

## RETURN TO EDUCATION IN THE INFORMAL SECTOR IN INDONESIA

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### Abstract

As developing countries with large population, Indonesia face challenges in managing its human capital to support the development. The government has allocated significant amount of money in educational sector to improve the education in Indonesia that will lead to increase in Indonesian capability and competitiveness in the labour market. However, labour market in Indonesia is still dominated by the informal workers which characterized with low educated and low earning jobs. This paper aims to explore whether education bring private return to the informal workers by applying the Mincer human capital earning function and exploring the returns between gender and areas (rural or urban). The results show that education bring positive impact to the worker's earning although the return is smaller in the informal sector than the informal one.

**Keywords:** labor market; return to education; informal workers

### Introduction

Indonesia is a developing country and the 4th most populous country in the world that-from the latest census conducted by Statistics Indonesia (Badan Pusat Statistik-BPS) in September 2020-stands at 270.2 million people. Around 137.91 million people of the population are in the workforce. Indonesia's workforce has some characteristics like growing working-age population, decreasing dependency ratio, high urbanization, large numbers of female participation in the workforce and increasing workers' average years of schooling (Manning & Pratomo, 2018). In this workforce, 131.03 people are working and around 56.5 percent of the workers are in the informal sector (Statistics Indonesia 2020).

A formal worker usually is defined as a paid labour with a formal agreement or contract with the employer (Malta, Kolovich, Martinez, & Tavares, 2019). In the National Labour Force Survey (Survei Tenaga Kerja Nasional/ Sakernas) formal and informal employers are identified as those who are included in the workforce and categorized according to the job status in the questionnaire they filled. Employers that are assisted by permanent/paid worker and those who work permanently in an institution/office/company or for other people are considered as formal workers. Others who do not belong to the category are considered informal workers. According to the International Conference of Labour Statisticians (ICLS), informal sector was defined as "employment and production that takes place in small and/or unregistered enterprises"

and this definition then broadens in the 17th ICLS as informal employment by including informal wage employment (Cuevas, Rosario, Barcenas, & Christian, 2009).

A large share of the informal sector is a common trend in developing countries. Data from International Labour Organizations (ILO) showed that in 2018 informal employment dominated the labour market in developing countries. For instances, in India 88.6 percent of the workers are in the informal sector, 81.7 percent in Pakistan and 79.5 percent in Myanmar and the percentage could be larger in sub-Saharan Africa. Women and children usually dominated this sector. These numbers of informal workers possibly increase due to the COVID-19 crisis that causes a decline in the economy in many countries especially the developing countries. Some firms/companies were forced to reduce the employees to maintain their business, some even closed and bankrupt. This situation can lead people to work as an informal worker to continue earning for living.

The informal sector has some characteristics such as lack of compliance in paying taxes (Esteban-Pretel & Kitao, 2021), inefficient resources allocation (Hsieh & Klenow, 2009) and difficulty in getting finance from formal sources and government programs (Rothenberg et al., 2016). This sector is considered vulnerable since the workers have no social safety net and have a higher risk of crisis (Narula, 2020). On the other side, the workers in the sector tend to have lower education, skills and earnings compare to workers in the formal sector (Günther & Launov, 2012) whereas people with higher education tend to earn more. In Indonesia, this sector is perceived to have significant roles in the economy by absorbing workers who cannot enter the formal sector (Cuevas et al., 2009).

Education is considered as key to improving the quality of human capital and is believed as an important determinant of income since it can be a “signal of innate abilities” (Spence, 1973). The more educated person will be less unemployed (Mincer 1991). It is assumed could increase income and productivity with the knowledge and skills to analyse problems which make it – combine with training - the most important investment in man (Ma & Iwasaki 2021). (Chen & Hamori, 2009) strengthen the argument by a study that found higher earnings were considered related to better productivity which is attributed to a higher level of education. There are various benefits from higher education such as more stable employment (Mincer, 1991), wider networks that reduce the possibility to be unemployed and higher average income (Peet, Fink, & Fawzi, 2015). These benefits are considered can be an elevator in social mobility and hopefully could narrowing the income inequality among individuals. Therefore, it is not surprising if many developing countries allocated a significant amount of their budget to education. Return to schooling/education is usually used to measure the relation between educational attainment and earning

In Indonesia Education is regulated in Law No. 20 of 2003. The law stated that National Education is aimed to develop a learner’s potential in intellectual capability, character and civilization of the nation. According to the law, the levels of education are divided into three: basic, secondary and higher education. Basic education includes the

elementary schools (Sekolah Dasar/SD) and junior secondary school (Sekolah Menengah Pertama/SMP). Secondary education consists of general secondary school (Sekolah Menengah Atas/ SMA) and vocational secondary school (Sekolah Menengah Kejuruan/ SMK). While higher education comprises a diploma, bachelor (sarjana), masters, postgraduate and doctorate programmes.

The Indonesian government has made some reforms to increase the quality of education in the country. Many schools were built massively in 1973, six years of schooling compulsory applied in 1984 - which was extended to be nine years in 1994 and twelve years in 2015 (Suryadarma & Jones, 2013). The twelve years compulsory learning programmes give right for every citizen aged seven to fifteen to attain basic education. The government also mandated 20 percent of its national budget be used on education. This spending used in various programs like the School Operational Assistance Grant Since (Bantuan Operasional Sekolah/ BOS) that can be used by the school to provide supporting materials to enhance the learning process and Smart Indonesia Program (Program Indonesia Pintar/ PIP) that helping parents to put their children in schools.

This paper is interested in exploring the return to education in the informal sector in Indonesia since most of the workers are in that sector and that the government devoted a large amount of money to improve the national quality of education. The informal sector is often characterized by poverty, low earnings and, low educated workers but if we see the Sakernas 2019, although a very small percentage, individuals with graduate/post-graduate education also enter the sectors. Using the Mincer equation, this paper will try to see whether education has an impact on determining earnings for workers in the informal sector. It will also explore the possibility of workers choosing their sector employment to see its relation with educational attainment. Following this section, Section 2 will provide the literature review of informality and return to education, Section 3 will talk about data and the model used in this paper, section 4 will discuss the result of the return to education in Indonesia and this paper will be closed with conclusion that sums up the findings and implication for practice and policy in section 5.

### **Research Methods**

This paper explores data from the 2019 Indonesia National Labour Survey (Sakernas), a cross-sectional survey conducted by the central statistics agency in Indonesia - Statistics Indonesia (BPS)- which is design to captured Indonesia's workforce and its changes. It provides individual information of highest educational attainment, working status, working hours, income, and employment sectors. Although Sakernas has some inconsistency in defined the certain term, it is still a good source to observe the trend of employment measures in the long term (Dong, 2016).

The survey usually held twice a year, in February and in August and specifically designed to collect data of the labour force and working-age population. SAKERNAS 2019 is chosen since it is the latest data before the pandemic hit Indonesia and the world

in 2020 which must be brought significant changes in the labour market and so does in the return to education.

The survey used labour force concepts as suggested by the International Labour Organization (ILO) which divides the population into the working-age groups (which then classified into individuals who are in the labour force and individuals who are not in the labour force) and non-working age group. The working-age group consists of individuals aged 15 years but to be considered in the labour force, they need to meet some criteria such as aged 15-65, working in the previous week, having jobs but temporarily not work and currently not working because still in job searching or developing new business (Statistics Indonesia 2020). Working is defined as an activity which is done at least one hour on the survey week, included unpaid worker. The employment status divided into seven categories: own-account worker, employer that is assisted by temporary/unpaid worker, casual agriculture worker, casual non-agriculture worker, unpaid family worker, employer that is assisted by permanent/paid worker and employee. The last two is considered as workers in the formal sector while others are informal workers.

The 2019 survey has 782,789 observations aged 15 and above with the most educational attainment in elementary schooling (23.81 percent) followed by Junior high school (21.41 percent) and general senior high school (18.60 percent). 60.52 percent of the observations were in the informal sectors with most are own-account workers (21.26 percent). Among the observations, 66.42 percent are in the workforce with unemployment counts for 4.49 percent. Most unemployed workers are those who graduated from Senior high school (general and vocational school) with contributed 51.28% of the unemployed. More detail of the educational attainment can be seen in the table below

**Table 1**  
**The Variables Description and Data Source**

Education	Workforce		Sectors	
	Employed (%)	Unemployed (%)	Informal (%)	Formal (%)
< Elementary	17,92	6,94	25,03	6,88
Elementary	24,91	12,62	31,29	15,03
Junior High School	17,22	15,28	19,18	14,23
General High School	18,52	30,80	15,32	23,48
Vocational school	9,13	20,48	6,08	13,82
Undergraduate	11,56	13,62	3,03	24,80
Graduate/Post graduate	0,72	0,26	0,06	1,76
Total	100	100	100	100

Source: Author's calculation using Sakernas 2019.

This paper uses Mincer's (1974) human capital earning function in estimating the return to education (Card 1999). Although Mincer's equation does not imply causality

between schooling and earnings, the results of this function are considered useful in providing information in making a decision that is related to the education investment. Besides the Mincer equation, we can use the cost of education to calculating the return, but this method is not supported by the Sakernas data and quite difficult to apply. The Mincer equation uses the natural logarithm of wage as a function of years of schooling and years of individual's experience. The equation is as follow:

$$\ln W_i = \alpha + \beta_1 S_i + \beta_2 X_i + \beta_3 X_i^2 + e_i \quad i = 1, \dots, N$$

Where  $\ln W_i$  is the natural logarithm of wage as the measure of income,  $S_i$  is the years of schooling of an individual,  $X_i$  is the years of an individual's work experience. The quadratic in work experience ( $X_i^2$ ) is because increasing earnings in work experience have a decreasing rate. The  $e_i$  is for the error random term. The years of schooling have a negative correlation with years of work experience because when an individual who has more years of schooling will have fewer years in working experience since he/she started to work after completing school (Angrist & Pischke).

The same equation is employed in this paper but since the Sakernas did not provide data about working experience, this paper use age minus years of schooling minus six as a proxy. Years of schooling is 0 for individual who never attended school, 3 for an individual who ever been schooling in elementary but did not manage to finish, 6 for individuals who finished elementary school, 9 for individuals who finished junior high school, 12 for individuals who finished senior high school, 13 for individuals who finished diploma I, 15 for individuals who finished diploma III, 16 for individuals who finished an undergraduate degree, 18 for individuals who finished the graduate degree and 22 for individuals who finished a post-graduate/doctoral degree. Coefficients are estimated under the Ordinary Least Square (OLS) regression. This paper used monthly wage instead of hourly wage and has also control for province residential,

From around 500,000 workers aged 15 to 65 in the observations, only 321,214 observations reported income which is observed in this paper. This paper then explores each sector by looking at the difference of return to education for males and females in urban and rural areas. In processing the data, individuals are classified as formal workers if they are in the labour force and work in the institution/ office/company/other people and get wage/salary or if they are employers that are assisted by permanent/paid worker and those who work permanently. Meanwhile, according to Statistics Indonesia, in the questionnaire section employment status, there five categories of individuals in the informal sector. First are the entrepreneurs or the own-account labours who work at their own risk without any help from the paid or unpaid worker. Second, the employer who work at their own risk and is helped by the unpaid or temporary worker. Third, the casual agriculture labour who works temporarily for others (employer or institution) in the agriculture sector and getting paid in money or goods with the daily or direct payment system. Next is the casual non-agricultural labours who are similar to the

previous categories but work in the non-agriculture fields such as mining, construction, trade, and transportation. The last are individuals who work as unpaid labours or work for another family member (for example a wife helping her husband's work without getting paid).

Before running the Mincer regression, we first estimate the choice of worker's employment sector whether to work in the formal sector or the informal sector with binary response models. In this model, we use the interest will be in the response probability as in (Wooldridge, 2013):

$$P(y=1|x) = P(y=1|x_1, x_2, x_3, \dots, x_k)$$

$$P(y=1|x) = G(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k) = G(\beta_0 + x\beta)$$

where  $y$  is the response to be in the formal sector ( $y=1$ ),  $x$  represents the explanatory variables. The explanatory variables used in this paper are gender, educational attainment, marriage status, age group, and whether the labours are the head of the household or not.  $G$  is the standard normal cumulative distribution function (cdf) with values between zero and one.

$$G(x) = \Phi(x) \equiv \int_{-\infty}^x \phi(v) dv$$

where  $\phi(x)$  refers to the standard normal density.

We then report the marginal effects that show the change in the probability of  $y=1$  given a change in 1 unit of an independent variable. The marginal effects for probit is as follow:

$$\partial p / \partial x_j = \phi(x' \beta) \beta_j$$

We then predict the probability of  $y=1$  for each observation and the value for the predicted probabilities are limited between zero and one:

$$\hat{p} = pr[y = 1|x] = G(x'\beta)$$

## Results and Discussions

### 1. Choice of Work Sector

As the informal sector often characterized by low educated workers with low earnings, some people may see to be employed in the informal sector as the last resort. However, a study from (Günther & Launov, 2012) found that the sector is not only considered as a last resort but also as a working field for individuals with comparative advantage. Observing the youth labour market in developing economy, (Ahn et al., 2019) find that women tend to choose to work in the informal sector and that less educated labours are more likely to be worked in the informal sector.

This paper tries to observe the probability of being an informal worker by looking at some variables like gender, educational attainment, marriage status, age

group, and whether the labours are head of household or not. We apply the probit equation with binary choices where 0 for choosing to work in the informal sector and 1 for choosing to work in the formal sector. The results of the probit estimation can be seen in Table 1 below:

**Table 1**  
**The Estimation of Choice of employment sector**

<b>Employment Choice</b>	<b>OLS Coeff</b>	<b>Probit Coeff.</b>	<b>Probit average marginal effects</b>
Gender	0.0513894 (0.0016054)	0.1694256 (0.0051827)	0.0521029 (0.0015892)
Education	0.1124365 0.0004062	0.3299276 (0.0013324)	0.1014615 (0.0003318)
Age group	-0.0386245 (0.0005438)	-0.1355848 (0.0018109)	-0.0416959 (0.000549)
Head of HH	0.0546074 (0.0017162)	0.1989375 (0.0055886)	0.0611786 (0.0017132)
Marriage Status	-0.0309413 (0.0014848)	-0.814593 0.0048462	-0.0250509 (0.001489)
Urban	0.1472537 (0.0012778)	0.4541006 (0.0040256)	0.139648 (0.0011934)
(Pseudo) R square	0.2337	0.1896	

Sources: Author’s calculation using Sakernas 2019

Standard errors in parentheses All results are statistically significant with  $p < 0.05$

Interpreting the result, we can say that under the probit marginal effect male have a 5.2 percent higher probability to choose work in the formal sector than female. For each additional level of schooling, individuals have a 10.14 percent higher probability to prefer being in the formal sector than the informal. This could explain why the informal sector is still dominated by the less educated workers. The result shows that age and marriage status decrease the probability to enter the formal sector. The probability to choose the formal sector increase by 6.11 percent for individuals who are the head of the household and the probability to choose the sector is higher with 13.96 percent for individuals who live in the city/urban area. The model results have a sensitivity value of 58,96% and specificity of 81.74% and correctly classified 72.74% of the values.

**2. Return to Education in Indonesia**

Table 2 display the results of mincer equation under OLS regression and compare the return to education of the whole sample with the return to education in both sectors. For all samples in the Sakernas 2019, the private return to education coefficient is 0.06989 or 6.98 percent which means that each additional level of schooling will increase an individual’s wage by 6.98 percent. The return for individuals in the formal sector is higher than for individuals in the informal sector. Worker in the formal sector will earn 7.11 percent higher for each additional level of schooling while workers in the informal sector only earn 4.36 percent higher for each

additional level of schooling. The variable experience shows that for each additional year of working experience, the wage will increase by 2.98 percent. Similar to the return to education, return to working experience also higher in the formal sector than in the informal sector. The result is in line with (Günther & Launov, 2012) who found that education and experience returns are higher in the formal sector:

**Table 2**  
**Return to Education by Formal and Informal**

	Overall	Formal	Informal
Schooling	0.06989*** (0.00061)	0.07108*** (0.00073)	0.04360*** (0.00105)
Experience	0.02987*** (0.00049)	0.03708*** (0.00064)	0.026891** (0.00085)
Experience <sup>2</sup>	-0.00051*** (7.86e-06)	-0.00058*** (0.00001)	-0.00047*** (0.00001)
Province FE	Yes	Yes	Yes
R square	0.1961	0.1972	0.1193

Sources: Author's calculation

Standard errors in parentheses All results are statistically significant with  $p < 0.01$   
Province FE is the province fixed effect

It is not surprising that the return of formal workers is higher than the informal ones because the requirements to enter the formal sector usually include certain educational attainment. Education also plays role in determining the worker's position in the firm where higher educated workers have the higher possibility to work in managerial jobs while lower educational workers tend to be in technical jobs. The salary structure usually follows the worker's position which is determined by the worker's education and this leads to higher educational workers gain higher income than lower educational workers. Moreover, formal workers may find the opportunity to continue their study while working since some companies provide scholarships or training to improve the worker's skills and knowledge.

While in the informal sectors, firms operate in a fluctuating mode which is driven by the demand of the market which leads to unstable profits. Firms and workers in this sector have high heterogeneity where while some firms may have limited access to financing but some may have stood stable, some have grown with stable demand while some still struggle to get consumers. This condition makes the informal sector focus more on the operationalisation of firms and lack in improving human capital.

Looking further to the return to education for individuals who worked in the informal sector as in Table 2, we can see that return to education is different between males and females in both areas. For a female worker in the urban area, each additional level of schooling will result in 5.21 percent higher income while female in rural only gain 3.81 percent higher income for each additional level of schooling. On the other hand, each additional level of schooling brings to 4.25 percent higher earnings for the male who works in the informal sector in urban area and 2.37 percent higher earnings if



he works in a rural area. For each area, women have higher return to education compare to men. For each additional year of experience, a woman in the urban area gains higher than a man with 2.82 percent compared to 2.48 percent. However, in the rural area, the man getting higher income for each year of additional working experience with 2.65 percent compared to the woman who only gains 2.54 percent higher income.

**Table 2**  
**Return to Education in Informal by groups**

Variables	Male Urban	Male Rural	Female Urban	Female Rural
Schooling	0.04252*** (0.00167)	0.02368*** (0.00162)	0.0521*** (0.00304)	0.03807*** (0.00311)
Experience	0.02486*** (0.00144)	0.02649*** (0.00126)	0.02818*** (0.00238)	0.02544*** (0.00227)
Experience <sup>2</sup>	-0.00047*** (0.00002)	-0.00048*** (0.00001)	-0.00039*** (0.00003)	-0.00040*** (0.000293)
Province FE	Yes	Yes	Yes	Yes
R square	0.1408	0.0892	0.1035	0.0947

Sources: Author's calculation

Standard errors in parentheses All results are statistically significant with p<0.01  
Province FE is the province fixed effect

The results are quite similar in the formal sector. Looking at table 4.3. For both areas, woman gain higher individual return to education than man. Each additional level of schooling will increase woman wage in the urban area by 10.28 percent. The gap is quite far compared to man in an urban area who only get 7.89 percent higher income for each additional level of schooling. In the rural area, women also have higher education return with 7.81 percent while man only has 4.94 percent return to education. However, in the formal sector, return to experience bring higher gain to male than to female.

**Table 3**  
**Return to Education in Formal by groups**

Variables	Male Urban	Male Rural	Female Urban	Female Rural
Schooling	0.07894*** (0.00104)	0.04938*** (0.00121)	0.1028*** (0.00183)	0.07814*** (0.00283)
Experience	0.03548*** (0.00092)	0.039932*** (0.00114)	0.017424*** (0.00138)	0.0383*** (0.00227)
Experience <sup>2</sup>	-0.00056*** (0.000017)	-0.00064*** (0.00002)	-0.00025*** (0.000283)	0.000521*** (0.00004)
Province FE	Yes	Yes	Yes	Yes
Observations	31,883	23,621	14,938	8,142
R square	0.2537	0.1559	0.2739	0.1554

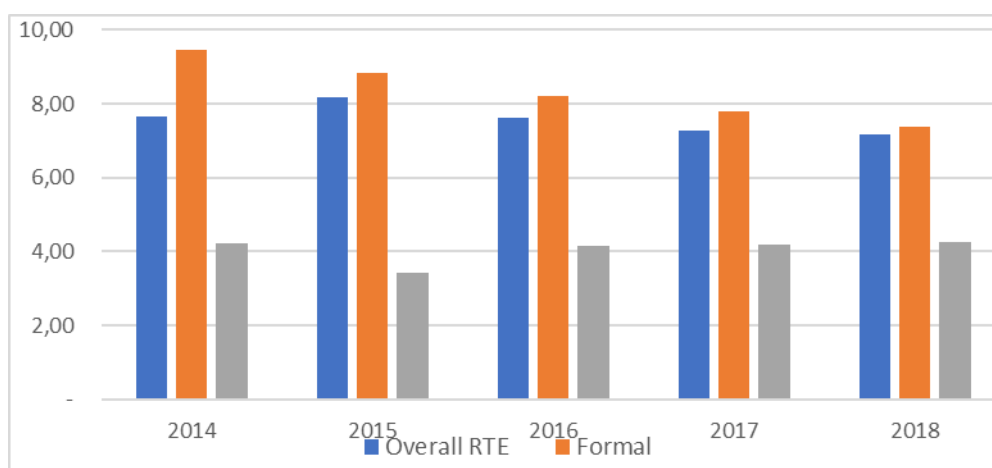
Sources: Author's calculation

Standard errors in parentheses All results are statistically significant with p<0.01  
Province FE is the province fixed effect

For both sectors, urban workers gain a higher return to education than rural workers. It is as expected that in urban areas, employers are more likely to appreciate educated workers than the less educated ones. The jobs in urban areas usually are more related to analytical thinking and problem solving which needed more intellectual ability than physical ability. If we look at table 4.2.3, the return to experience in the rural area is higher than the urban one for male and female. It may be indicated that experience in doing the jobs in the rural area may bring positive influence on worker's productivity.

It is interesting that from the regression women have a higher return to education in both sectors and areas which means that each additional level of education brings higher additional income to women in both sectors than to men whereas women often being considered to earn a lower income than men. This result is aligned with (Azlam, 2007) who studied the return to education in Pakistan and found that returns to women's education are higher than man and statistically significant. Using the National Longitudinal Survey of Youth, (Dougherty, 2003) also found that female's return to education is higher than male and he reasoned that it was due to women work in sectors that relatively valuing educational attainment more but the tendency that women perform better in academic compare to men do not explain any connection between educational attainment and income. Moreover, he explained that a better-educated woman will have a higher potential income so that she can pay for household services (including child care) that enable her to have better job suits to her education. This higher return may also come as a better-educated woman will have a stronger attachment to the labour force than the less-educated ones (Mincer, 1991). This result also supported by (Psacharopoulos, 1994) who stated that it is more beneficial to educate women than men.

Applying the mincer equations into Sakernas data from 2014-2018, we can see the trend of return to education in Indonesia as shown by Figure 4.2.1 below:



**Figure 1**

**Return to education in Indonesia 2014-2018**

**Source: Author's calculation using Sakernas data from 2014-2018**

Looking at the graph, from 2014 to 2015, the overall return to education is increasing but the following years show a declining trend. If we look into the political side, 2014 was the year for the presidential election and 2015 was the first period of President Jokowi. In the educational sector, President put the concern to improve the educational attainment and educational quality in Indonesia to increase the human capital competitiveness. Some programs like Indonesia Smart Card (Kartu Indonesia Pintar) were used to make education can be reached by more children in Indonesia. The educational programmes in line with the labour market target in enhancing workers productivity by promoting vocational schools and training to improve workers' capacity. President had also been successful in lowering the agriculture employment and increasing the services sector, but in manufacturing the jobs still did not grow.

However, a study by (Manning & Pratomo, 2018) showed that the improvement only happened in the increase of education enrolment and the number of jobs (particularly in the service sector) but not the humans' quality which then leads to low productivity of workers. Figure 4.2.1 may show this story where for all observations return to education decreased from 2015 to 2018. However, the decline happened in the formal sector while in the informal sector the return to education showed an increasing trend. This might due to the increase in service jobs which are usually employed by informal workers and since the jobs in the manufacturing sector (which is usually employed by formal workers) did not grow, workers gained lower returns to education in that sector.

## **Conclusion**

The quality of human capital is an important factor in the economy particularly in this globalization era as Schwab and Vanham (2021) argue that to ripe the benefit from globalization the society's excellence needs to be congruent with the powerful technology. Education plays important role in improving human capital and has been long considered as an escalator in social mobility. Earnings that an individual gets from jobs can be a proxy to the human capital (Jorgenson & Fraumeni 1992) by measuring the return to education. Studies show that return education could vary among gender, school levels and work sector.

This paper contributes to answer the return to education in the informal sector in Indonesia which has the biggest part in employment since 60.52 percent labours are in the informal sector. Despite any reasons that courage an individual to work in the informal sector, we found that education still has a significant role in determining income in the informal sector although the return is smaller than the formal one. It is also interesting that women have higher returns in education than men while in fact, women tend to have lower earnings than men.

Using the 2SLS method, it is assumed that the fiscal balance funds is affecting the capital expenditure that is done by the local government (first stage), and the capital expenditure with the other variables is affecting the economic growth (second stage). The result of the first stage shows that the fiscal balance funds has positive and strong

effect for the local economic growth, with DAU as the most influencing variable. While on the second stage, it is shown that every variable has positive effect for the economic growth. However, from all the variables calculated, capital expenditure has the strongest coefficient. Furthermore, the results from the calculation also assure that human capital is also important in increasing economic growth.

The results of this paper may come as an insight to policymaker in reconsider the informal sector and government investment in education. As we see most workers are in the informal sector and in that sector, labours are dominated by elementary school graduates, it may come to think about how to develop the education system supported with effective implementation so that workers can improve their knowledge and ability to make them more competitive in the labour market so that they can have better earnings. Although the government has promoted vocational school to equip students to be more engaged with the labour markets, the fact of high-rate unemployment for the vocational school graduates may be indicated that there might be mismatched in the labour market. The difficulty to enter university due to the high course fee also need to be considered since the numbers of graduated people in Indonesia is still considered low. Moreover, the government needs to rethink the connection between policy regarding education investment and employment policy so that human capital in Indonesia can be more productive and the linked between the two sectors can be clearer so that human capital in Indonesia can be more effective to improve the economy. However, the result in this paper might be biased since some unobserved variables cannot be captured and they may be correlated to education and wage such as the person's ability. If panel data is available, fixed-effect regressions can be used to overcome the omitted variable problems.

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