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# Secondary vocational education and decent work in Indonesia: differences between urban and rural areas

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## ABSTRACT

Indonesia has prioritized upper secondary vocational education since 2006. This study examines the labour market outcomes of upper secondary vocational education in terms of decent work (DW), using Indonesian Family Life Survey data and a research framework that links DW into the broader labour economics of the school to work transition. We compare urban and rural workers with upper secondary vocational education to those with general education, using both simple regressions and propensity score matching. Workers with upper secondary vocational education do not earn higher wages or have better employment conditions than workers with general education. An exception is for workplace-provided training and pensions, where vocational graduates did better than general ones in 2014–15, a change from 2007; this effect was also much stronger in urban than in rural areas. Our findings raise questions about Indonesia's policy of expanding upper secondary vocational education without also focusing on its quality.

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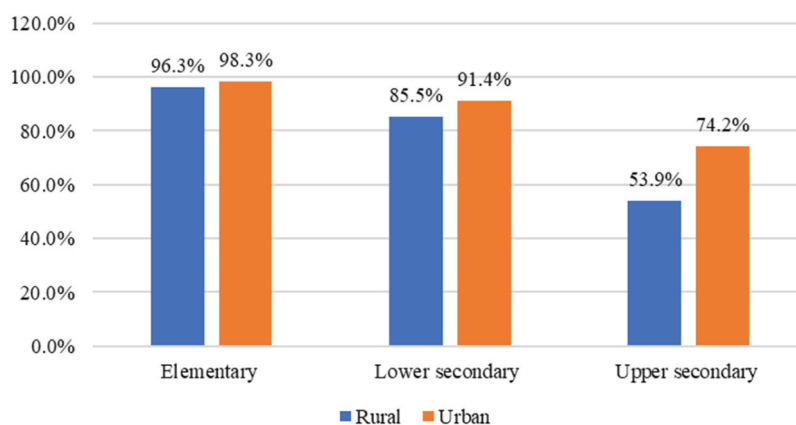
Vocational education; decent work; propensity score matching method; Indonesia

## 1. Introduction

Indonesia, the largest economy in Southeast Asia, has experienced rapid sustained economic growth in recent decades. Despite this and despite declining overall unemployment, the quality of human resources, a high youth unemployment rate, a high proportion of workers in low-productivity employment, and gender and geographic disparities are still major issues. Indeed, the proportion of those employed but still vulnerable has increased to a very high 58% even though the work force's overall educational qualifications are greater than in (ILO, 2017; Jasmina, 2020). As highlighted by Campbell (2013) and Cling et al. (2007), Indonesia's labour market shares similar dualistic characteristics with other developing countries, such as urban/rural and public/private sector divisions and a high prevalence of informal employment and multiple job holding. Additionally, young people in Indonesia face specific challenges, such as limited access to skilled jobs, which are often concentrated in urban areas and the public sector. This means that young rural people, who are less likely to complete upper secondary than those in urban areas (Figure 1), may benefit more from their education by moving to urban areas (Nilsson,

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**Figure 1.** Education completion rate in Indonesia (2021). *Source:* statista (2023).

2019). Furthermore, the scarcity of wage jobs means that self-employment may be the only viable option for some youth, and just as good a livelihood as most employment, due to the absence of contractual agreements and social protection with most employment.

Vocational education and training (VET) is often regarded as a solution to youth unemployment (Doerr et al., 2016; Eichhorst et al., 2015). There is a common belief that a well-functioning VET system is crucial for developing countries' progress. This is because VET can provide individuals with the skills that are in demands, thus aiding to reduce unemployment (Eichhorst et al., 2015; Neuman & Ziderman, 1999; Oketch, 2007). VET is also seen as an effective way to provide opportunities for those lacking resources or motivation for higher education, improve life outcomes for unemployed youth and special needs groups, and produce middle-level technicians (King, 2012).

According to Suharno and Harjanto (2020), Indonesia has been trying to transform its economic structure economy to increase labour productivity and to reduce unemployment and poverty. This has required improvements in education, physical capital, the returns to education, new skills, etc. One key has been much more attention to vocational education since 2006, following a 1998 broader educational reform, based on Malley and Keating (2000) revealing that better implementation of vocational education could result in a higher industrial growth.

Previous studies in many countries regularly highlighted the labour market outcomes of vocational education versus general education, especially in developing countries, although VET has recently been relatively neglected in developed countries (Guo & Wang, 2020; Vandenberg & Laranjo, 2021; Wang & Guo, 2019). In some developing countries, including China, India, Thailand, and the Philippines, the labour market returns to vocational education are higher than those to general education (Agrawal & Agrawal, 2017; Hawley, 2008; Tangtipongkul, 2015; Vandenberg & Laranjo, 2021; Wang & Guo, 2019). However, there is no consistency in the analysis of labour market outcomes resulting from general and vocational education, mainly because of data availability and data selectivity problems, both in general (Torun & Tumen, 2019), and also in Indonesia (Mahirda & Wahyuni, 2016; Newhouse & Suryadarma, 2011; Purnastuti et al., 2013; Tadjoeeddin, 2016; Widyanti, 2018).

Even when vocational education has positive effects, the analysis has been limited to relatively few labour market outcomes, mainly wages and employment. A broader concept of labour market outcomes should also include individuals' experiences of their work lives, as included in the concept of 'decent work' (DW) (Deranty & MacMillan, 2012). The International Labour Organization (ILO) defines DW to involve opportunities for work that is full and productive, respects workers' rights, gives people freedom, and provides workers with security and social protection. Specifically, Indonesia's steady progress in reducing poverty and unemployment means that improving productivity through DW can now be considered, through higher wages, improved working conditions, shorter working hours and investment in human capital. Efforts are needed to strengthen vocational training institutions and apprenticeship systems in urban labour markets as Indonesia shifts from rural agriculture towards urban industrial and services sectors (ILO, 2015).

However, the effect of vocational education on rural/urban labour market DW outcomes has not been sufficiently researched. The aim of this study is to examine the labour market outcomes of upper secondary vocational education in terms of DW outcomes, using Indonesian Family Life Survey (IFLS) data, and a research framework that links DW into the broader labour economics of the school to work transition. We employ five DW indicators: hourly wages, formal employment,<sup>1</sup> and having training, health insurance, and pensions provided by the workplace. More specifically, we compare urban and rural areas using propensity score matching (PSM) analysis to deal with data selectivity problems. The paper is structured as follows: we first provide a theoretical framework based upon the school to work transition that explains why we adopt the five specific DW indicators; then we review overall education and youth employment in Indonesia; look at research evidence on vocational education and on decent work, in general and in Indonesia; describe our data sources, samples, and methodology; present our results; and finally summarize our conclusions and their implications for policy and for further research.

## 2. Theoretical framework

DW can be thought of in terms of the school to work transition. The concept of the transition developed several decades ago (Mortensen & Pissarides, 1999; J. E. Rosenbaum et al., 1990; Ryan, 2001), remains valuable for understanding the relationship between education and work. Work transition from education involves the collective knowledge, skills, abilities, and aptitudes that individuals possess and can contribute to productive work. A higher level of work transition from education can lead to increased efficiency and improved work quality, thereby enabling individuals to command higher wages.

In the labour economics literature, the relationship between education and labour market outcomes has traditionally been explored with the theory of the school-to-work transition (Byun, 2018; Masdonati et al., 2022; Rogers & Creed, 2000; Ryan, 2001). The quality and relevance of education can influence the ability to enter the job market (Green et al., 2002). The theory also emphasizes the value of vocational education and training (Arum & Shavit, 1995; Brunetti & Corsini, 2019; Findeisen et al., 2022; Kim & Shin, 2007; Middeldorp et al., 2019), work experience programs, and employer participation in the education process. Some suggest that the transition has become more prolonged and challenging over time, particularly in developing economies (Basil et al., 2021; Kozan &

Blustein, 2019; Nilsson, 2019; Tadjoeeddin, 2014, 2016). While the school-to-work transition was traditionally viewed as a straightforward linear process, recent research in career development, vocational psychology, and sociology has focused on exploring job quality and DW as labour market outcomes, following the ILO guidelines from the early 2000s (Dodd et al., 2019; Duffy et al., 2017; Kim & Shin, 2007; Kozan & Blustein, 2019; Masdonati et al., 2022; Nam & Kim, 2019). These guidelines emphasize the importance of ensuring access to full and equitable employment opportunities for all individuals, while also promoting social protection and dialogue within the workplace. This trend has garnered increased academic attention.

Traditionally, the transition has referred to the shift to full-time work from full-time study. Empirical analysis has often focused on controlling for factors such as educational attainment (especially vocational education), gender, parental education and income, and region (Arum & Shavit, 1995; Brunetti & Corsini, 2019; Byun, 2018; Middeldorp et al., 2019; Nilsson, 2019). We take this further and look specifically at how transition from full time study can lead to different aspects of DW, not just full-time work. This requires an operational definition to measure DW.

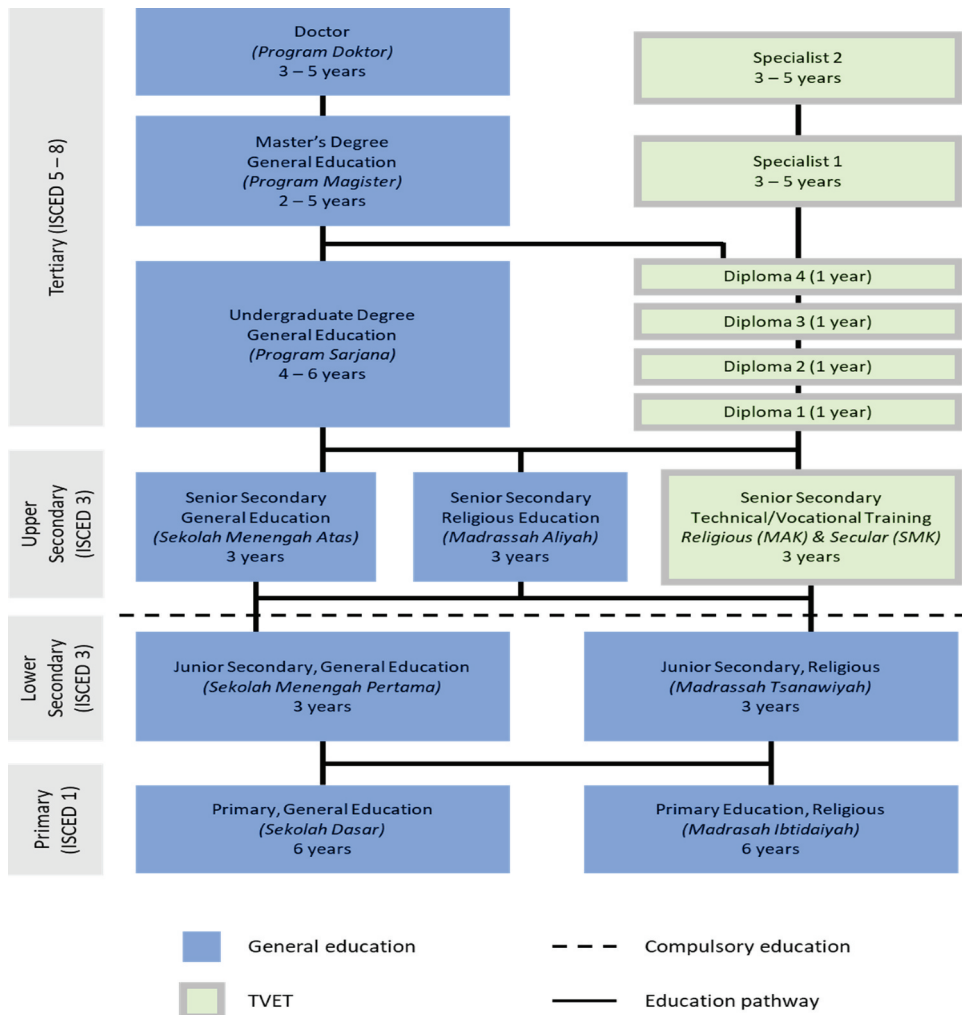
There are wide variations in the instruments used to measure DW empirically. For example, Kozan and Blustein (2019) measured DW using social status, work volition, career adaptability, job satisfaction, and life satisfaction, while Basil et al. (2021) employed gender, marital status, education level, household size and working experience. In vocational psychology studies (Dodd et al., 2019; Duffy et al., 2017, 2022a; Nam & Kim, 2019), mostly in developed economies, the instruments used to measure DW included safe working conditions, access to healthcare, adequate compensation, free time and rest, and complementary values. Demographic characteristics such as age, gender, qualification levels, employment status, household income, and social class were also controlled for.

dos Santos (2021) pointed out that the ILO's proposed DW universal values are of different acceptability in different countries. Efforts to promote DW must recognize and adapt to such cultural differences, as both the universal values and their cross-cultural expressions need to be considered. Furthermore, Fields (2003) has argued that, in developing countries, certain labour standards (such as earnings levels but also minimum wages, maximum hours of work, mandated fringe benefits, and occupational safety and health regulations) are much more important in practice than are universal values, due to the high rates of unemployment and underemployment, low levels of earnings, and high levels of poverty.

Taking these factors into consideration, we have established a research framework that investigates the school-to-work transition in relation to DW, a key aspect of labour market outcomes, in the context of developing economies. In developing countries, wage-related basic aspects of DW (i.e. wages and benefits) are the most relevant. Hence this paper focuses on five wage-related aspects of DW, the most important ones for which data is available in Indonesia.

### **3. Education and youth employment in Indonesia**

The Indonesian education system (Figure 2) encompasses both general education and (VET programs. VET programs can start at the upper secondary level, and take three years,

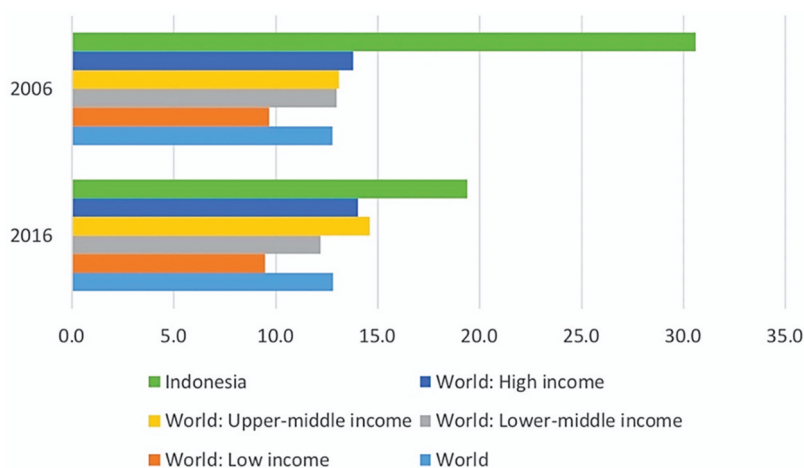


**Figure 2.** Indonesian education system. Source: (UNESCO-UNEVOC,2020).

as does upper secondary general education. It is possible to go onto higher education after both the general and the vocational upper secondary levels. Higher general education consists of academic programs leading to degrees. Higher vocational education consists of a series of diplomas, each reflecting more and more years of study, combining both classroom instruction and workplace training.

As noted, the Indonesian labour market faces several challenges, notably a high youth unemployment rate, a shortage of low skilled workers, and a need to improve job quality (Tadjoeddin, 2014). However, while the youth unemployment rate improved rapidly between 2006 and 2016, at almost 20% it is still much higher than the 12% average of a comparable group of lower middle-income countries (Figure 3).

High youth unemployment has led the Indonesian government to invest in education in general, and in vocational education in particular. Indeed, Indonesia allocates 20% of public spending to education (ILO, 2017). Moreover, Indonesian has expanded vocational



**Figure 3.** Youth unemployment rate (%) in Indonesia, 2006 and 2016. Sources: ILOSTAT for global figures and Sakernas for Indonesia (2017).

senior secondary education since 2006 (Torar & Wahono, 2016), principally to increase the size of the ‘ready to work’ labour force, mainly among those who do not attend higher education, both academic and vocational. The government believed that increasing the proportion of vocational secondary school graduates would lower unemployment. Hence, the Ministry of Education and Culture established targets for the ratio of vocational to general high-school students of 50:50 by 2010 and 70:30 by 2015. Construction of new general secondary schools was stopped, new vocational schools were built, and some existing general high schools were converted into vocational schools (Mahirda & Wahyuni, 2016). In addition, significant changes were implemented in the VET program’s content, pedagogical approaches, and teacher training. These changes aimed to ensure that students received education and training that was relevant, effective, and of high quality.

## 4. Literature review

### 4.1. Vocational education and labour market outcomes

Numerous studies have investigated the impact of vocational education on labour market outcomes throughout the world, though predominantly in developed countries (Bishop & Mane, 2004; Brunello & Rocco, 2017; Hampf & Woessmann, 2017). However, the research results are mixed, showing both positive and negative returns. Zimmermann et al. (2013) defined four basic categories of (VET, depending on where they are provided: ‘(i) secondary (high) school vocational education; (ii) post-secondary technical and vocational education; (iii) short-course training as part of active labour market policies (ALMP) targeting youth and the unemployed; and (iv) employer-sponsored training’.

This review section focuses on type (i) in developing countries, the most relevant for our research on Indonesia. Tripney et al. (2013) identified over 8000 studies of Technical and Vocational Education and Training (TVET) programs outcomes using randomized control trial and quasi-experimental designs between 2000 and 2011 in low and middle-income countries. In many cases, wages and employment were affected positively, but the effect

was often small and often not statistically significant. In addition, most studies were conducted in Latin America, with only two in Asia (India and Bhutan) and one in Africa (Kenya). Consequently, it is very hard to make any generalizations about TVET.

Secondary vocational education and is implemented through both vocationalized and diversified secondary schools (King & Palmer, 2010; Lee et al., 2016). Moenjak and Worswick (2003) examined the returns to upper secondary vocational education compared to general education in Thailand using a probit model, finding higher earnings for vocational education than for general education. The results suggested the earnings of general education graduates would increase if they could also receive on the job training. Kahyarara and Teal (2008) investigated the relationship between vocational education and wages in Tanzania. Those with higher general education have greater returns than those with vocational education; however, the returns are better for vocational education graduates than general education graduates among those with less education overall. Olfindo (2018) evaluated the impact of vocational education on wages in the Philippines using labour force survey data for 2014 and for 2016. Both studies concentrated on correcting the selectivity problem of typical regression models by using the Heckman model and also using propensity score matching (PSM) to deal with endogenous bias. Guo and Wang (2020), using rich data from the China Social Survey in a design using propensity score matching and Two-Stage least squares, found that academically low performing VET high school students have higher returns than general high school students, especially females, suggesting that VET can be an alternative to academic education in terms of social cost-benefit analysis. Additionally, Guo and Wang (2020) addressed the appropriate empirical methodology for rigorous estimation of the relationship between VET and labour market outcomes when considering unobserved variables. Another study in the Philippines by Vandenberg and Laranjo (2021) found that TVET high school graduates have higher employment and wage outcomes than those who only complete general education at or below the high school level. However, TVET graduates with tertiary education had lower wages than those who only completed secondary general education.

#### **4.2. Vocational education and labour market outcomes in Indonesia**

Despite a general lack of empirical studies of developing countries that deal with data limitations as well as causal inference, there are some that do so for Indonesia. Purnastuti and Salim (2015) explored the returns to education with OLS and IV (Instrumental variables) methods following the 2006 education reform, using IFLS 4 data collected in late 2007 and early 2008, The IV method should provide estimation results of the true return to schooling, offsetting both the upward ability bias and the downward measurement error bias that occur with OLS estimations. Purnastuti et al. (2013) used as instrumental variables the father's years of schooling, the mother's years of schooling, preschool attendance, and the age of primary school enrolment. However, Duflo (2001) pointed out in her paper about schooling and labour market consequences in Indonesia using IFLS data that there was no significant difference between OLS and IV estimations. Newhouse and Suryadarma (2011) examined secondary vocational high school graduates' labour market outcomes in light of the 2006 policy of vocational education expansion by the Ministry of National Education, using



the IFLS data for 1997, 2000 and 2007, and considering heterogeneity in age, family background, and academic ability. They found that female vocational high school graduates had higher wages than females with general education, unlike male groups with vocational education, and so suggested reforming practical VET in male-dominated subjects. Another study of the returns to general and vocational education in high schools was carried out by Mahirda and Wahyuni (2016) using IFLS 4 data. They employed the OLS and Heckman methods to deal with the sample selectivity problem that individual employment was self-selected but not random. They found no differences in the returns to education between general and vocational high schools and suggested improving the vocational education curriculum and making access to higher education easier.

### **4.3. Decent work in the labour market**

Although DW has been emphasized to promote human and labour rights, not many studies have analysed the different aspects of DW empirically and quantitatively. Since the ILO's statement on DW in 1999, studies have emphasized the importance of measuring DW using different dimensions and different sets of statistical indicators. The initial DW goals from the ILO specified basically six dimensions, including opportunities for work, freedom of choice of employment, productive work, equity, security, and dignity at work (Ghai, 2003). Bescond et al. (2003) compared DW in 40 developed and developing countries, focusing on seven DW indicators (low hourly pay, excessive working hours, unemployment rate, youth share of unemployment rate, child labour, male and female gap in labour force participation, and pension). The basic findings were that youth unemployment is generally high in both developed and developing countries and that developing countries' DW scores are universally lower than those of developed countries, suggesting that a country's DW score is very closely related to its level of national economic development. However, there are some limitations in the analysis, including that self-employed and unpaid family workers are largely ignored, despite being very common in developing countries. In addition, though the national data for each country using a labour force survey was comparable, the definitions of each indicator were not consistent across countries.

Limited research exists on DW. Lavagnini and Mennella (2016) estimated DW in Italy based on reinterpreting the ILO concept in a multidimensional approach with a basic profile of four indicators: daily working conditions with working hours, safety at work, legality of labour contracts, and the pressure of unemployment rate again at the country level. The unexpected findings were that DW conditions were not well fulfilled and there was still a long way to go in Italy. Another study by Duffy et al. (2017) developed a DW Scale (DWS) and demonstrated several aspects of its validity with two samples of working adults in the US. The scale is a useful tool for those assessing DW among employed adults. The first sample used a 15-item scale with five factors/subscales corresponding to the five components of DW: (a) physically and interpersonally safe working conditions, (b) access to health care, (c) adequate compensation, (d) hours that allow for free time and rest, and (e) organizational values that complement family and social values. A second sample confirmed that a 5-factor, bifactor model offered the best fit to the data. The finding

demonstrated that the structure of the instrument did not differ across gender, income, social class, and majority/minority racial/ethnic groups.

Moreover, several studies have developed the work of Duffy et al. (2017) using and testing their five DW dimensions. Dodd et al. (2019) emphasized the scarcity of studies on the individual-level understanding of DW, despite the presence of macro-level indicators monitoring access to it. Their research focused on measuring DW in the UK context. Study 1 validates the Decent Work Scale (DWS), while Study 2 delves into working individuals' perceptions of DW. The findings have the potential to influence the assessment and conceptualization of DW among specific populations. Nam and Kim (2019) analysed the Korean-Decent Work Scale (K-DWS) in South Korea, finding good internal consistency (0.74 to 0.94) and supporting a 5-factor model. The K-DWS demonstrated convergent, discriminant, and predictive validity, with gender differences observed. Cultural implications and future research were discussed. Again, Duffy et al. (2022b) introduced the concept of decent education as a critical predictor of DW, then reviewed areas such as subjective student experiences, school-to-work programs, and macro-level recommendations to identify six core components of decent education. These included safety, quality instruction, equitable learning environments, social connection opportunities, and post-high school programming. Decent education contributes to understanding the relationship between education and access to DW. Kashyap et al. (2022) explored how faculty members' work engagement levels in Indian higher education institutions are influenced by dimensions of DW. The study found that only 'access to health care' and 'complementary values' significantly predicted work engagement, while the dimensions of 'adequate compensation', 'free time and rest', and 'safe interpersonal working conditions' were not linked to work engagement.

Previous studies in several countries have emphasized the significance of DW regarding workers' rights, job security and social protection at the country level, but have not evaluated DW at the individual level at which education is the most important factor determining future employment opportunities.

In the Indonesian context, as Tadjoeuddin (2016) argued, DW included working conditions like adequate earnings, improved quality of employment, productivity, and inequality rather than a focus on reducing the unemployment rate. Although overall unemployment has decreased, there is still a high unemployment rate among educated youth, especially in urban areas where the government attempted to boost vocational upper secondary education to improve young people's employability. Moreover, the study highlighted deficits in employment quality in terms of tremendous underemployment (both voluntarily and involuntarily), employment in the informal economy, very low levels of job security coverage, and low real wages in rural areas. Indeed, there is still much vulnerable labour, such as self-employment, unpaid family workers and casual workers, notably in agriculture. Indonesia is far from achieving DW with deficits in the quality of employment.

## **5. Data and methodology**

### **5.1. Data**

The data this study uses to analyse the DW effect of vocational education among Indonesian adult workers were drawn from the Indonesian Family Life Survey (IFLS5)

2014 round. IFLS data is an ongoing longitudinal survey begun in 1993 (IFLS1) with 7,224 households, then repeated in 1997 (IFLS2), 1998 (IFLS2+), 2000 (IFLS3), 2007–2008 (IFLS4), and 2014–2015 (IFLS5). There has been no IFLS since 2015. We used IFLS5 to explore the policy effect of vocational education on DW since the government's vocational education expansion policy in 2006.<sup>2</sup> Moreover, IFLS5 clearly distinguished employment status in terms of self-employed, self-employed with unpaid family, self-employed with employees, government worker, private worker, unpaid family worker, casual worker in agriculture, and casual worker not in agriculture.

Firstly, we considered several prior studies to help determine our DW indicators, especially Bescond et al. (2003) and Duffy et al. (2017) in terms of wages, formal employment, training, health-insurance, and pension at the workplace, elements that are still frequently not included among basic working rights in developing countries. Then we examined the correlation between DW indicators at the individual level and workers' different education levels, as well as different types of education compared to those with no education, using OLS and probit estimations. Secondly, we addressed the precise effect of vocational education on DW by applying the PSM method to control for self-selection bias with workers who chose vocational education<sup>3</sup> when they were in upper secondary school.

Table 1 presents descriptive statistics showing the distribution of each of the applied variables in this study. The dataset contains 3,561 workers (2,658 urban and 903 rural) as our study is restricted to upper secondary education and below, focusing on vocational education, and excludes missing values (i.e. respondents who did not answer the questionnaire). We have five dependent variables of DW: wages, formal employment, and training, health insurance and pension provided by the workplace. For wages we use hourly wages; and for formal employment we use the categories of working for the government or for a private company in the formal economy, or of being self-employed in the informal economy. As would be expected, the mean hourly wage is higher in urban (Rp. 12625.74) than in rural areas (Rp. 10283.51). There is a secondary education gap between urban and rural areas, with less vocational than general education in rural areas. However, rural areas have higher proportions of workers with either only primary or lower secondary education.

## **5.2. Methodology**

We investigate both upper secondary general and vocational education graduates' labour market outcomes related to DW with five indicators: hourly wages, formal employment, training, health-insurance, and pension at the workplace, comparing urban and rural areas. Firstly, to investigate the wage and employment effects in terms of wages, formal employment, pension, training, and health insurance that improve job security, we analyse for each of the wage and the employment effects with the following Equation (1) employing OLS and probit estimations. We then use the PSM method to deal with endogeneity problems such as innate ability, family background, and different types of education interests as well as non-random selection in vocational education from OLS and probit method by Equation (1) below.

**Table 1.** Descriptive statistics in urban and rural areas at the mean: Paid employees (2014; IFLS5 data).

Variable	Definition	ALL (Mean)	Urban (Mean)	Rural (Mean)
<b>Dependent Variables</b>				
Hourly wage (IDR)	Hourly income from employment	12220.82	12924.51	10133.35
Hourly wage (log)	Natural log of hourly income from employment	9.01	9.09	8.77
Formal employment	1= government or private worker 0= otherwise	0.90	0.92	0.86
Training	1= Employment's training opportunity provided by workplace 0= otherwise	0.24	0.24	0.22
Health Insurance	1= Employment with health insurance provided by workplace 0= otherwise	0.35	0.37	0.29
Pension	1= Employment with pension provided by workplace 0= otherwise	0.17	0.18	0.15
<b>Independent variables</b>				
<i>Highest education level completed</i>				
Primary School	1= Highest education at primary school 0= otherwise	0.24	0.21	0.34
Lower secondary	1= Highest education at lower secondary 0= otherwise	0.20	0.19	0.25
Upper secondary (general)	1= Highest education at upper secondary 0= otherwise	0.29	0.31	0.23
Upper secondary (vocational)	1= Highest education at senior vocational high school 0= otherwise	0.26	0.30	0.17
Age	Individual's age	34.45	34.66	33.81
Age^2	Individual's age squared	1269.93	1284.25	1227.47
Number of Siblings	The total number of siblings	3.67	3.68	3.64
Gender	1= Female, 0= Male	0.34	0.34	0.32
Marital Status	1= Married, 0= Not Married	0.80	0.79	0.83
N		4,018	3,005	1,013

Source: Authors' calculation based on the IFLS5 data set.

$$y_i = \beta_3 \exp_i + \beta_4 \exp_i^2 + \gamma X_i + \varepsilon_i \quad (1)$$

where  $y_i$  is the five indicators of DW,<sup>4</sup> natural logarithm of hourly wage, formal employment, training, health-insurance, and pension at working place of individual  $i$  in numeric and dummy variables.  $\exp_i$  indicates worker's years of working experience,  $X_i$  is vector of individual's characteristics in four types<sup>5</sup> of education: i) primary school, ii) lower secondary school, iii) upper secondary school general, iv) upper secondary school vocational, number of siblings and marital status as a dummy variable and  $\varepsilon_i$  is the error term in the model.

As noted, the OLS and probit models might still include the endogeneity problem of choosing secondary vocational education. To deal with these potential problems in vocational education, the PSM method (P. R. Rosenbaum & Rubin, 1983) is very useful as it compares only those with overlapping background characteristics, creating samples in control and treatment groups that are as comparable as possible in the distribution of pre-treatment coefficients (Graham & Kurlaender, 2011). In terms of estimation, we specifically used the nearest neighbour matching method among the various PSM methods. The key feature of this method is to match individuals' characteristics with vocational education (treatment group) to individuals with similar characteristics who did not pursue vocational education (control group). In this way, we can control for selection bias among

those who chose vocational education, as if randomizing the choice of education. The PSM method is estimated in Equation (2) below:

$$e_i = Pr(VE_i = 1 | \beta_1 E_i + \beta_2 exp_i + \beta_3 exp_i^2 + \gamma X_i) \quad (2)$$

where  $e_i$  is the dependent variable regarding DW indicators of this study in earnings, formal employment, pension, training, and health insurance using both continuous and binary variables. The individual  $VE_i$  denotes vocational education in upper secondary school instead of general education, employing the PSM method based on probit model estimation that the individual equals to '1' if they attended upper secondary vocational education and '0' otherwise. Equation (2)'s identification is subject to a typical earnings function from the Mincerian model with the most important two variables being years of working experience,  $exp_i$  and years of working experience squared,  $exp_i^2$  and upper secondary vocational education experience,  $e_i$ . A vector variable of  $X_i$  includes individual's characteristics in terms of number of siblings and marital status. Then the results of PSM were estimated using nearest 1 neighbour (NN1) and nearest 3 neighbour (NN3) in average treatment effect on the treated (ATT) following Guo and Wang (2020).

## 6. Results

We show the results of the returns to vocational upper secondary education in Tables 2–6, and then compare the difference between the returns to vocational upper secondary education and general upper secondary education in the labour market after considering the elimination of endogenous problems in Tables 7 and 8. Below we provide the detailed results of our analysis.

Tables 2–6 show the estimation results for our five DW indicators using 2014–15 IFLS data,<sup>6</sup> (hourly wages, formal employment, training, health insurance, and pension at the workplace) employing OLS and probit models in Equation (1). All levels of education above primary school have positive effects on DW compared to that for those who only completed primary school. Table 2 presents the estimation of hourly wages of workers with an upper secondary vocational education where we found a significantly positive

**Table 2.** OLS estimation for hourly wage (log) (2014; IFLS5 data).

VARIABLES	Hourly wage (log)		
	All	Urban	Rural
Lower secondary	0.341*** [0.044]	0.335*** [0.050]	0.358*** [0.088]
Upper secondary (general)	0.719*** [0.041]	0.743*** [0.046]	0.660*** [0.085]
Upper secondary (vocational)	0.709*** [0.043]	0.745*** [0.048]	0.569*** [0.096]
Urban	0.209*** [0.035]		
Constant	7.662*** [0.232]	7.865*** [0.276]	7.734*** [0.444]
Observations	4,018	3,005	1,013
Other Controls	Yes	Yes	Yes
R-squared	0.198	0.193	0.161
Adjust R-squared	0.196	0.190	0.154

Robust standard errors in brackets, \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1.

NOTE: All predictors at mean value.

**Table 3.** Probit estimation for formal employment (2014; IFLS5 data).

Variables	Formal employment					
	All	Marginal Effect	Urban	Marginal Effect	Rural	Marginal Effect
Lower secondary	0.205*** [0.074]	0.047*** [0.017]	0.145 [0.091]	0.032 [0.020]	0.329** [0.131]	0.085** [0.033]
Upper secondary (general)	0.798*** [0.083]	0.132*** [0.014]	0.760*** [0.099]	0.117*** [0.016]	0.879*** [0.161]	0.172*** [0.028]
Upper secondary (vocational)	0.651*** [0.084]	0.118*** [0.015]	0.647*** [0.098]	0.107*** [0.017]	0.609*** [0.164]	0.137*** [0.033]
Urban	0.177*** [0.063]	0.028*** [0.010]				
Constant	0.147 [0.393]		0.319 [0.473]		0.173 [0.717]	
Observations	4,018	4,018	3,005	3,005	1,013	1,013
Other Controls	Yes		Yes		Yes	
Log Likelihood	-1191		-804.7		-382.7	
Pseudo R-squared	0.0682		0.0680		0.0508	

Robust standard errors in brackets, \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1.  
NOTE: All predictors at mean value.

**Table 4.** Probit estimation for training (2014; IFLS5 data).

Variables	Training					
	All	Marginal Effect	Urban	Marginal Effect	Rural	Marginal Effect
Lower secondary	0.321*** [0.081]	0.061*** [0.015]	0.255** [0.100]	0.047** [0.018]	0.432*** [0.140]	0.089*** [0.029]
Upper secondary (general)	0.974*** [0.072]	0.257*** [0.017]	0.945*** [0.085]	0.248*** [0.019]	1.029*** [0.133]	0.281*** [0.036]
Upper secondary (vocational)	0.938*** [0.075]	0.244*** [0.018]	0.926*** [0.088]	0.241*** [0.020]	0.911*** [0.150]	0.237*** [0.041]
Urban	-0.072 [0.054]	-0.020 [0.015]				
Constant	-0.898*** [0.323]		-0.755** [0.373]		-1.513** [0.656]	
Observations	4,018	4,018	3,005	3,005	1,013	1,013
Other Control Individual Characteristics	Yes		Yes		Yes	
Log Likelihood	-2031		-1545		-482.9	
Pseudo R-squared	0.0739		0.0701		0.0891	

Robust standard errors in brackets, \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1.  
NOTE: All predictors at mean value.

effect of 71%; however, workers with an upper secondary general education had a very slightly higher wage effect of 72%. Both general and vocational upper secondary education had more effect on wages in urban than in rural areas. Although we conclude that the wage returns for individuals with an upper secondary vocational education are higher than for those with primary school education from [Table 2](#), we can see that the returns to upper secondary general education are slightly higher than to upper secondary vocational education. Beyond wages, we estimated the four other DW indicators (formal employment, training, health insurance, and pensions) with a probit model. [Table 3](#) shows the formal employment effect of upper secondary vocational education and indicates that the formal employment returns to upper secondary vocational education are higher than those to primary education. Workers with upper secondary general and vocational education were more likely to be public or private employees rather than to be

**Table 5.** Probit estimation for health insurance (2014; IFLS5 data).

	Health insurance					
	All	Marginal Effect	Urban	Marginal Effect	Rural	Marginal Effect
Lower secondary	0.327*** [0.071]	0.086*** [0.019]	0.266*** [0.086]	0.070*** [0.023]	0.468*** [0.125]	0.123*** [0.033]
Upper secondary (general)	1.013*** [0.063]	0.333*** [0.019]	0.992*** [0.075]	0.328*** [0.022]	1.083*** [0.121]	0.346*** [0.037]
Upper secondary (vocational)	1.018*** [0.066]	0.334*** [0.020]	1.030*** [0.077]	0.343*** [0.022]	0.921*** [0.135]	0.284*** [0.043]
Urban	0.051 [0.051]	0.017 [0.017]				
Constant	-1.310*** [0.305]		-1.107*** [0.354]		-1.733*** [0.612]	
Observations	4,018	4,018	3,005	3,005	1,013	1,013
Other Control Individual Characteristics	Yes		Yes		Yes	
Log Likelihood	-2360		-1798		-555.3	
Pseudo R-squared	0.0909		0.0899		0.0900	

Robust standard errors in brackets, \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1.

NOTE: All predictors at mean value.

self-employed, in both urban and rural areas. By contrast, the formal employment returns to vocational education in rural areas are higher than in urban areas, that is workers in urban areas with upper secondary vocational education are less likely to be employees than those in rural areas.

Similar results to those in Table 3 are shown in Table 4 for training, regardless of upper secondary general or vocational education (but not specific coefficient values), compared with people without upper secondary school education, the probability of having a job with training available is greater. In terms of specific coefficients, in the overall sample, individuals with vocational upper secondary education are about 25% more likely to have a job with training available, than those who have only a primary school education. The probability is 24% (25%) for vocational (general) upper secondary education urban workers; and 24% (28%) for vocational (general) upper secondary education rural workers. The returns to education in terms of having a job with training available for upper secondary general education graduates in rural areas are greater than those in urban areas, whereas the returns for upper secondary vocational education graduates are almost indistinguishable between rural and urban areas. Moreover, the disparity between upper secondary general and vocational education was much less in urban areas (just a 1% difference between 25% and 24%), than in rural areas where the difference exceeded 4% (a 4% difference between 28% and 24%).

Tables 5 and 6 present findings about health insurance and pension benefits from the probit model. Except for the specific coefficients, the broad results in the two tables are similar. There are statistically significant effects on workplace health insurance and pensions for both upper secondary general and vocational education graduates. However, health insurance and pensions are the only DW benefits that are more likely for those with vocational rather than general education. Health insurance and pensions are also more likely for vocational graduates in urban than in rural areas, though the opposite applies for upper secondary general education graduates. Compared with primary school graduates, rural workers with upper secondary

**Table 6.** Probit estimation for pension (2014; IFLS5 data).

Variables	Pension					
	All	Marginal Effect	Urban	Marginal Effect	Rural	Marginal Effect
Lower secondary	0.241*** [0.087]	0.034*** [0.013]	0.212* [0.110]	0.028* [0.015]	0.374** [0.150]	0.060** [0.025]
Upper secondary (general)	0.821*** [0.074]	0.167*** [0.014]	0.806*** [0.092]	0.158*** [0.016]	0.948*** [0.136]	0.205*** [0.031]
Upper secondary (vocational)	0.966*** [0.077]	0.211*** [0.016]	1.006*** [0.093]	0.219*** [0.018]	0.811*** [0.157]	0.165*** [0.036]
Urban	-0.095 [0.059]	-0.022 [0.014]				
Constant	-2.084*** [0.354]		-2.207*** [0.409]		-2.090*** [0.690]	
Observations	4,018	4,018	3,005	3,005	1,013	1,013
Other Control Individual Characteristics	Yes		Yes		Yes	
Log Likelihood	-1677		-1276		-391.5	
Pseudo R-squared	0.0862		0.0864		0.104	

Robust standard errors in brackets, \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1.  
NOTE: All predictors at mean value.

**Table 7.** Propensity score matching estimation for decent work indicators (2014; IFLS5 data).

Decent work indicators	NN1			NN3		
	All	Urban	Rural	All	Urban	Rural
Hourly wage	-0.005 (0.045)	0.005 (0.049)	-0.055 (0.113)	-0.023 (0.040)	-0.007 (0.044)	-0.107 (0.099)
Formal employment	0.000*** (0.000)	-0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	-0.000*** (0.000)
Training	0.035 (0.025)	0.049* (0.026)	-0.030 (0.061)	0.017 (0.022)	0.029 (0.024)	-0.033 (0.053)
Health Insurance	-0.006 (0.027)	0.009 (0.030)	-0.082 (0.061)	0.000 (0.024)	0.011 (0.027)	-0.071 (0.054)
Pension	0.034 (0.021)	0.054** (0.024)	-0.069 (0.050)	0.046** (0.019)	0.063*** (0.021)	-0.043 (0.044)
Other Control Individual Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
N	2,225	1,815	410	2,225	1,815	410

Robust standard errors in brackets, \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1.  
NOTE: All predictors at mean value.

vocational (general) education graduate have a 28% (35%) higher probability to work in jobs with health insurance available, but urban workers with upper secondary vocational (general) education graduate have a 34% (33%) higher probability to work in jobs with health insurance available; rural workers with upper secondary vocational (general) education graduate have a 17% (21%) higher probability to work in jobs with pensions available, but urban workers with upper secondary vocational (general) education graduate have a 22% (16%) higher probability to work in jobs with pensions available.

After addressing the issue of sample bias, intriguing findings emerge from the analysis of the 2014 data using PSM. **Table 7** reveals that urban workers with upper secondary vocational education exhibit a 5% higher probability of obtaining a job with training opportunities, as well as an increased likelihood of around 5% to 6% of securing a job with a pension. However, the estimation results of the 2007 IFLS data (**Table 8**) did not demonstrate any statistically significant positive effects on the DW indicators.



**Table 8.** Propensity score matching estimation for decent work indicators (2007; IFLS4 data).

Decent work indicators	NN1			NN3		
	All	Urban	Rural	All	Urban	Rural
Hourly wage	-0.019 (0.046)	0.009 (0.049)	-0.099 (0.136)	-0.061 (0.042)	-0.058 (0.042)	-0.098 (0.122)
Formal employment	0.000*** (0.000)	-0.000*** (0.000)	0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
Training	0.005 (0.028)	0.016 (0.031)	-0.036 (0.068)	-0.010 (0.025)	-0.005 (0.027)	-0.024 (0.058)
Health Insurance	0.047 (0.030)	0.042 (0.034)	0.059 (0.066)	0.026 (0.026)	0.017 (0.029)	0.069 (0.057)
Pension	0.001 (0.021)	0.003 (0.022)	0.023 (0.052)	-0.003 (0.018)	-0.013 (0.020)	0.055 (0.041)
Other Control Individual Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
N	1,677	1,358	319	1,677	1,358	319

Robust standard errors in brackets, \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1.

NOTE: All predictors at mean value.

## 7. Discussion and conclusion

The study has focused on the labour market outcomes of individuals who pursued upper secondary vocational education in terms of DW, defined as both higher wages (wage effect) as well as formal employment (employment effect), using Indonesian Family Life Survey (IFLS) data. Workers with upper secondary vocational education were compared to those with upper secondary general education and comparisons were also made between urban and rural areas. To estimate DW, we used five DW indicators: hourly wages, formal employment (working in the public sector or for a private company in the formal economy rather than in self-employment), and having training, health insurance, and pensions provided by the workplace using OLS and probit estimation method and more specifically PSM method to deal with data selectivity problems.

We found statistically significant results for both the OLS and probit models, but statistically much weaker results with the PSM method. Overall, our study implies that workers with upper secondary vocational education are not likely to earn higher wages or have better employment conditions compared to workers who pursued general upper secondary education. This is despite the Indonesian government attempting to transform the structure of the economy, including through expanding the share of vocational education at the upper secondary level. However, we have observed some interesting findings indicating a slight improvement in the DW indicators related to training and pensions among upper secondary vocational graduates when comparing the 2007 and 2014 data, possibly supported by the policy decision to expand vocational education since 2006. These improvements are particularly notable in urban areas when we account for the impact of selection bias.

This finding aligns with prior research (Birkelund & van de Werfhorst, 2022; Dee, 2004; Silliman & Virtanen, 2022), which suggests that the specific skills acquired from vocational education can safeguard students against the vulnerabilities of unskilled jobs; however, this advantage is most apparent right after leaving education and tends to decline after several years in the labour force. Thus, our results also underline that achieving decent work in the workplace in Indonesia is still a distant goal, as Tadjoeidin (2016) noted, with deficiencies in employment quality comparable to those in Italy and India, reaffirming previous studies (Fields, 2003; Lavagnini &

Mennella, 2016). Furthermore, Jasmina (2020) pointed out the challenges faced by formal secondary vocational education graduates, including skill and competency mismatches and difficulties with the school-to-work transition. Our findings similarly indicate that rural upper secondary vocational education graduates face particular challenges in transitioning from school to the workforce, performing less favorably than their urban counterparts.

Although unemployment has fallen dramatically in the recent past in Indonesia, and despite the government's economic development policy to expand vocational education, workers with vocational education did not do especially well in terms of labour market outcomes, both wages and other basic elements of DW, even though we found interesting results for training and pensions. Even workers with upper secondary general education are still far from having even basic DW, at least in terms of global standards in accordance with the ILO's campaign. While the ILO campaign did not specifically explore the differential effects of different types of education on DW indicators, previous studies such as Duffy et al. (2022a) and Nam and Kim (2019) have underscored the importance of education as a crucial factor in shaping DW outcomes. Additionally, research has shown that vocational education can have a significant impact on the job market (Arum & Shavit, 1995; Brunetti & Corsini, 2019; Byun, 2018; Middeldorp et al., 2019; Nilsson, 2019), further emphasizing its relevance in understanding and promoting decent work.

Several policy implications emerge from the findings of the study, for both Indonesia and for similar developing countries. First, as currently provided in Indonesia, upper secondary vocational education does lead to more decent work than just primary or lower secondary education, but upper secondary general education is superior, except in terms of workplace pensions and training. This implies that the Indonesian government needs to focus more on the content and quality of vocational education as well as simply expanding it. Beyond this, since most of the Indonesian labour force is in the informal sector, including many who are self-employed, the government could consider vocational education to support them. Other developing countries at similar economic levels to Indonesia also cannot fully cover the full range of DW. Therefore, it is important for them to recognize the current DW position in their labour market, and then gradually expand the range of DW dimensions from there. Additionally, as most developing countries have a dual labour market, they should also consider improving job quality for the informal sector, including many self-employed, with practical education, such as vocational education.

Our paper also has implications for future researchers, both in general and specifically in Indonesia. First, there is little research on DW in developing countries because (a) there is no general acceptance of a universal concept of DW; and (b) data are frequently very limited. Nonetheless, as we have shown, research is possible, by adopting a pragmatic wage-related set of DW indicators and by exploiting DW-related data in labour force surveys. Research on Indonesia could be expanded from this initial look at those in formal employment to study also those who are self-employed and in informal employment. Moreover, it would be helpful to expand the analysis to study gender differences as well as urban/rural ones. Finally, there is scope to deepen the analysis and throw more light on vocational education and DW, including more about pathways, by applying more mixed methods in addition to our econometric analysis.

## Notes

1. We define formal employment as working in the public sector or for a private company in the formal economy rather than in self-employment or working in the informal economy.
2. We also analyse the labour market outcomes in terms of DW aspects using 2007–2008 (IFLS4) data to see the differences between before and after the new vocational education policy.
3. The data include vocational junior high-school graduates; however, there were only 41 such individuals in our initial sample as it is unusual to choose vocational education at the junior secondary level in Indonesia. So, we dropped these 41 from the sample and focused on vocational education at the upper secondary level, as did government policy.
4. We have examined the interrelation among the indicators of DW, which could potentially introduce some bias into the estimation results. However, the correlations between these indicators are not strong, with correlation coefficients all below 0.46, as indicated by the explained variables in [Appendix 1](#).
5. Since we are interested in upper secondary education, both general and vocational, that itself is affected by both primary and lower secondary education, we follow and use primary school as the reference group.
6. We only present the results of the PSM analysis using the 2007–08 IFLS4 data in [Table 8](#), as there were significant differences in the results between IFLS4 and IFLS5. However, we also estimated the results of the OLS/probit model for our five decent work indicators, and the results for the IFLS4 data were similar to those for IFLS5.

## Disclosure statement

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## References

- Agrawal, T., & Agrawal, A. (2017). Vocational education and training in India: A labour market perspective. *Journal of Vocational Education and Training*, 69(2), 246–265. <https://doi.org/10.1080/13636820.2017.1303785>
- Arum, R., & Shavit, Y. (1995). The transition from school to work. *American Sociological Association*, 68(3), 187–204. <https://doi.org/10.2307/2112684>
- Basil, O. C., Nwokoye, E., & Aduku, E. B. (2021). Computing education, decent work and economic growth in Nigeria. *International Journal of Economics Development Research* 2(1), 44–64. <https://doi.org/10.37385/ijedr.v2i2.255>
- Bescond, D., Châtaignier, A., & Mehran, F. (2003). Seven indicators to measure decent work: An international comparison. *International Labour Review*, 142(2), 179–212. <https://doi.org/10.1111/j.1564-913x.2003.tb00258.x>

- Birkelund, J. F., & van de Werfhorst, H. G. (2022). Long-term labor market returns to upper secondary school track choice: Leveraging idiosyncratic variation in peers' choices. *Social Science Research*, 102, 102. <https://doi.org/10.1016/j.ssresearch.2021.102629>
- Bishop, J. H., & Mane, F. (2004). The impacts of career-technical education on high school labor market success. *Economics of Education Review*, 23(4), 381–402. <https://doi.org/10.1016/j.econedurev.2004.04.001>
- Brunello, G., & Rocco, L. (2017). The labor market effects of academic and vocational education over the life cycle: Evidence based on a British Cohort. *Journal of Human Capital*, 11(1), 106–166. <https://doi.org/10.1086/690234>
- Brunetti, I., & Corsini, L. (2019). School-to-work transition and vocational education: A comparison across Europe. *International Journal of Manpower*, 40(8), 1411–1437. <https://doi.org/10.1108/IJM-02-2018-0061>
- Byun, G. (2018). School-to-work transition in South Korean young adults: Stratified or individualized? *Asian Social Work & Policy Review*, 12(3), 169–182. <https://doi.org/10.1111/aswp.12148>
- Campbell, D. (2013). *The labour market in developing countries* (S. Cazes & S. Verick, eds.). ILO.
- Cling, J. P., Gubert, F., Nordman, C. J., & Robilliard, A. S. (2007). *Youth and labor markets in Africa: A critical review of literature* (No. 49). Agence Française de Développement. [www.afd.fr](http://www.afd.fr)
- Dee, T. S. (2004). Are there civic returns to education? *Journal of Public Economics*, 88(9–10), 1697–1720. <https://doi.org/10.1016/j.jpubeco.2003.11.002>
- Deranty, J. P., & MacMillan, C. (2012). The ILO's decent work initiative: Suggestions for an extension of the notion of decent work. *Journal of Social Philosophy*, 43(4), 386–405. <https://doi.org/10.1111/josp.12003>
- Dodd, V., Hooley, T., & Burke, C. (2019). Decent work in the UK: Context, conceptualization, and assessment. *Journal of Vocational Behavior*, 112(March), 270–281. <https://doi.org/10.1016/j.jvb.2019.04.002>
- Doerr, A., Fitzenberger, B., Strittmatter, A., Paul, M., & Strittmatter, A. (2016). Employment and earnings effects of awarding training vouchers in Germany. *ILR Review*, 70(3), 767–812. <https://doi.org/10.1177/0019793916660091>
- dos Santos, N. R. (2021). Decent work expressing universal values and respecting cultural diversity: Propositions for intervention. *Psychologica*, 62(1), 233–250. [https://doi.org/10.14195/1647-8606\\_62-1\\_12](https://doi.org/10.14195/1647-8606_62-1_12)
- Duffy, R. D., Allan, B. A., England, J. W., Blustein, D. L., Autin, K. L., Douglass, R. P., Ferreira, J., & Santos, E. J. R. (2017). The development and initial validation of the decent work scale. *Journal of Counseling Psychology*, 64(2), 206–221. <https://doi.org/10.1037/cou0000191>
- Duffy, R. D., Kim, H. J., Perez, G., Prieto, C. G., Torgal, C., & Kenny, M. E. (2022a). Decent education as a precursor to decent work: An overview and construct conceptualization. *Journal of Vocational Behavior*, 138(February), 103771. <https://doi.org/10.1016/j.jvb.2022.103771>
- Duffy, R. D., Kim, H. J., Perez, G., Prieto, C. G., Torgal, C., & Kenny, M. E. (2022b). Decent education as a precursor to decent work: An overview and construct conceptualization. *Journal of Vocational Behavior*, 138(February), 103771.
- Duflo, E. (2001). Schooling and labor market consequences of school construction in Indonesia: Evidence from an unusual policy experiment. *American Economic Review*, 91(4), 795–813. <https://doi.org/10.1257/aer.91.4.795>
- Eichhorst, W., Rodríguez-Planas, N., Schmidl, R., & Zimmermann, K. F. (2015). A road map to vocational education and training in industrialized countries. *ILR Review*, 68(2), 314–337. <https://doi.org/10.1177/0019793914564963>
- Fields, G. S. (2003). *International labor standards and decent work: Perspectives from the developing world*. (J. Robert, Y. Flanagan, & B. William, eds.). Stanford University Press. <https://ecommons.cornell.edu/handle/1813/75713>
- Findeisen, S., Jüttler, A., Neuenschwander, M. P., & Schumann, S. (2022). Transition from school to work – explaining persistence intention in vocational education and training in Switzerland. *Vocations and Learning*, 15(1), 129–154. <https://doi.org/10.1007/s12186-021-09282-4>
- Ghai, D. (2003). Decent work: Concept and indicators. *International Labour Review*, 142(2), 113–145. <https://doi.org/10.1111/j.1564-913X.2003.tb00256.x>

- Graham, S. E., & Kurlaender, M. (2011). Using propensity scores in educational research: General principles and practical applications. *The Journal of Educational Research*, 104(5), 340–353. <https://doi.org/10.1080/00220671.2010.486082>
- Green, F., McIntosh, S., & Vignoles, A. (2002). The utilization of education and skills: Evidence from Britain. *The Manchester School*, 70(6), 792–811. <https://doi.org/10.1111/1467-9957.00325>
- Guo, D., & Wang, A. (2020). Is vocational education a good alternative to low-performing students in China. *International Journal of Educational Development*, 75(March), 102187. <https://doi.org/10.1016/j.ijedudev.2020.102187>
- Hampf, F., & Woessmann, L. (2017). Vocational vs. general education and employment over the life cycle: New evidence from PIAAC. *CESifo Economic Studies*, 63(3), 255–269. <https://doi.org/10.1093/cesifo/ifx012>
- Hawley, J. D. (2008). Vocational-technical schooling and occupational matching in Thailand: Differences between men and women. *Asia Pacific Journal of Education*, 28(2), 189–205. <https://doi.org/10.1080/02188790802035846>
- ILO. (2015). *Labour and social trends in Indonesia 2014 - 2015: Strengthening competitiveness and productivity through decent work*. [https://www.ilo.org/jakarta/whatwedo/publications/WCMS\\_381566/lang-en/index.htm](https://www.ilo.org/jakarta/whatwedo/publications/WCMS_381566/lang-en/index.htm)
- ILO. (2017). *Indonesia jobs outlook 2017*.
- Jasmina, T. (2020). Vocational secondary education in Indonesia: Yea or nay? *Departmental Bulletin Paper*, 27(3), 115–129. <https://doi.org/10.34382/00013126>
- Kahyarara, G., & Teal, F. (2008). 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>
- Kashyap, V., Nakra, N., & Arora, R. (2022). Do “decent work” dimensions lead to work engagement? Empirical evidence from higher education institutions in India. *European Journal of Training & Development*, 46(1–2), 158–177. <https://doi.org/10.1108/EJTD-08-2020-0127>
- Kim, A. K., & Shin, D. J. (2007). School to work transition and employment status of high school graduate youths. *Korean Journal of Labor Studies*, 13(2), 125–148. <https://doi.org/10.17005/kals.2007.13.2.125>
- King, K. (2012). The geopolitics and meanings of India’s massive skills development ambitions. *International Journal of Educational Development*, 32(5), 665–673. <https://doi.org/10.1016/j.ijedudev.2012.02.001>
- King, K., & Palmer, R. (2010). *Planning for technical and vocational skills development* (U. IIEP, ed.). Fundamentals of educational planning, no. 94.
- Kozan, S., & Blustein, D. L. (2019). Decent work and well-being among low-income Turkish employees: Testing the psychology of working theory. *Journal of Counseling Psychology*, 66(3), 317–327. <https://doi.org/10.1037/cou0000342>
- Lavagnini, M., & Mennella, A. (2016). Decent work in Italy: The basic-relations-fairness proposal. *Forum for Social Economics*, 45(2–3), 193–212. <https://doi.org/10.1080/07360932.2014.995198>
- Lee, K. W., Kim, D. H., & Lee, H. K. (2016). Is the Meister vocational high school more cost-effective? *International Journal of Educational Development*, 51, 84–95. <https://doi.org/10.1016/j.ijedudev.2016.07.003>
- Mahirda, K., & Wahyuni, H. (2016). Returning to general and vocational high-schools in Indonesia. *Review of Economic and Business Studies*, 9(2), 9–28. <https://doi.org/10.1515/rebs-2016-0031>
- Malley, J., & Keating, J. (2000). Policy influences on the implementation of vocational education and training in Australian secondary schools 1. *Journal of Vocational Education and Training*, 52(4), 627–652. <https://doi.org/10.1080/13636820000200146>
- Masdonati, J., Massoudi, K., Blustein, D. L., & Duffy, R. D. (2022). Moving toward decent work : Application of the psychology of working theory to the school-to-work transition. *Journal of Career Development*, 49(1), 41–59. <https://doi.org/10.1177/0894845321991681>
- Middeldorp, M. M., Edzes, A. J. E., & Van Dijk, J. (2019). Smoothness of the school-to-work transition: General versus vocational upper-secondary education. *European Sociological Review*, 35(1), 81–97. <https://doi.org/10.1093/esr/jcy043>

- Moenjak, T., & Worswick, C. (2003). Vocational education in Thailand: A study of choice and returns. *Economics of Education Review*, 22(1), 99–107. <https://doi.org/10.1016/S0272-77570100059-0>
- Mortensen, D., & Pissarides, C. (1999). New developments in models of search in the labor market. In O. Ashenfelter & D. Card (Eds.), *Handbook of labor economics* (Vol. 3, pp. 2567–2627). Elsevier. [https://doi.org/10.1016/S1573-4463\(99\)30025-0](https://doi.org/10.1016/S1573-4463(99)30025-0)
- Nam, J. S., & Kim, S. Y. (2019). Decent work in South Korea: Context, conceptualization, and assessment. *Journal of Vocational Behavior*, 115. <https://doi.org/10.1016/j.jvb.2019.05.006>
- Neuman, S., & Ziderman, A. (1999). Vocational education in Israel: Wage effects of the VocEd-occupation match. *The Journal of Human Resources*, 34(2), 407–420. <https://doi.org/10.2307/146351>
- Newhouse, D., & Suryadarma, D. (2011). The value of vocational education: High school type and labor market outcomes in Indonesia. *The World Bank Economic Review*, 25(2), 296–322. <https://doi.org/10.1093/wber/lhr010>
- Nilsson, B. (2019). The school-to-work transition in developing countries. *The Journal of Development Studies*, 55(5), 745–764. <https://doi.org/10.1080/00220388.2018.1475649>
- Oketch, M. O. (2007). To vocationalise or not to vocationalise? Perspectives on current trends and issues in technical and vocational education and training (TVET) in Africa. *International Journal of Educational Development*, 27(2), 220–234. <https://doi.org/10.1016/j.ijedudev.2006.07.004>
- 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>
- Purnastuti, L., Miller, P. W., & Salim, R. (2013). Declining rates of return to education: Evidence for Indonesia. *Bulletin of Indonesian Economic Studies*, 49(2), 213–236. <https://doi.org/10.1080/00074918.2013.809842>
- Purnastuti, L., & Salim, R. (2015). The returns to education in Indonesia: Post reform estimate. *The Journal of Developing Areas*, 49(3), 183–204. <https://doi.org/10.1353/jda.2015.0174>
- Rogers, M., & Creed, P. (2000). School-to-work transition: From theory to practice. *Australian Journal of Career Development*, 9(3), 1–23. <https://www.researchgate.net/publication/234721095School-to-Work>
- Rosenbaum, J. E., Kariya, T., Settersten, R., & Maier, T. (1990). Market and network theories of the transition from high school to work: Their application to industrialized societies. *Annual Review of Sociology*, 16(1), 263–299. <https://doi.org/10.1146/annurev.so.16.080190.001403>
- Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Matched Sampling for Causal Effects*, 70(1), 41–55. <https://doi.org/10.1093/biomet/70.1.41>
- 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>
- Silliman, M., & Virtanen, H. (2022). Labor market returns to vocational secondary education. *American Economic Journal: Applied Economics*, 14(1), 197–224. <https://doi.org/10.1257/app.20190782>
- statista (2023, May 13). *Education completion rate in Indonesia*.
- Suharno, P. N. A., & Harjanto, B. (2020). Vocational education in Indonesia: History, development, opportunities, and challenges. *Children & Youth Services Review*, 115(January), 105092. <https://doi.org/10.1016/j.childyouth.2020.105092>
- Tadjoeddin, M. Z. (2014). Decent work: On the quality of employment in Indonesia. *Asian Journal of Social Science*, 42(1–2), 9–44. <https://doi.org/10.1163/15685314-04201004>
- Tadjoeddin, M. Z. (2016). Earnings, productivity and inequality in Indonesia. *The Economic & Labour Relations Review*, 27(2), 248–271. <https://doi.org/10.1177/1035304616643452>
- Tangtipongkul, K. (2015). Rates of return to schooling in Thailand. *Asian Development Review*, 32(2), 38–64. [https://doi.org/10.1162/ADEV\\_a\\_00051](https://doi.org/10.1162/ADEV_a_00051)
- Torar, L., & Wahono, W. (2016). *Education development in Indonesia 2014/2015*.
- Torun, H., & Tumen, S. (2019). Do vocational high school graduates have better employment outcomes than general high school graduates? *International Journal of Manpower*, 40(8), 1364–1388. <https://doi.org/10.1108/IJM-11-2017-0314>

- Tripney, J., Hombrados, J., Newman, M., Hovish, K., Brown, C., Steinka-Fry, K., & Wilkey, E. (2013). Technical and vocational education and training (TVET) Interventions to improve the employability and employment of young people in low- and middle-income countries: A systematic review. *Campbell Systematic Reviews*, 9(1), 1–171. <https://doi.org/10.4073/csr.2013.9>
- UNESCO-UNEVOC. (2020). *TVET country profile: Indonesia*. <https://unesdoc.unesco.org/ark:/48223/pf0000373698?locale=en>
- Vandenberg, P., & Laranjo, J. (2021). Vocational training and labor market outcomes in the Philippines. *International Journal of Educational Development*, 87(September), 102501. <https://doi.org/10.1016/j.ijedudev.2021.102501>
- Wang, A., & Guo, D. (2019). Technical and vocational education in China: Enrolment and socio-economic status. *Journal of Vocational Education and Training*, 71(4), 538–555. <https://doi.org/10.1080/13636820.2018.1535519>
- Widyanti, R. D. (2018). Wage inequality and return to education in Indonesia: Quantile regression analysis. *Signifikan: Jurnal Ilmu Ekonomi*, 7(1), 27–44. <https://doi.org/10.15408/sjie.v7i1.6071>
- Zimmermann, K. F., Biavaschi, C., Eichhorst, W., Giulietti, C., Kendzia, M. J., Muravyev, A., Pieters, J., Rodríguez-Planas, N., & Schmidl, R. (2013). Youth unemployment and vocational training. *Foundations and Trends in Microeconomics*, 9(1–2), 1–157. <https://doi.org/10.1561/07000000058>

## Appendix 1. Correlation coefficient between the explained variables in the overall sample

	Log of hourly wages	Formal employment	Pension	Training	Health insurance
Log of hourly wages	1				
Formal employment	0.235	1			
Pension	0.351	0.142	1		
Training	0.228	0.182	0.252	1	
Health insurance	0.440	0.207	0.461	0.304	1