (squared)			0.000			0.000
			(0.234)			(0.021)
How to learn work process - from supervisors				0.127		0.092
				(1.168)		(0.900)
How to learn work process - from peers				−0.013		−0.078
				(−0.128)		(−0.853)
How to learn work process - by yourself				−0.200		−0.193
				(−1.833)		(−1.728)
How to learn work process - from all				0.042		0.001
				(0.462)		(0.014)
Reported to TVI during in-company training (1=yes)					0.009	−0.035
					(0.181)	(−0.846)
Times visited TVI teacher during in-company training (1=yes)					−0.004	−0.003
					(−1.463)	(−1.655)
Constant	8.226***	8.612***	8.899***	8.277***	8.634***	8.696***
	(23.766)	(12.073)	(18.858)	(13.949)	(13.266)	(15.532)
Observations	397	192	192	206	189	189
R-squared	0.070	0.096	0.171	0.113	0.100	0.198
Enrollment Year dummy	YES	YES	YES	YES	YES	YES
School dummy	YES	YES	YES	YES	YES	YES

Source: DTS Tracking Survey, 2015, World Bank. World Bank calculations.
Note: Robust t-statistics in parentheses. * p<0.1; ** p<0.05; *** p<0.01.

Table 1.5: Additional Employment Probability for the DTS, General Average HS Grade - Probit Estimate on Current Employment Status

VARIABLES	(1) DTS	(3) DTS	(4) DTS	(5) DTS	(6) DTS	(7) DTS
Years of schooling	0.001	−0.028	−0.037**	−0.022	−0.025	−0.046***
	(0.019)	(0.018)	(0.018)	(0.016)	(0.016)	(0.015)
Standardized HS grade	0.040***	0.024	0.017	0.028	0.017	0.017
	(0.014)	(0.032)	(0.036)	(0.029)	(0.035)	(0.035)
Work experience	−0.000	−0.004	−0.005	−0.003	−0.005	−0.005
	(0.003)	(0.006)	(0.007)	(0.003)	(0.004)	(0.007)
Work experience (squared)	−0.000	0.000**	0.000*	0.000***	0.000***	0.000*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female	−0.114***	−0.154***	−0.142**	−0.156***	−0.148***	−0.113
	(0.023)	(0.029)	(0.059)	(0.041)	(0.038)	(0.074)
Mother's educational level	−0.002*	−0.002**	−0.002**	−0.001*	−0.003**	−0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
DTS implementation scheme dummy (1=Block release)		0.071				0.055
		(0.138)				(0.150)
Given training plan from TVI (1=yes)		−0.034				−0.019
		(0.067)				(0.060)
Weeks spent for in-school learning			0.001			0.001
			(0.003)			(0.002)
Weeks spent for in-company training			0.003***			0.002***
			(0.001)			(0.001)
Number of hours per week for in-company training			0.032***			0.029***
			(0.011)			(0.011)
Number of hours per week for in-company training (squared)			−0.000***			−0.000***
			(0.000)			(0.000)
How to learn work process - from supervisors				0.086		−0.040
				(0.093)		(0.112)
How to learn work process - from peers				−0.137		−0.204
				(0.125)		(0.144)
How to learn work process - by yourself				0.009		−0.010
				(0.158)		(0.118)
How to learn work process - from all				0.073		−0.018
				(0.088)		(0.077)
Reported to TVI during in-company training (1=yes)					0.021	0.022
					(0.039)	(0.039)
Times visited TVI teacher during in-company training (1=yes)					0.006**	0.002
					(0.003)	(0.002)
Observations	837	374	374	407	365	418

Source: DTS Tracking Survey, 2015, World Bank. World Bank calculations.
*Note: Standard errors in parentheses. * p<0.1; ** p<0.05; *** p<0.01*

Table 1.6: Additional Employment Probability for the DTS, General Average HS Grade - Probit Estimate on Employment Right after TVET

VARIABLES	(1) DTS	(2) DTS	(3) DTS	(4) DTS	(5) DTS	(6) DTS
Years of schooling	−0.014	−0.013	−0.016	−0.011	−0.016	−0.015
	(0.012)	(0.013)	(0.012)	(0.013)	(0.012)	(0.013)
Standardized HS grade	−0.003	−0.004	−0.010	0.006	−0.008	−0.014
	(0.017)	(0.019)	(0.025)	(0.021)	(0.018)	(0.029)
Work experience	−0.010***	−0.010***	−0.009*	0.010	−0.010***	−0.008*
	(0.003)	(0.003)	(0.005)	(0.009)	(0.004)	(0.005)
Work experience (squared)	0.000***	0.000***	0.000**	−0.001***	0.000***	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	−0.028	−0.042	−0.021	−0.014	−0.045	−0.025
	(0.040)	(0.037)	(0.041)	(0.043)	(0.035)	(0.044)
Mother's educational level	−0.003***	−0.003**	−0.003**	−0.003***	−0.003***	−0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
DTS implementation scheme dummy (1=Block release)		−0.050				−0.037
		(0.057)				(0.079)
Given training plan from TVI (1=yes)		0.031				0.040
		(0.045)				(0.044)
Weeks spent for in-school learning			0.001			0.001
			(0.002)			(0.002)
Weeks spent for in-company training			0.001			0.000
			(0.001)			(0.001)
Number of hours per week for in-company training			0.021**			0.021***
			(0.008)			(0.006)
Number of hours per week for in-company training (squared)			−0.000**			−0.000***
			(0.000)			(0.000)
How to learn work process - from supervisors				−0.048		−0.093
				(0.077)		(0.134)
How to learn work process - from peers				−0.074		−0.071
				(0.117)		(0.178)
How to learn work process - by yourself				−0.052		−0.092
				(0.096)		(0.073)
How to learn work process - from all				−0.019		−0.079
				(0.046)		(0.087)
Reported to TVI during in-company training (1=yes)					−0.015	−0.026
					(0.054)	(0.052)
Times visited TVI teacher during in-company training (1=yes)					0.001	0.001
					(0.002)	(0.002)
Observations	407	374	374	389	365	365

Source: DTS Tracking Survey, 2015, World Bank. World Bank calculations.
Note: Standard errors in parentheses. * p<0.1; ** p<0.05; *** p<0.01

Table 1.7: Institutional Cost to Deliver the DTS and RPs – Public Large TVI (PHP)

	2010		2011		2012		2013		2014	
	DTS	RP	DTS	RP	DTS	RP	DTS	RP	DTS	RP
Personnel	550,000	12,450,000	576,000	12,000,000	600,000	12,400,000	672,000	13,300,000	696,000	14,300,000
Non-personal	120,000	640,000	128,287	744,000	317,243	650,000	280,000	750,000	649,441	853,000
Materials and supplies	140,000	750,000	150,000	800,000	147,000	950,000	209,820	1,100,000	214,717	1,200,000
Maintenance	150,000	800,000	110,000	750,000	170,000	1,300,000	155,618	2,200,000	68,425	3,200,000
Administrative	72,000	216,000	90,000	300,000	120,000	310,000	140,000	400,000	170,000	600,000
Capital expenses	63,000	400,000	140,000	650,000	160,000	700,000	180,000	1,200,000	190,000	1,400,000
Contingencies	0	0	0	0	0	0	0	0	0	0
Total	1,337,050	18,942,575	1,374,005	18,009,876	1,623,599	17,833,589	1,571,339	18,544,000	1,658,112	18,216,291
Enrolled	499	1865	562	3,038	550	2,272	132	2,473	255	4,262
total per trainee	2,679	10,157	2,445	5,928	2,952	7,849	11,904	7,499	6,502	4,274
DTS/Non-DTS	0.3	—	0.4	—	0.4	—	1.6	—	1.5	—
personnel cost per trainee	1,102	6,676	1,025	3,950	1,091	5,458	5,091	5,378	2,729	3,355
DTS/Non-DTS	0.2	—	0.3	—	0.2	-	0.9	—	0.8	—
MMC per trainee	707	1,046	712	724	867	1,298	4,132	1,820	1,855	1,361
DTS/Non-DTS	0.7	—	1.0	—	0.7	—	2.3	—	1.4	-

Source: DTS Tracking Survey, 2015, World Bank. World Bank calculations.
Note:

	DTS	RP
Average per-trainee cost	5,297	7,141

MMC = Material/supplies, Maintenance, and Capital Expenses

Table 1.8: Institutional Cost to Deliver the DTS and RPs – Private Large TVI (PHP)

	2010		2011		2012		2013		2014	
	DTS	RP	DTS	RP	DTS	RP	DTS	RP	DTS	RP
Personnel	4,076,854	6,115,282	4,062,720	6,094,080	4,349,036	6,523,553	4,598,261	6,897,391	4,564,733	6,847,099
Non-personal	788,827	1,183,241	718,294	1,077,441	766,643	1,149,965	884,732	1,327,099	858,922	1,288,382
Materials and supplies	536,810	805,214	631,245	946,868	627,401	941,101	863,881	1,295,822	849,476	1,274,213
Maintenance	1,122,428	1,683,642	966,613	1,449,920	989,040	1,483,561	1,245,198	1,867,796	1,275,914	1,913,871
Administrative	2,416,143	3,624,215	2,678,024	4,017,035	2,761,933	4,142,900	2,490,532	3,735,799	2,289,950	3,434,925
Capital expenses	377,764	566,646	637,905	956,857	705,252	1,057,877	789,213	1,183,820	196,299	294,449
Contingencies	—	—	—	—	—	—	—	—	—	—
Total	11,520,334	17,280,502	11,374,233	17,061,350	11,078,754	16,618,130	10,588,509	15,882,765	8,543,849	12,815,771
Enrolled	398	682	455	695	478	702	694	551	638	520
Total per trainee	28,946	25,338	24,998	24,549	23,177	23,673	15,257	28,825	13,392	24,646
DTS/Non-DTS	1.1	—	1.0	—	1.0	—	0.5	—	0.5	—
Personnel cost per trainee	10,243	8,967	8,929	8,768	9,098	9,293	6,626	12,518	7,155	13,167
DTS/Non-DTS	1.1	—	1.0	—	1.0	—	0.5	—	0.5	—
MMC per trainee	5,118	4,480	4,914	4,825	4,857	4,961	4,176	7,890	3,639	6,697
DTS/Non-DTS	1.1	—	1.0	—	1.0	—	0.5	—	0.5	—

Source: DTS Tracking Survey, 2015, World Bank. World Bank calculations.
Note:

	DTS	RP
Average per-trainee cost	21,154	25,406

MMC = Material/supplies, Maintenance, and Capital Expenses