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RESEARCH ARTICLE

Vocational Education and Training (TVET) and Its Impact on the Employment Prospects of the ALS Graduates

Martha Joy J. Abing
MSU-Iligan Institute of Technology
marthajoy.abing@g.msuiit.edu.ph

Mitzie Irene P. Conchada
De La Salle University, Manila, Philippines

The pressure for technical-vocational education and training to deliver skilled and competent laborers has become a major concern in the labor market. As such, the strong desire to explore the effectiveness of TVET's skills training programs remains. There is limited literature on the employability of the alternative learning system graduates in comparison to those graduates of the ALS program who did not pursue TVET. Using the dataset of the World Bank STEP Skills Measurement Household Survey for the Philippines, 2015-2016, this study seeks to determine whether completing TVET has significantly increased the employability of ALS graduates. Utilizing the method of propensity score matching, this study finds that ALS graduates who completed TVET are 26% more likely to be employed compared to those ALS graduates with no TVET. This positive and significant effect of TVET on employment to ALS graduates who completed TVET is validated by the use of coarsened exact matching (CEM) and fixed effect regression model, highlighting the robustness and reliability of the study's methodology. Hence, this study concludes that TVET in the Philippines plays a significant role in promoting employability among ALS graduates.

Keywords: TVET, ALS, employment, impact evaluation

JEL Classifications: I25, JO1, J21

Human capital is deemed vital in a dynamic society and economy. It allows countries to remain competitive and relevant to the growing demands of the global economy. Given its importance, there is a need to prioritize human capital investment. The literature on human capital theory is based on the seminal work of Becker (1962), who, according to Leuven (2005), viewed training as an investment.

Investing in human capital aims to increase productivity, but this comes with a cost.Investing in human capital is crucial for economic growth and development, especially for a developing country such

as the Philippines. Therefore, more resources should be directed toward programs on training-specific knowledge and skills. Technical Vocational Education and Training (TVET) provides opportunities for individuals to be equipped with practical and specific skills. Recognizing this, the government has intensified efforts in recent years to strengthen and refine these programs, making them more attuned to the needs of the workforce and more effective in addressing the country's high levels of unemployment and underemployment rates.

This study seeks to evaluate the impact of TVET in wider measures by integrating into the analysis the effect of TVET on the Alternative Learning System (ALS) graduates on their employability skills, which is manifested in employment. Limited literature has shown empirical evidence that measures the employability skills of the ALS graduates with TVET completion in comparison to those graduates of the ALS program who did not pursue TVET, when in fact both groups actually have similar backgrounds of completing basic education, which is through an alternative learning system. The ALS is a second-chance education program that empowers out-of-school learners to continue their education and improve their quality of life by eventually becoming employed. In this context, the success of TVET is measured by employment. This study aims to address this gap and provide empirical evidence on the impact of TVET on the employability skills of ALS graduates.

Specifically, this study investigates how graduates of TVET, who went through the ALS program, progressed to be absorbed into the workforce. This study presupposes that completing TVET improves employability compared to those who only completed ALS. Thus, this study tries to answer the question: Does TVET lead to an increase in the employability of ALS graduates?

The study is divided into the following sections. The next section discusses the methodology, which consists of the underlying framework of the theory of change and method of estimation such as the propensity score matching, coarsened exact matching, and fixed effect regression model. The third section covers the results and analysis. The last section summarizes the study and provides policy recommendations.

Literature Review

Several studies have examined the role of TVET in enhancing the employability of its graduates, with a focus on young recipients of TVET, types of Technical Education and Skills Development Authority (TESDA) scholars, modalities of TESDA training programs, and specific educational levels. For instance, Vandenberg and Laranjo (2020) revealed that TVET has a stronger positive impact on TVET graduates than on those who have only completed secondary level or lower education. Similarly, Orbeta and Abrigo (2012) found that TESDA scholars, particularly those under the Private Education Student Financial Assistance (PESFA) program, have a higher likelihood of being employed compared to non-PESFA TVET scholars. However, the study also revealed no significant effect between the Training for Work Scholarship Program (TWSP) scholars and employment, which is unexpected given that TWSP was designed to address the problem of frictional unemployment in the Philippines. According to TESDA (2018), one possible reason why this happens is the mismatch of skills and training acquired by the TWSP scholars and the skills required by industries, which is also a common issue for other training programs that fail to achieve their employment targets.

The impact of TVET on the employability of young Filipinos aged 15–24 was explored by a study conducted by the Asian Development Bank (ADB) in 2021. The findings suggest that enterprise-based TVET programs have a higher likelihood of providing job opportunities compared to community-based or mobile training programs. Additionally, TVET graduates with higher educational backgrounds have a higher likelihood of securing employment in the country. Meanwhile, according to TVET (2018), TVET graduates in the dual training system and enterprise-based training demonstrate a higher employment rate. Moreover, a logistic model for employability concluded that older age, male sex, and higher educational attainment are statistically significant factors that can affect the employability status of graduates.

Meanwhile, Chen and Chindarkar (2017) and Popescu and Roman (2018) studied the impact of vocational training on employability in rural areas in India and urban areas in Romania, respectively. Both studies found that women who participated in vocational training had a higher likelihood of finding

employment outside household farms and earning more. However, Popescu and Roman (2018) also found that female trainees who were 25 years old had fewer chances of being employed, whereas Lee et al. (2019) reported a positive impact of vocational training programs on employment for older women in South Korea. On the other hand, Alnıaçık et al. (2019) suggested that women may be more likely to leave the labor market after finishing vocational training due to their child-bearing roles and homemaking responsibilities. As a result, the statistically significant factor of male sex in explaining employment status may be related to this phenomenon.

The positive impact of TVET on employment in the Philippines is also similar to some studies abroad. For instance, the study conducted by Nuri et al. (2012) and Zegarra et al. (2018) in Bangladesh and Peru. Nuri et al. (2012) found that vocational training programs have positively increased the employment rate among unemployed individuals with physical disabilities in Bangladesh. In particular, the program that is considered the most effective in terms of employment rate is the garment operator because all participants are able to find full-time employment, whereas the computer training program provides the lowest employment rate to its participants. Zegarra et al. (2018) showed similar results, particularly for women, in that training increases women's participation in the labor and financial market in Peru. Likewise, Malkan (2009) concluded that VET programs in India have shown a positive performance in preparing their graduates for the needs of industries and businesses because of their positive effect on employment.

Meanwhile, mixed results were found in the studies of Card et al. (2011), Rotar (2012), and Lechner et al. (2011) that compared and evaluated the short- and long-run effect of the training program on a particular group of trainees. Specifically, Card et al. (2011) found no significant impact on employment among the youth trainees undergoing 350 hours of training from those interns in private businesses in the Dominican Republic. Rotar (2012), on the other hand, examined the institutional training program among youth in Slovenia in terms of their reemployment probabilities by using the methods of propensity score matching and the two-step Hechman procedure to estimate the treatment effect. Using PSM analysis, it is found that the institutional training program is positively and statistically significant at 5% level in the short- and long- run periods as compared to the results obtained from the Heckman procedure. However, a significant decline in spite of its positive effect on employment probabilities among the program beneficiaries, occurs in the long run. As explained by Rotar (2012), the courses offered in the training may not fit the employer's requirements in the long run, which will result in a decreasing possibility of employment among the beneficiaries in the long run.

Similar to the method of estimator used by Rotar (2012) and Popescu and Roman (2018), which is the PSM, Lechner et al. (2011) also estimated the short-, medium-, and long- run impact of the different government-sponsored training programs in Germany on the individual's employment, unemployment, and earnings. The intensity of the training program determines the duration of the program. For example, if the program has shorter and less training, then it is classified as a short-term or medium-term program; it is a long-term program if it has substantial and comprehensive training to reduce unemployment.

The findings of this study were consistent with the findings of Rotar (2012), who concluded that the least and most intense training program types have positive short and long-run effects on employment and earnings. However, that positive effect is more prevalent in the shorter programs than in the longer ones. Findings of these studies are similar to the study of Aksoy (1998), who concluded that education and training can be important factors for hiring, but differ in job levels. For example, high school level, which is equivalent to short time training, may be hired in basic or low-level market jobs, whereas higher educational degree levels are more likely to be hired than vocational education because of their specialized skills and knowledge that is learned in the long term.

Other studies that showed no significance between vocational training are the studies of Brunelle and Rocco (2017) and Lee (2019). In particular, Brunelle and Rocco (2017) analyzed the impact of VET on the employment status of individuals (either currently employed or not) by comparing its effects on different treated groups by educational attainment, namely those who are in ISCED level 3 (upper secondary), ISCED level 4 (post-secondary non-tertiary education), and ISCED 5 (short-cycle tertiary education). Findings depicted that VET in upper secondary and post-secondary education have an insignificantly higher probability of being currently employed than those

who are in academic education. The probability of getting jobs among those enrolled in VET is reinforced by their first job. Meanwhile, at ISCED level 5, it was found that VET has a significantly lower probability of being currently employed than those who are in academic education. This study also revealed that older age groups with VET tend to lose their employment advantage more than those who are in academic education. When compared to sex, females with vocational VET tend to have a bigger disadvantage in being employed than those with academic education. This opposes the study of TESDA (2018) on age and Popescu and Roman (2018) on the sex of TVET participants.

The studies of Richardon and van den Berg (2002), Forster et al. (2016), International Labour Organization (2004), and Oswald-egg and Renold (2021) implied favorable effects of TVET on faster time of finding jobs or being employed. Specifically, Oswald-egg and Renold (2021) estimated the effect of higher education graduates with work experience from VET on labor market entry. The study revealed that significantly less time is spent searching for a first job (about 2 months) after graduation from higher education (HE) with working experience from VET, which is prevalent in dual training programs. This result implied that VET brings a good start among beneficiaries, even after higher education.

In conclusion, the studies mentioned above show the potential benefits of TVET on the employability of their graduates. However, this study adds a new perspective by examining the impact of TVET on ALS graduates in urban Philippines. The study aims to assess whether pursuing and graduating from TVET after completing ALS significantly enhances employability outcomes.

Theoretical Framework

The theory of change is a framework utilized in impact evaluation research to serve as a valuable tool in expressing the underlying assumptions and causal pathways of a program or intervention. By outlining the anticipated inputs, activities, outputs, outcomes, and impact of a program, the theory of change offers a clear roadmap for evaluating the effectiveness of the program or TVET (Blamery & Mackenzie, 2007). A well-defined theory of change can help explain how TVET program is expected to improve employability outcomes for ALS graduates.

Before completing their technical vocational education and training, ALS graduates faced difficulties in finding employment due to their lack of essential skills required in the job market. Additionally, their limited financial resources hindered their ability to pursue higher education for acquiring and enhancing employability skills. However, with the introduction of TVET, ALS graduates who were unable to proceed to higher education were given an opportunity to acquire new knowledge and skills required in various economic sectors. Consequently, ALS graduates who completed TVET have better employability skills compared to those without TVET. Notably, the completion of the TVET program significantly increases the likelihood of ALS graduates securing employment, as depicted in the schematic diagram presented in Figure 1.

Figure 1 illustrates the positive impact of TVET on the employability skills of ALS graduates who completed the program. It presents the performance and success indicators of TVET, which are categorized into four parts: input, activity, output, and expected outcome. The input and activity parts refer to the strategies and resources utilized in the program implementation, including the students, teachers, staff, administrators, monetary funds, training period, and TVET training centers. The success of these inputs is measured by the ALS graduates' pursuit of TVET after completion, as this is the main focus of the study. The implementation of budget allocation, involvement of trainers, staff and administrators, training period, and training centers are essential indicators of success.

The activity part refers to the TVET program itself. In this study, TVET graduates are defined as ALS graduates who pursued and completed post-secondary technical and vocational education in a formal educational institution. The output of TVET is an increased number of enrollees in the program. The expected outcome is that ALS graduates who completed TVET are more likely to increase their employability skills, as reflected in their employment status, compared to those who did not pursue TVET.

In this study, economic theories were utilized to support the positive economic returns of higher education and training on employment outcomes. One theory is the human capital theory of Becker (1962), which serves as the foundation for all economic theories related to training (Leuven, 2005). The theory

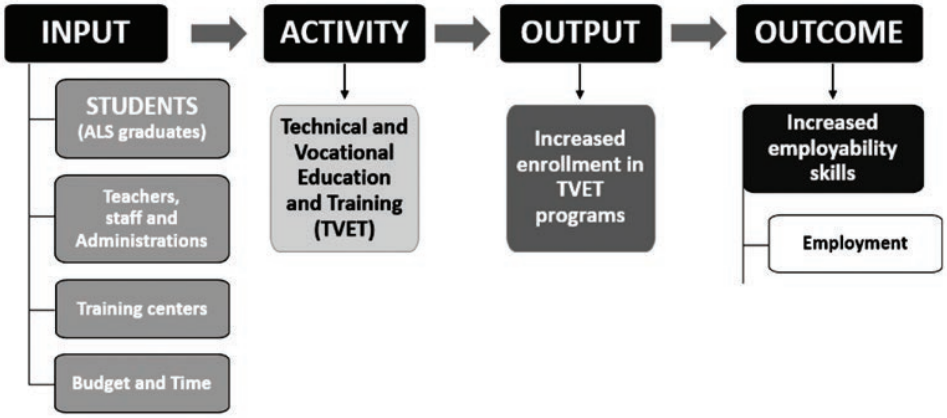

Figure 1
Schematic Diagram of the Theory of Change

suggests that training programs have a significant positive effect on employment for individuals who participate in them. Trained individuals are more productive and can contribute more to a firm's marginal revenue, making them more attractive to employers. Similarly, search and match theory suggests that job seekers who undergo training are more valuable in the labor market, increasing their likelihood of being hired or matched to job vacancies compared to those without training (Crépon et al., 2013).

Methodology

Method of Estimation

This study examined the influence of TVET on the employment outcomes of ALS graduates. To compare the employability of ALS graduates with and without TVET, the study employed three methods: propensity score matching (PSM), coarsened exact matching (CEM), and the fixed effect regression model. These methods were utilized to address the issue of selection bias that may arise from the non-random assignment of individuals to TVET. PSM calculates the probability of program assignment based on observed factors, whereas CEM matches ALS graduates with and without TVET through exact covariate matching. Both methods require ALS graduates with similar observed characteristics prior to enrolling in TVET. Additionally, the fixed effect model was employed to estimate the relationship between an outcome and explanatory variables such as age, gender, sex, household size, civil status, and a fixed effect dummy variable of geographical location or region.

Empirical Model

Probit Model

In Equation 1, the probability regression model of the study is presented, which aims to reveal the likelihood of an ALS graduate enrolling in and successfully completing TVET based on the treatment outcome of employment.

$$P_i = \beta X_0 + \beta A_i + \beta S_i - \beta H.size_i - \beta C.stat_i - \beta Reg_i + \varepsilon_i \quad (1)$$

where P_i is the probability of an ALS graduate to complete in TVET; X_0 is a constant variable; A_i is the age of the beneficiary measured in years from 18 to 64 of age; S_i is the sex of the beneficiary, 1 male, 0 for female; $H.size_i$ is the household size or household listing measured in numbers; $C.stat_i$ is the civil status of the beneficiary, which is dummied by a variable who has a spouse, 1 has a spouse, 0 otherwise; and Reg_i is the region categorical variable that categorizes individuals based on their geographical location, using the National Capital Region (NCR) as the base category because it is the most highly urbanized. The hypothesis suggests that age and being male have a positive association with TVET, indicating that as individuals grow older, their likelihood of completing TVET also increases. Male individuals are more likely than females to enroll in and successfully complete TVET. A larger household size is associated with a lower probability of completing TVET. Individuals who have a spouse are less likely to graduate from

TVET compared to those without a spouse. Finally, individuals residing in less urbanized regions have a lower likelihood of pursuing and completing TVET than those residing in highly urbanized regions such as NCR.

Outcome Model

In addition to TVET, this study incorporated control variables such as age, sex, household size, marital status, and region. These variables were selected based on previous empirical studies on program evaluations, indicating their significant influence in explaining the employability skill outcomes, specifically in terms of employment. Equation 2 presents the statistical regression model that demonstrates the impact of TVET on the employability outcomes of ALS graduates who have successfully completed the program, with a specific focus on employment.

$$Y_i = \beta X_0 + \beta T_i + \beta A_i + \beta S_i - \beta H.size_i - \beta C.stat_i - \beta Reg_i + \varepsilon_i \quad (2)$$

where Y_i is the employability outcome measured in terms of employment 1 employed 0 otherwise, the independent or explanatory variables; T_i is a binary treatment variable, 1 ALS graduates with TVET completion and 0 otherwise; A_i is age; S_i is the sex of the beneficiary; H_i is the household size; C_i is the civil status of the beneficiary; Reg is the region, a dummy fixed variable and is a categorical variable using NCR as the baseline variable; and e_i is the error term that captures unobserved characteristics.

The prediction is that there is a positive relationship between TVET and employment, indicating that ALS graduates who have completed TVET are more likely to be employed compared to those who have only finished ALS without pursuing TVET. Furthermore, it is anticipated that age and being male will have a positive association with employment outcomes, suggesting that older individuals and males are more likely to find employment. On the other hand, individuals with spouses, larger household sizes, and those residing in less urbanized regions are expected to have a lower likelihood of securing employment.

Data

The cross-sectional secondary data utilized in this study was obtained from the 2015–2016 World Bank Skills Towards Employment and Productivity (STEP) Skills Measurement Household Survey specifically focused on the Philippines. Its sample population focused mainly on those non-institutionalized Filipino individuals aged 18 to 64 who were living in urban areas in the country at the time the survey was conducted. However, due to data availability, this study only covered the regions of Ilocos (R-1), Cagayan Valley (R-II), Central Luzon (R-III), CALABARZON (R-IVA), Bicol (R-V), Western Visayas (R-VI), Zamboanga Peninsula (R-IX), Northern Mindanao (R-X), Davao (R-XI), SOCCSKSARGEN (R-II), CARAGA (R-XIII), Cordillera Administrative Region (CAR), and National Capital Region (NCR).

Results and Discussion

Summary of Statistics of the Sample

Among the total of 650 observations, it was discovered that 36.2% were employed individuals, whereas 31% were ALS graduates who had completed TVET. On average, the individuals in the sample were 39 years old with a household size of eight members. The mean percentage of individuals living in each region was found to be 9.6%.

Furthermore, when comparing the mean differences between ALS graduates who pursued and completed TVET and those without TVET, it was observed that, on average, a higher proportion of ALS graduates with TVET completion (55.4%) were employed compared to ALS graduates without TVET (27.5%). ALS graduates who completed TVET were also, on average, one year older than ALS graduates without TVET. Both groups had an average household size of eight members. The majority of ALS graduates without TVET were males, whereas the proportion of males among ALS graduates with TVET completion was lower. Additionally, both groups had a higher percentage of individuals with a spouse compared to those without a spouse. In terms of regional distribution, ALS graduates with TVET completion were found to have an average representation of 2.7% in each region, whereas ALS graduates without TVET had an average representation of 2.6% in each region.

Covariate

An important finding, as shown in Table 1, emerged from the study: age, sex, civil status, and household size do not have a significant impact on the likelihood

of an ALS graduate pursuing and completing TVET. Instead, it was discovered that other factor, such as the geographic location or "region" of individuals, play a crucial role in influencing their pursuit and completion of the program, holding other variables constant.

Table 1. *Factors Influencing the Likelihood of ALS Graduates Pursuing and Completing TVET Programs*

TVET	Coef.	Std. Err.	Expected Sign
Sex_male1	-0.042	0.110	+
Age	0.008	0.005	+
hh_size	0.007	0.011	-
Civil status_ has_spouse1	0.132	0.110	-
region_1	-0.285	0.302	-
region_2	0.091	0.347	
region_3	-0.337*	0.181	-
region_4	-0.462***	0.162	-
region_5	0.1241***	0.247	-
region_6	-0.204	0.242	-
region_9	0.929***	0.319	-
region_10	0.375	0.245	-
region_11	0.329	0.249	-
region_12	0.198	0.229	-

*Level of significance of the p-value: ***1%, **5%, *10%*

Specifically, individuals residing in Regions III, IV, V, and IX exhibit varying influences on their completion in TVET compared to those in NCR, which serves as the reference category.

For instance, ALS graduates from Regions III and IV are found to be less likely to pursue and complete TVET compared to those in highly urbanized region, such as NCR. This may be attributed to limited opportunities to study TVET, as a significant number of TVET programs were closed in these regions (TESDA, 2015). This finding aligns with previous research by Strand (2014) and Berrington et al. (2016), which suggest that limited resources and restricted access to information may discourage individuals from actively pursuing training and education opportunities.

Whereas, the positive coefficients for Regions V and IX indicate that ALS graduates in these regions are more likely to complete TVET than those in NCR. This may reflect the impact of strengthened linkages and partnerships between TESDA and State universities and colleges in Region IX, among other entities, as providers of TVET training or assessment centers, particularly benefiting marginalized groups (TESDA, 2016).

Surprisingly, although sex and civil status are found to be insignificant factors in explaining the likelihood of an ALS graduate completing TVET, the study's hypothesis regarding these factors was challenged. Contrary to expectations, females and individuals with spouses are actually more likely to enroll in and complete TVET, suggesting a deviation from the anticipated male bias. This unexpected outcome suggests that there may be specific training programs that are better suited for females, indicating the need for tailored approaches. Alternatively, individuals with spouses may be motivated by the desire to secure improved career opportunities.

These findings provide two important implications: first, expanding TVET programs and strengthening collaborations with institutions, such as academic partners, across other regions may increase access and completion rates in TVET programs; second, addressing gender equality issues through targeted training initiatives could empower more women to enter the labor market. Together, these measures may enhance employment opportunities for ALS graduates.

Common Support

The common support, or overlap condition, is one of the key assumptions underlying propensity score matching (PSM) methodology (Heinrich, et al., 2010; Rosenbaum & Rubin, 1983). It ensures that every individual has a positive probability of being assigned to either the treatment or control group. Figure 2 presents compelling evidence supporting this assumption by displaying the estimated density of the probability of receiving each treatment level. The red line represents the treatment group, whereas the blue line represents the untreated group. Importantly, the graph demonstrates that none of the estimates exhibit excessive concentration near 0 or 1. Instead, the predicted probability densities of both groups largely overlap, indicating substantial common support between them. This finding strongly indicates that the overlap assumption is not violated.

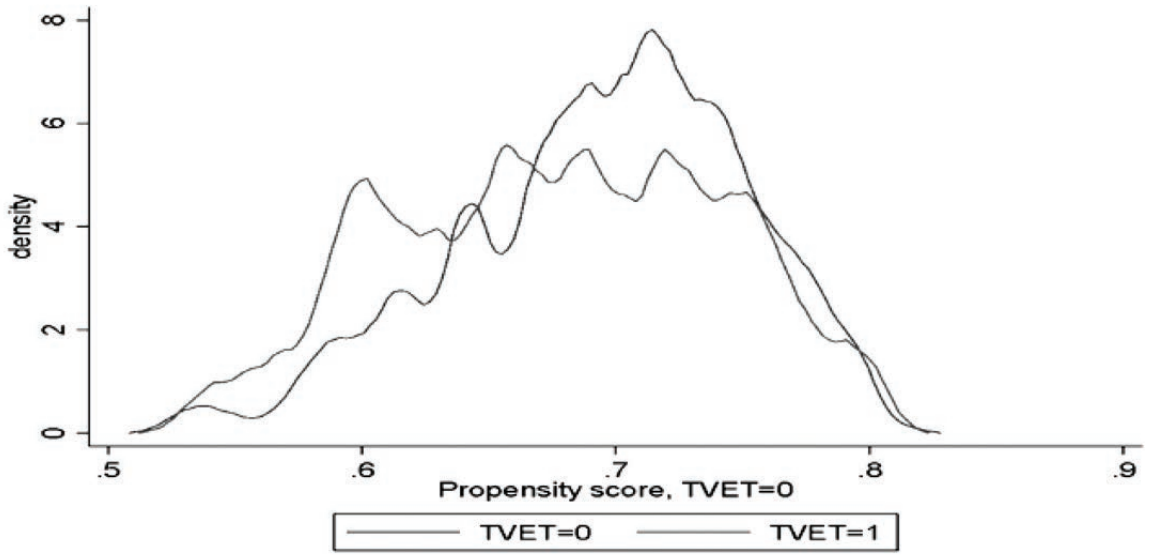

Figure 2
Overlap Plot

Balance Test

Maintaining balanced covariates is crucial in this study as it ensures that the distributions of the covariates are comparable across different treatment levels. This balance is essential because it reduces the likelihood of biased treatment effect estimates. Biased estimates can potentially mislead the conclusions drawn about the effectiveness of the program. By emphasizing the importance of balanced covariates, this study ensures the robustness of the analysis and the reliability of the treatment effect estimates, thereby providing valuable insights into the program's effectiveness.

Estimated Impact of TVET on Employment

The findings from the analysis are summarized in Table 2, which displays the average treatment effect (ATE) and average treatment effect of the treated (ATET) estimates based on the matching techniques used. The result shows that completing TVET significantly increases the likelihood of employment for ALS graduates by 25.7% to 26.2% compared to those who have not completed TVET. The study also found that TVET has a positive impact on employment among the ALS graduates with an increase of 29% to 30.7%. These findings are validated by the use of CEM and fixed effects techniques.

Table 2. *Estimated Impact of TVET on Employment*

	Matching Technique		
	Nearest Neighbor	Caliper bwidth (0.1)	Kernel bwidth (0.001)
ATE	0.262*** (0.048)	0.262*** (0.048)	0.257*** (0.047)
ATET	0.307*** (0.051)	0.307*** (0.059)	0.290*** (0.046)

The standard error is in parenthesis.
*Level of significance of the p-value: ***1%, **5%, *10%*

These findings provide important insights into the value of TVET for ALS graduates and shows its significant positive impact on their employment prospects. It implies the following key points: First, in the face of the high demand for skilled labor, TVET effectively fulfills its objective of producing employable skilled workers, making investment in human capital through TVET worthwhile.

Second, introducing TVET to unemployed individuals or those seeking employment can enhance their chances of finding a job, underscoring TVET's potential to address issues of unemployment and underemployment. Third, technical and vocational training significantly enhances the employability and functionality of ALS graduates in the labor

market compared to those who do not pursue TVET, emphasizing the importance of TVET in equipping individuals with the necessary skills and knowledge for the job market. Fourth, through skills development programs, TVET can contribute to achieving inclusive growth by providing education and employment opportunities for individuals who may lack access to higher levels of education, thereby promoting social mobility and reducing labor market inequalities.

In addition, using the fixed effect regression, the study reveals that male individuals have a higher likelihood of employment compared to their female counterparts, suggesting sex bias favoring males in employment. This result is consistent with previous research by Becker (1962), González et al. (2019), and Cools et al. (2017), which suggest that this may be due to the perceived higher productivity of this group in the workforce**.**

Conclusion

This study aims to determine the impact of TVET on employment outcomes through the methods propensity score matching, coarsened exact matching, and fixed effect regression model. Results reveal that TVET leads to an increase in employability for ALS graduates. TVET increases the likelihood of being employed between 25% to 28%.

Based on this analysis, TVET proves to be a strong and effective tool in equipping graduates with the necessary skills and competencies needed to be employed. This is a compelling reason for the government to continue promoting TVET programs, especially for ALS graduates. Additionally, it was found that geographical location plays a crucial role in influencing the completion rates in TVET programs.

Therefore, this study recommends that local government units, particularly in regions with low TVET participation, should work hand in hand with the Department of Education and TVET providers in supporting ALS graduates, as well as out-of-school youths, to pursue TVET programs. Considering the significant effect of TVET on ALS graduates, there should also be a follow-up effort to place ALS graduates in TVET programs through government scholarships and private-public partnerships to offer scholarships. Lastly, further research could focus on women's participation in TVET.

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