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Urban/rural disparities in the wage effect of additional vocational education after formal education: the case of the Philippines

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ABSTRACT
The aim of this study is to investigate and compare rural and urban returns to additional vocational education after completing formal education in the Philippines. We estimate the returns to additional vocational education after formal education in formal employment and also rural/urban disparities for each industry sector. The investigation of the wage effect is based on the Mincerian Earnings Function, initially using OLS estimations and then correcting for sample selection bias using the Heckman method. Preliminary findings confirm that the wage effect is associated with additional vocational education for those completing secondary education, and the effect is more pronounced in rural than in urban areas. Thus, our principal finding is that vocational education is potentially more useful in rural areas, especially for those completing secondary education in the Philippines and especially considering that only about 6% of the workforce has completed any vocational education.

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Technical and Vocational Education and Training (TVET); rate of return to education (ROR); wage effects; Philippines

1. Introduction

Beliefs vary about the impact of vocational education on poverty reduction in developing countries; with many human capital economists linking it to potential national GDP growth (Becker, 1962; Mincer, 1974; Schultz, 1961). There are many disagreements about vocational education's effect on individuals' work transitions in the labor market, including its effect on wages, decent jobs and so on. There are also both positive and negative impacts on national GDP growth. Vocational education in developed countries has largely been neglected because it had a negative effect on labor market outcomes, both in terms of decent jobs and in terms of wages compared to general education, though recent evidence is quite scarce (Burgess, 2016; Carbonaro, 2005; Gunderson & Oreopoulos, 2010; Krueger & Kumar, 2004; Patrinos & Psacharopoulos, 2020; Psacharopoulos, 1987). There is also almost no research on whether it is better to deliver vocational education in the same schools as academic education or in separate schools (Burgess, 2016). On the other hand, some studies show the positive effect of vocational education because it is more directly linked to specific employment

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opportunities than is general education (Hanushek et al., 2017; Ryan, 2001; Zimmermann et al., 2013) and also that vocational education is normally as effective as apprenticeships (Ryan, 1998), though the returns to apprenticeships depend heavily on specific contexts (Ryan, 1998; Wolter & Ryan, 2011) and apprenticeships can also improve educational outcomes, as in Brazil (Corseuil et al., 2019). Studies of vocational education in developing countries, especially in Africa, also show its positive effects on wages and/or employment (Choi, 2016; Field et al., 2019; Kahyarara & Teal, 2007; Söderbom et al., 2006); the limited number of studies of apprenticeships in developing countries also show some positive effects, as in Brazil (Corseuil et al., 2019).

Rutkowski (2015) revealed that a major issue in the Philippines is low-quality employment in the informal sector, especially in agriculture in rural areas. Rural areas also have a high risk of low income and unstable job status, because of their high rate of underemployment and relative lack of full secondary education completion, resulting in much more persistent poverty than in urban areas. However, workers with mid-level vocational skills are much less likely to be poor than those without such skills, as their skills are better matched to the demand side of the labor market, especially among rural youth. UN Sustainable Development Goal (SDG) 4 also expanded the international definition of quality education to 'achieve the goal of universal primary and secondary education, affordable vocational training, access to higher education and more.[1]' Consistent with this SDG concept, the Technical Education and Skills Development Authority (TESDA), one of the Philippine government institutes responsible for vocational education and training under the Department of Labor and Empowerment (DOLE), issued a new mid-term plan (the 4th cycle of the National Technical Education and Skills Development Plan (NTESDP) 2018–2022) which includes as a main theme: 'vibrant quality Technical and Vocational Education and Training (TVET) for decent work, especially for middle level manpower and sustainable inclusive growth.'

Despite persistent efforts to develop TVET in the Philippines, there are few studies that evaluate TVET's effects on the main labor market outcomes, and none that consider TVET's effects on urban/rural areas separately, though this would be useful to help resolve how to reduce rural poverty. In recent years, the Philippines' Labor Force Survey (LFS) has started to provide much detailed information at each level of education for each individual, including labor market status, etc. Prior studies by Choi (2016) and Olfindo (2018) examined the wage effects of vocational education in the Philippines with differing and inconclusive results, in part because they used different years of LFS, 2014/2015 and different estimation techniques. However, those studies did not look into rural/urban differences among TVET providers and receivers, despite there being a plan to overcome the poverty gap in rural areas through TVET.

The main purpose of this study is to evaluate the wage effect of additional vocational education after completing each level of formal education, and to compare this effect between urban and rural areas of the Philippines. This involves separate scrutiny of urban and rural areas. To identify the wage effect, this study applies both ordinary least squares (OLS) and Heckman methods, the latter to reduce the data selection issue in the results of the 2014 Labor force Survey (LFS) data.

The rest of this paper is organized as follows: Section 2 outlines the basic features of vocational education in the Philippines; Section 3 introduces the cross-sectional data using the 2014 nationwide labor force survey; Section 4 specifies the models for two econometric methodologies and their empirical implementation based on the earnings function, including

discussing its limitations; Section 5 presents the results of each model; and the final Section 6 presents conclusions.

2. Overview of vocational education in the Philippines

The Philippines' formal education system only includes a few vocational courses, mainly at the post-secondary level. Most vocational education is non-formal and most is at the post-secondary non-degree level. Thirteen years of formal K-12 education have been required since 2011, when senior high school was made compulsory (Figure 1). Day care centers and kindergartens are regulated by the Early Childhood Care and Development Council (ECCD Council), primary and secondary schools by the Department of Education (DepEd), and higher education by the Commission on Higher Education (CHED).

Vocational education is the main component of non-formal education, though this category also includes all education that leads to specific learning outcomes for specific groups, such as out-of-school youth or adult illiterates who did not have a formal education. TESDA has the authority to regulate TVET institutions in both the private and the public sectors. TESDA is responsible for job identification and training and for matching

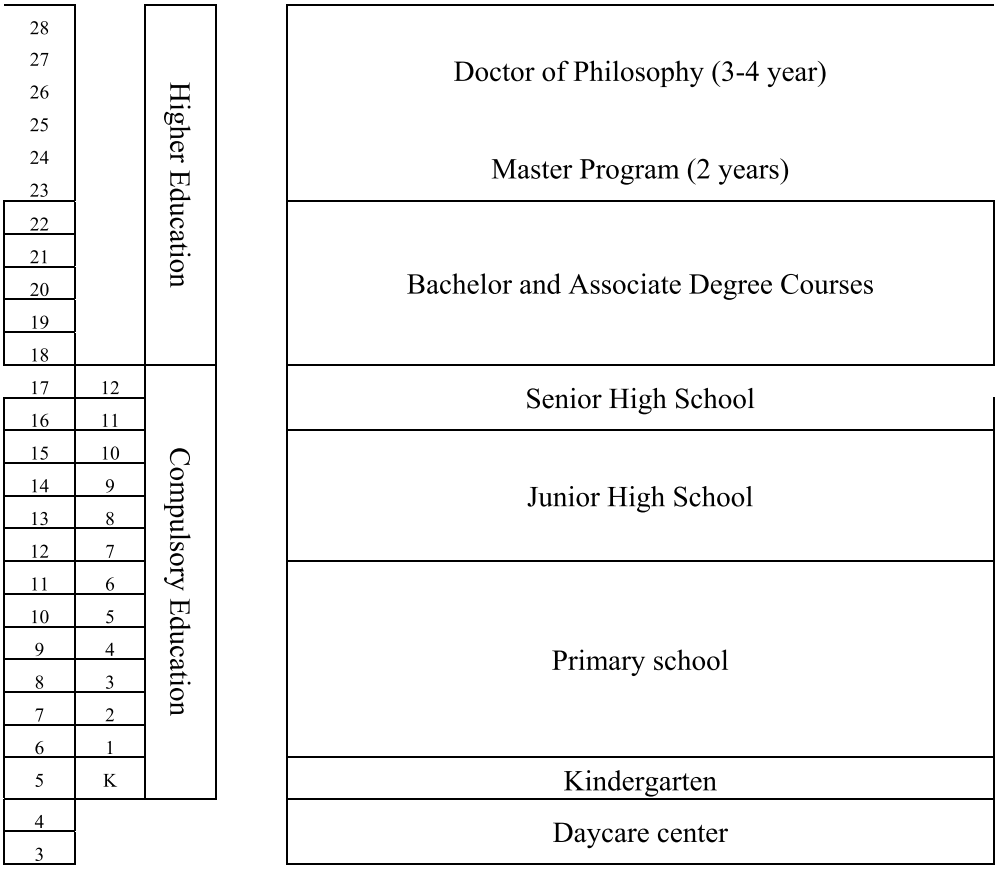

Figure 1. The National Formal Education System in the Philippines. *Source: Created by Author based on* Unesco IBE (2011)

trained people to jobs and also for helping develop people who work for micro-businesses and SMEs. TESDA's main goal is to develop the middle-level workforce by guiding all stakeholders, including government, industry, academia, local and international organizations, students, and the general public. It also formulates manpower skills plans, sets skills standards and tests, coordinates and monitors manpower policies and programs, and provides guidelines for resource allocation. In all this, the main purpose of TVET in the Philippines is to improve the skills and job prospects of low skilled workers, most of whom have completed secondary education, and so reduce unemployment by better matching their skills to industry's needs.

TVET courses are delivered by TVET institutions, in communities and in enterprises. Enterprise-based TVET is relatively uncommon compared to the other two modes (Figure 2), and there is therefore likely not much continuous training but rather mainly specific courses. TVET courses vary in length from a few weeks to three years, the latter being the few formal degree courses (Unesco IBE, 2011). Most of those taking TVET courses do so in roughly equal numbers in both institution-based and community-based courses, while fewer than 5% take enterprise-based courses. Yet more than 50% (9,664 out of a total of 18,347) of all TVET programs are in the following urban areas: NCR (capital city), III, IV-A, X, XII (International Labour Organization, 2016) .[2] Almost 4 million people (5.7% of those aged over 15 in the Philippines in 2017), have taken a TVET course and more than half of them are in the service sector, with about a quarter (23%) in tourism (TESDA, 2018). This relatively low percentage is because most TVET courses charge fees and only about 24% of those taking them obtain scholarships, even though almost half of vocational education financing in the Philippines is by the public sector (TESDA, 2015; UNESCO-UNEVOC, 2019). Almost all of those who have taken courses have a formal secondary education, with most (74%) not being employed when they started the TVET training. Slightly more than half (52%) of those taking TVET courses are women (TESDA, 2015). In 2014, 57% of those taking TVET courses were aged 15–24, 21% were 25–34 and 12% were 35–44.

3. Data

The Philippine Statistical Authority conducts the Labor Force Survey data every year on a quarterly basis, in January, April, July and October. It includes labor force status (employed, unemployed, or not in labor force status), hourly wages, size of workplace, occupation, completed education level, and also whether or not the sampled people have

Year	2014	2015	2016
Total	**1,785,679**	**2,129,758**	**2,151,236**
Institution-based	833,659	1,036,290	1,057,574
Enterprise-based	57,414	57,002	67,080
Community-based	894,603	1,036,466	1,026,582

Figure 2. Those completing TVET courses by type of delivery, 2014–2016. *Source:* UNESCO-UNEVOC (2019)

experience of taking additional vocational education after their highest completed formal education. This paper uses the January 2014 Labor Force Survey. The data were collected for 201,551 individuals in around 50,000 households, including classifying workers as in private household, private establishment, government corporation or non-government corporation, self-employment, normal employment, paid employment in family-owned businesses and unpaid employment in family-owned businesses.

The data in this paper are limited to the 36,209 paid workers who responded about their wages, while the bulk of observations in the survey (165,342) had no response to the enquiry about wages in the questionnaire. Reasons for not stating a wage likely include many being employed in family businesses without formal wages, a significant proportion of workers in precarious situations (short-term/seasonal/casual workers and those who worked for different employers on a day-to-day or week-to-week basis – see International Labour Organization (2016)), and an embarrassed reluctance to provide information when wages are very low. Using the data only for the paid workers causes a selection problem that is discussed in the next section. Those with TVET represent only 6% of those with formal education. The majority of TVET obtainers completed their formal education at the secondary level; in the sample they are 57% urban and 43% rural. The dependent variable in this study is the log of wages per hour, and the independent variables are: age as a proxy variable for work experience (Miller, 1993), age squared, years of education as a continuous variable, and dummy variables that are urban/rural (equal to 1 if the respondent lives in an urban area), gender as male and female (equal to 1 if male and 0 if female), marital status, highest completed education level (no education, primary education, secondary education, tertiary education), and 'Additional TVET' – meaning that the individual took the TVET course after completing formal education. Interaction terms are also created for each level of education plus TVET: Primary plus TVET (TVET graduates with primary education), Secondary plus TVET (TVET graduates with secondary education), and Tertiary plus TVET (TVET graduates with tertiary education). The parental education variable includes the parents' highest education level above secondary education. Table 1 shows summary statistics of the data for every variable, randomly selected among all paid workers but with the number of observations greatly reduced because most respondents did not provide wage information. Table 2 also reports workers' hourly mean wages by education level in US dollars, with and without TVET, comparing urban

Table 1. Summary Statistics.

Variable	Obs.	Mean	Min	Max
Log wage per hours	12,640	0.82	0.4	1.3
male	12,640	0.87	0	1
Age	12,640	43.85	15	87
Age	12,640	2046.01	256	7569
Highest Education				
No education	12,640	0.15	0	1
Primary education	12,640	0.26	0	1
Secondary education	12,640	0.42	0	1
Tertiary Education	12,640	0.16	0	1
Secondary plus TVET	12,640	0.06	0	1
Tertiary plus TVET	12,640	0.01	0	1
Parental education	12,640	0.58	0	1
Employment	12,640	0.95	0	1

Source: Created by Author based on the Philippines' Labor Force Survey (LFS) of 2014

Table 2. Summary Statistics of mean wages.

Hourly Wages (USD)	No education	Primary education	Secondary education	Tertiary education	With TVET	Without TVET
Urban area	0.6	0.7	0.9	1.9	1.0	1.2
Rural area	0.5	0.5	0.7	1.8	0.9	0.8

Source: Created by Author based on the Philippines' Labor Force Survey (LFS) of 2014

and rural areas. Overall mean wages are higher in urban areas than rural ones, however mean hourly wages with TVET in rural areas are higher than without TVET, unlike in urban areas

4. Model specification

This study estimates the returns to additional vocational education after formal education. We first use ordinary least squares (OLS) estimation for wage effects in simple regression based on the Mincerian earnings function (Mincer, 1974). However, this causes the OLS regression estimator of parameters to be biased in sample selection with the respondents who provided wage information. We approach this selectivity problem by then using the Heckman method. A detailed explanation of these two estimations is presented below.

4.1. Ordinary least squares

The Mincerian earnings functions for OLS estimation are usually validated by using Labor Force or Household Surveys or Population Censuses which have data available on individual earnings as well as age-earnings profiles for each level of education. The method is described by equation (1) as follows:

$$\ln y_i = a_0 + a_1 s_i + a_2 yr_i + a_3 yr_i^2 + \beta' X_i + e_i \tag{1}$$

where i indicates individuals, $\ln y$ is the individual's log of wages; s is years of education and each level of education in primary, secondary and tertiary education as well as additional vocational education after completing formal educations for each individual; yr is age, which is a proxy variable for years of working experience; X is the vector of explanatory variables with individual and particular characters: region (urban or rural), gender, and marital status; and e is the error term.

OLS estimation for the returns to education when using cross-sectional data has a potential selection problem. To deal with this problem, the Heckman method is used, as previously validated in many prior studies.

4.2. Heckman method

As is well known (Gronau, 1974; Heckman, 1979), OLS estimation is selectively biased in that the estimation of the return to education is based only on paid workers in the selected sample, i.e. those who provided wage information. However, this estimation therefore excludes wage information for the individuals who do not provide it. This condition can be written as the following equation,

$$Y_i = \left\{ \begin{array}{ll} Y_i^* & if\ M_i = 1 \\ .(unobservable) & if\ M_i = 0 \end{array} \right\},\ Y_i^* = a + bX_i + u \tag{2}$$

where Y_i^* is the wages and bX_i is all the explanatory variables included. Here, the data Y_i^* is observed only for the individual ($M_i = 1$) who provides the wage amount, and not for the individual ($M_i = 0$) who does not provide the wage amount. In Equation (2), the condition that determines the presence or absence of an observation is the variable M_i that can indicate whether or not there is a wage amount. But in the Heckman Method we can satisfy the condition matching what kind of factors affect the unobservable variable $M_i = 0$, that is, formulate it with a model as follows,

$$M_i = \left\{ \begin{array}{l} 1\ if\ M_i^* > m_i \\ 0\ if\ M_i^* \leq m_i \end{array} \right\},\ M_i^* = a + \beta Z_i + v_i \tag{3}$$

In this equation, M_i is regarded as a dependent variable in which the wage amount can be observed, and the variable Z_i that affects M_i is estimated as an explanatory variable. This consists of a first-step estimation in equation (2) and a second-step estimation in equation (3), and the sample selection bias can be removed. Regarding equations (2) and (3) of the estimation process, the conditional expected value in the Heckman model, the so-called mills ratio, λ_i can be written as follows,

$$\mathrm{E}(Y_i|M_i = 1) = a + bX_i + c\lambda_i,\ \lambda_i = \frac{f(a + \beta Z_i)}{F(a + \beta Z_i)} \tag{4}$$

Thus, the complete Heckman model can be written by equation (5) in which calculating the mills ratio, λ_i is relevant for explaining the variation in Z_i and can satisfy the sample-selection bias in OLS estimation.

$$\mathrm{lny}_i = a_0 + a_1 \mathrm{s}_i + a_2 yr_i + a_3 yr_i^2 + \beta' X_i + c\lambda_i + u_i \tag{5}$$

Based on the Heckman method (Heckman, 1979), this study considered unobserved variables in terms of non-stating wage information that may be biased and influence the sample randomization, TVET attendance, as well as the wage effect. In the Philippines, there is a significant proportion of workers in precarious situations (short-term/seasonal/casual workers and those who worked for different employers on a day-to-day or week-to-week basis). This makes them reluctant to provide wage information and means that they are overrepresented in the informal sector of the sample, possibly influencing TVET attendance and the potential returns to TVET. Thus, TVET could be more or less beneficial for the full population than is suggested by the OLS analysis of the reduced sample of people that provided wage information. The Heckman estimation ideally informs us whether selection matters, and in which direction the bias goes, i.e. whether TVET is likely to be more or less beneficial for the unobserved people, using the employment variable on M in the first stage and the parental education variable on Z, which is not directly related to wages on Y in the second stage but to TVET on X in the Heckman model.

5. Results

5.1. Ordinary least squares

Table 3 first presents the results of the OLS estimation of the wage effect of each level of education, for both urban and rural areas. In all areas, there was a positive effect on wages for males as well as for those with longer working experience. Male wages are 4% higher than female ones, the gender effect being more pronounced in rural areas. The worker's age has a higher positive effect on wages in rural than in urban areas, but both secondary and higher education had a positive effect on wages, more pronounced in urban than in rural areas, unlike primary education that had a more positive effect on wages in rural than in urban areas. All the results for individual characteristics, gender, age and education, were statistically significant at the 1% and the 10% levels. Compared to those without any education, people with each level of education had wages that were greater by 3%, +7%, and +19%, respectively, for each of primary, secondary and tertiary education, respectively. Parental education seems not to influence wages in the OLS estimation.

Table 3 also shows the effect of additional TVET on wages after each level of formal education: 7.7% (=0.07 + 0.007) at the secondary level and 15% (=0.19+(−0.0434)) at the tertiary level, compared to those without additional TVET education. Additional TVET after secondary education slightly increased wages by more than 0.7%, but additional TVET after tertiary education in fact reduced wages. The differences in the additional TVET after secondary education between urban and rural areas were 0.5% and 1.4%, respectively. Additional TVET for those in rural areas with secondary education seems to increase wages more than in urban areas at the statistically significant level.

Table 3. OLS estimates of Log of Hourly Wage in Urban/Rural.

	All	Urban	Rural
VARIABLES	Log of wage	Log of wage	Log of wage
Male	0.0427***	0.0420***	0.0485***
	(0.00236)	(0.00295)	(0.00370)
Age	0.00325***	0.00349***	0.00370***
	(0.000399)	(0.000580)	(0.000529)
Age2	−3.11e-05***	−3.50e-05***	−3.46e-05***
	(4.52e-06)	(6.76e-06)	(5.78e-06)
Primary education	0.0302***	0.0181***	0.0286***
	(0.00197)	(0.00342)	(0.00230)
Secondary education	0.0724***	0.0781***	0.0388*
	(0.0144)	(0.0182)	(0.0235)
Tertiary education	0.190***	0.185***	0.173***
	(0.0145)	(0.0182)	(0.0238)
Secondary plus TVET	0.00737***	0.00560*	0.0143***
	(0.00272)	(0.00301)	(0.00484)
Tertiary plus TVET	−0.0434***	−0.0478***	−0.0308
	(0.0117)	(0.0126)	(0.0267)
Parental education	0.000120	−0.0213	0.0183
	(0.0143)	(0.0181)	(0.0234)
Constant	0.630***	0.659***	0.599***
	(0.00866)	(0.0123)	(0.0121)
Observations	12,651	7,039	5,612
R-squared	0.394	0.361	0.369

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

5.2. Heckman method

When we control for sample selection bias, using cross-sectional data following the Heckman method (see Tables 4 and A1), the results are slightly different from those in the OLS estimation reported in Section 5.1. Interestingly, the wage effect of formal education is more pronounced in rural than in urban areas (6.3% vs. 5.6% for secondary education, and 17.9% vs. 13.9% for tertiary education). The coefficients for the wage effect decreased for each completed level of education, both with and without additional TVET. The additional TVET after formal secondary education has a positive effect on wages of 0.4% in urban areas and of 1.3% in rural areas. However, only the result in rural areas was statistically significant at the 10% level, implying reduced marginal wage effects in urban areas due to over-education, as is seen in many developed countries.

Compared to people with no education in urban areas, primary education positively affected wages by 2.1%, secondary education by 5.6% (though statistically insignificant), but tertiary education had a positive effect of 13.9% higher wages. Additional TVET after secondary education has a probability of 0.5% of higher wages, but this is not a statistically significant result; additional TVET after tertiary education reduces wages by 0.3% compared to formal tertiary education without TVET. In rural areas, the most significant results were that (a) formal tertiary education graduates are more likely to have 18% higher wages; and (b) additional TVET after secondary education results in slightly higher wages by 1.4% compared to those in urban areas (0.5%). While the magnitude of the coefficients in education do change slightly with the Heckman method, the TVET education effects in urban and rural areas are similar to the OLS results.

Table 4. Heckman estimates of Log of Hourly Wage in Urban/Rural.

	All	Urban	Rural
VARIABLES	Log of wage Second stage	Log of wage Second stage	Log of wage Second stage
Male	−0.0140	−0.0134	−0.0103
	(0.00908)	−0.0111	(0.0149)
Age	0.00238***	0.00248**	0.00280***
	(0.000741)	−0.00107	(0.00102)
Age2	−1.40e-05	−0.000014	−2.05e-05*
	(8.59e-06)	−0.0000126	(1.16e-05)
Primary education	0.0360***	0.0217***	0.0321***
	(0.00407)	−0.00723	(0.00458)
Secondary education	0.0789***	0.0567***	0.0632***
	(0.00389)	−0.00674	(0.00490)
Tertiary education	0.174***	0.139***	0.179***
	(0.00518)	−0.00884	(0.00721)
Secondary plus TVET	0.00668	0.00478	0.0135*
	(0.00558)	−0.00745	(0.00820)
Tertiary plus TVET	−0.0318**	−0.0323	−0.0305
	(0.0161)	−0.02	(0.0279)
lambda/mills	−0.138***	−0.146***	−0.124***
	(0.0239)	(0.0314)	(0.0352)
Constant	0.702***	0.737***	0.676***
	(0.0197)	(0.0272)	(0.0304)
Observations	12,980	7,230	5,750

Standard errors in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

6. Conclusion

As the estimation results show, the most significant effect of vocational education is for those who have completed secondary education. This is estimated by controlling for the selection problem using the Heckman method. However, this result is not consistent with the prior studies of Choi (2016) and Olfindo (2018), with the inconsistencies probably due to using different data years, estimation methods, data settings and data quality.

This study's principal results are: (1) that secondary education graduates benefit much more from additional vocational education than do tertiary education graduates, as there are fewer educated people with tertiary education in rural areas compared to urban areas, and as the gap between secondary and tertiary returns to education is very large. So, it seems that employers in urban areas prefer high skilled workers with higher education and this makes formal wage workers' education and income higher; (2) secondary education graduates seem to know this, with many more taking vocational education compared to those with tertiary education (e.g. 95% of those with TVET have secondary education while only 5% have tertiary education in the data sample); and (3) additional vocational education is slightly more likely to increase wages in rural than in urban areas even though urban workers take more TVET after secondary education than do rural workers.

Overall, the study results demonstrate that the effect of additional vocational education after secondary education is slightly greater in rural rather than in urban areas. Moreover, TVET seems an appropriate route to help workers with secondary education get decent jobs, consistent with the current TESDA plan, especially for middle level manpower and sustainable inclusive national growth. However, notwithstanding this evidence, there are still very few people taking TVET courses, despite high underemployment and unemployment rates in rural areas. This finding suggests that TESDA's plan should be revised to focus more on secondary education than on higher education and should also promote and provide much more TVET in rural areas where a significant proportion of workers are in precarious situations (short-term/seasonal/casual workers and those who worked for different employers on a day-to-day or week-to-week basis). Thus, considering workers in vulnerable rural environments, TVET can still be helpful for workers' career development.

Additional vocational education outside the formal sector varies enormously in length, from 1-week to 2-years as its purposes include a wide range, from participants' hobbies to obtaining a job. This may make it difficult to suggest the policy implications of vocational education unless TESDA improves its data quality and consistency. There are also no data available on job stability, which makes it impossible to analyze this important aspect of employment. Unfortunately, these data limitations meant that this study could not cover all these specific issues and future research is needed, if data become available, to determine the effect of specific types of TVET on estimating benefits in the labor market of the Philippines. However, as the main purpose of TESDA is to encourage and develop middle level manpower, it seems best that it should continue to focus on TVET for those who have completed secondary education. Since one obstacle to more TVET is the cost of taking courses, TESDA may also wish to explore how to increase the availability of scholarships and other financial support for those who have difficulty paying.

Notes

1. https://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-4-quality-education.html
2. The Philippines is grouped into 17 regions. Fourteen of them have a number (Regions I~ XIII, with Region IV divided into IV-A and IV-B) that corresponds to its geographical location. Those regions are I: Ilocos Region; II: Cagayan Valley; III: Central Luzon; IV-A: Calabarzon; IV-B: Mimaropa; V: Bicol Region; VI: Western Visayas; VII: Central Visayas; VIII: Eastern Visayas; IX: Zamboanga Peninsula; X: Northern Mindanao; XI: Davao Region; XII: Soccsksargen; and XIII: Caraga. The remaining three regions do not have a numerical designation and are the National Capital Region (NCR), Bangsamoro Autonomous Region in Muslim Mindanao (BARMM) and Cordillera Administrative Region (CAR). The National Capital Region, known as Metro Manila, is the most populous metropolitan area and consists of 16 cities (Caloocan City, Las Piñas City, Makati City, Malabon City, Mandaluyong City, Manila City, Marikina City, Muntinlupa City, Navotas City, Parañaque City, Pasay City, Pasig City, Quezon City, San Juan City, Taguig City, and Valenzuela City).

Disclosure of potential conflicts of interest

No potential conflict of interest was reported by the author(s).

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References

Becker, G. (1962). Investment in human capital: A theoretical analysis. *Journal of Political Economy*, *70* (5), 9–49. https://doi.org/10.1086/258724

Burgess, S. (2016). Human capital and education: The state of the art in the economics of education. IZA Discussion Paper No. 9885. https://ssrn.com/abstract=2769193

Carbonaro, W. (2005). Tracking, students' effort, and academic achievement. *Sociology of Education*, *78*(1), 27–49. https://doi.org/10.1177/003804070507800102

Choi, S. (2016). Effects of vocational education on wages: Case of the Philippines. *Journal of Economics and Sustainable Development*, *7*(10), 27–51. https://iiste.org/Journals/index.php/JEDS/article/view/30844

Corseuil, C., Foguel, M., & Gonzaga, G. (2019). Apprenticeship as a stepping stone to better jobs: Evidence from Brazilian matched employer-employee data. *Labour Economics*, *57*(1), 177–194. https://doi.org/10.1016/j.labeco.2019.02.002

Field, E., Linden, L., Malamud, O., Rubenson, D., & Wang, S. (2019). Does vocational education work? Evidence from a randomized experiment in Mongolia. NBER working paper. 26092.

Gronau, R. (1974). Wage comparisons–a selectivity bias. *Journal of Political Economy*, *82*(6), 1119–1143. https://doi.org/10.1086/260267

Gunderson, M., & Oreopoulos, P. (2010). Returns to education in developed countries. In E. Barker, M. McGaw, & P. Peterson (Eds.), *The economics of education* (pp. 39–51). Elsevier.

Hanushek, E., Schwerdt, G., Woessman, L., & Zhang, L. (2017). General education, vocational education, and labor market outcomes over the life-cycle. *Journal of Human Resources*, *52*(1), 48–87. https://doi.org/10.3368/jhr.52.1.0415-7074R

Heckman, J. (1979). Sample selection bias as a specification error. *Econometrica*, *47*(1), 153–161. https://doi.org/10.2307/1912352

International Labour Organization. 2016. *The (missing) link between wage and productivity in the Philippines: What role for collective bargaining and the new two-tier wage system? (Geneva)*.

Retrieved May 9, 2021, from https://www.ilo.org/wcmsp5/groups/public/—ed_protect/—protrav/—travail/documents/publication/wcms_531654.pdf

Kahyarara, G., & Teal, F. (2007). The returns to vocational training and academic education: Evidence from Tanzania. *World Development*, *36*(11), 2223–2242. https://doi.org/10.1016/j.worlddev.2007.11.011

Krueger, D., & Kumar, K. (2004). Skill-specific rather than general education: A reason for US–Europe growth differences? *Journal of Economic Growth*, *9*(2), 167–207. https://doi.org/10.1023/B:JOEG.0000031426.09886.bd

Miller, C. F. (1993). Actual experience, potential experience or age, and labor force participation by married women. *Atlantic Economic Journal*, *21*, 60–66. https://doi.org/10.1007/BF02302329

Mincer, J. (1974). *Schooling, experience and earnings*. Columbia University Press.

Olfindo, R. (2018). Rethinking vocational education in the Philippines: Does it really lead to higher wages? *Journal of Southeast Asian Economies*, *35*(1), 79–100. https://doi.org/10.1355/ae35-1g

Patrinos, H., & Psacharopoulos, G. (2020). Returns to education in developing countries. *The economics of education* (Second Edition, pp. 53–64). Academic Press.

Psacharopoulos, G. (1987). To vocationalize or not to vocationalize? That is the curriculum question. *International Review of Education*, *33*(2), 187–211. https://doi.org/10.1007/BF00598482

Rutkowski, J. (2015). *Philippine social protection note: Employment and poverty in the Philippines*. World Bank.

Ryan, P. (1998). Is apprenticeship better? A review of the economic evidence. *Journal of Vocational Education & Training*, *50*(2), 289–325. https://doi.org/10.1080/13636829800200050

Ryan, P. (2001). The school to work transition: A cross-national perspective. *Journal of Economic Literature*, *39*(1), 34–92. https://doi.org/10.1257/jel.39.1.34

Schultz, T. (1961). Investment in human capital. *American Economic Review*, *51*(1), 1–17. Retrieved May 28, 2021, from http://www.jstor.org/stable/1818907

Söderbom, M., Teal, F., Wambugu, A., & Kahyarara, G. (2006). The dynamics of returns to education in Kenyan and Tanzanian manufacturing. *Oxford Bulletin of Economics and Statistics*, *68*(1), 261–288. https://doi.org/10.1111/j.1468-0084.2006.00162.x

TESDA (2015). *Study on the employability of TVET graduates*. Retrieved December 23, 2020, from https://tesda.gov.ph/Uploads/File/Researches/2015%20SETG%20Highlights.pdf

TESDA (2018). National Technical Education and Skills Development Plan 2018-2022.

Unesco IBE (2011). *World data on education: Philippines, 7th edition, 2010/2011*. UNESCO-IBE. Retrieved December 23, 2020, from http://www.ibe.unesco.org/fileadmin/user_upload/Publications/WDE/2010/pdf-versions/Philippines.pdf

UNESCO-UNEVOC. (2019). *TVET country profile: Philippines*. UNESCO-UNEVOC. Retrieved December 23, 2020, from https://unevoc.unesco.org/home/UNEVOC+Publications/lang=en/akt=detail/qs=6240

Wolter, C., & Ryan, P. (2011). Apprenticeship. In E. Hanushek, S. Machin, & L. Woessmann (Eds.), *Handbook of the economics of education* (pp. 521–576).Elsevier.

Zimmermann, K. F., Biavaschi, C., Eichhorst, W., Giulietti, C., Kendzia, M. J., Muravyev, A., Pieters, J., Rodríguez-Planas, N., & R. Schmidl. (2013). Youth unemployment and vocational training. *Foundations and Trends in Microeconomics*, *9*(1–2), 1–157. https://doi.org/10.1561/0700000058

Appendix

Table A1. Heckman estimates of Employment in Urban/Rural (First stage)

	All	Urban	Rural
VARIABLES	Log of wage First stage	Log of wage First stage	Log of wage First stage
Male	1.147***	1.062***	1.296***
	(0.0415)	(0.0542)	(0.0662)
Age	0.00335	−0.00313	0.0233
	(0.00962)	(0.0131)	(0.0146)
Age2	−0.000266***	−0.000227	−0.000421***
	(9.98e-05)	(0.000139)	(0.000148)
Primary education	−0.188***	−0.0790	−0.170**
	(0.0568)	(0.0857)	(0.0789)
Secondary education	0.669***	0.637**	0.867**
	(0.229)	(0.287)	(0.370)
Tertiary education	1.522***	1.492***	1.733***
	(0.236)	(0.295)	(0.389)
Secondary plus TVET	0.0176	−0.00704	0.0680
	(0.0805)	(0.0980)	(0.143)
Tertiary plus TVET	−0.462*	−0.597**	0.0349
	(0.248)	(0.279)	(0.540)
Parental education	−0.874***	−0.620**	−1.149***
	(0.225)	(0.281)	(0.365)
lambda/mills	−0.138***	−0.146***	−0.124***
	(0.0239)	(0.0314)	(0.0352)
Constant	1.083***	1.105***	0.542
	(0.228)	(0.305)	(0.357)
Observations	12,980	7,230	5,750
Selected	11,995	6,613	5,382
Non-selected	973	609	364

Standard errors in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$