

# Does Vocational Education Matter for the Labour Market? (A Case Study in Mining Sector in East Kalimantan – Indonesia)

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*The research is funded by BPPS-DGHE Republic Indonesia*

## Abstract

This study investigates the impact of education on labour market in mining sector at East Kalimantan by using the National Labour Force Survey (Sakernas) in 2010. By using multinomial logit method with three dependent variables consisting of formal labours of mining sector, informal mining sector, and non mining, this study figures out that education has significant effect especially for labour absorption in formal-mining sector. For high school level, vocational education has positive and significant effect toward labour absorption in formal mining sector. On the other hand, for higher education level, education has negative effect toward labour absorption in formal mining sector. In addition, the impact of education toward labour absorption in informal mining sector is insignificant.

**Keywords:** worker's demography variable, economy (wage) variable, formal and informal mining sector, labour absorption, East Kalimantan.

## 1. Introduction

Indonesia has showed a significant development in education for more than 40 years (Suharti, 2013). It began with education improvement effort done by government of Indonesia by establishing special program as known as Inpres Program. In Inpres Program, government built elementary school in each village in Indonesia in 1973. Next, Inpres Program was continued by Program Wajib Belajar (Program of Compulsory Study) for elementary school in 1984, which then developed into 9-years compulsory study from elementary school until junior high school in 1994. Furthermore, National Education Ministry of Indonesia started to develop vocational education in senior high school level in 2006 in order to reduce the number of unemployment. By developing vocational education in senior high school level, government expected that the number of working class that is ready to work and particularly consists of those who do not intend to continue to college will be increased (Newhouse and Suryadarma, 2011). Government argued that unemployees graduating for vocational education is much lower than the ones graduating from general education.

Nowadays, there are many studies done to figure out the importance of vocational school and the relationship between vocational education and economy growth of a nation. Some studies show that vocational education has bigger impact toward economy growth than general education does (Vu, Tam Bang; Hammes, David L; Iksoon Im, Eric, 2012). Moreover, technical and vocational education and skill development have become important issue in development (King, 2009; Palmer, 2009). For example, in South Africa, there are many intervention policies, institution establishment, and new systems for skill development (Allais, Stephanie, 2012).

In Indonesia, the importance of vocational school is an important issue. Practically, vocational school could be seen in senior high school level. After graduating from junior high school (SMP), students are at their liberty to continue their education to general senior high school (SMA) or vocational high school (SMK). SMK or vocational school is a school providing education and skills, in which skill level could be developed outside school, either by training or apprenticeship. Unfortunately, studying at vocational school mostly becomes the second option after public senior

high school (SMA). In addition, people underestimate vocational school and think that students graduating from vocational school will have lower role among others. Bertocchi, Graziella, Spagat, Michael (2004) studied education system evolution in hierarchy differentiation between vocational and general education.

This study is not the first study investigating the importance of vocational education in Indonesia. Newhouse and Suryadarma (2011) studied the comparison between wage obtained by vocational education graduates and by general education graduates. The result of their study shows that premium wage obtained by vocational education graduates, especially for female graduates, is higher than the one obtained by general education graduates. World Bank (2010) also finds out that wage level for vocational school graduates in Indonesia is higher than public school graduates. Yet, this difference is disappearing day by day.

Comparing with several previous studies, this study was conducted in order to see the role of education, particularly vocational education, toward various formal-informal occupation in mining sector at East Kalimantan Province, Indonesia by using Data Survei Angkatan Kerja Nasional 2010. East Kalimantan is one of Indonesian provinces whose natural resources, particularly coal resources, contributing highly for East Kalimantan's economy and in the mean time becoming largest contributor for Gross Domestic Regional Product (GDRP) in East Kalimantan. In addition, East Kalimantan is one of the largest provinces that is a contributor for Indonesian PDB in mining sector besides Papua and Riau.

Mining sector development in East Kalimantan gives impact to the development of labour absorption in mining sector. Type of occupation in mining sector could be divided into two large parts that are formal mining sector worker and informal mining sector worker. Labours who work in formal mining sector includes labours/employees working with fixed labours/paid labours in mining sector. Meanwhile, informal mining labours consist of independent labours working with unfixed labours/unpaid labours (BPS: 2011).

Being a labour in informal sector is assumed to be a temporary option for those who wait for an opportunity to work in formal sector. It shows that informal sector has a role as "safety valve" for labours when crisis hits this country. Therefore, we could say that the relationship between informal and formal mining sector could not be viewed from two different sides since they relate each other (BPPN, 2009). However, informal sector was also viewed as a trap or pitfall for those who could not obtain formal job and have to work informally without regular pay and benefit. In other words, labours do not have any options to work in another sector because there is limitation in the availability of formal job. This limitation happens since the economic condition is decreasing or labours have relatively low skill or education which make them unable to enter formal labour market. Although they basically would like to turn into formal sector, this worker could not exit from informal sector. Thus, informal sector is their only option.

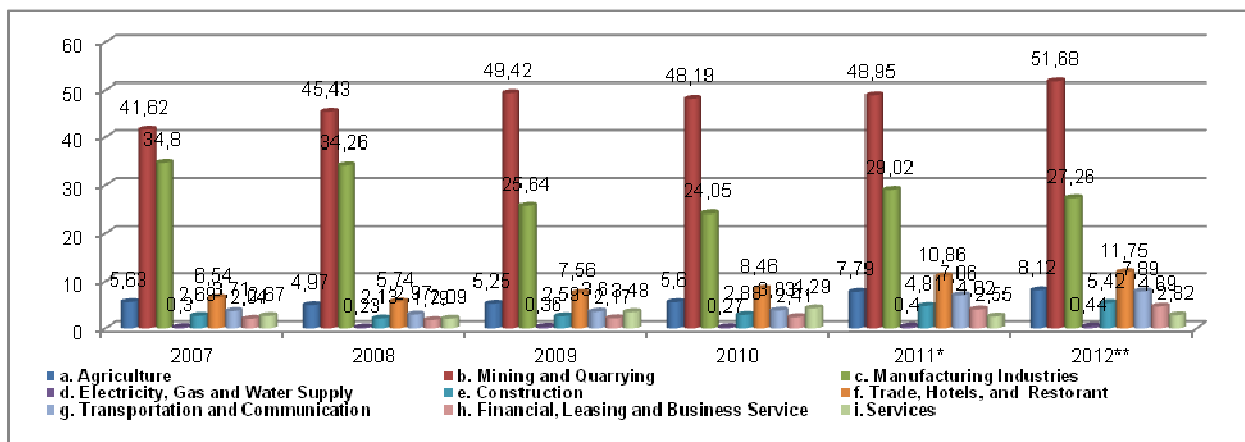
It is interested to conduct a study concerning mining sector's labours in East Kalimantan for Indonesia case since the percentage of labours in mining sector in East Kalimantan is relatively larger than other provinces in Indonesia. Nationally, it is only 2% of labours working in mining sector in Indonesia compared with other sectors, whereas it is 10% of labours working in mining sector in East Kalimantan.

This paper consists of 6 parts. The first part is introduction. Next, the explanation about economy condition in East Kalimantan is discussed in the second part. The third part is review of the related literature, and the fourth one consists of data and research method. The fifth part analyzes empirical findings obtained. Finally, the last part carries conclusion.

## **2. Economy Condition in East Kalimantan**

East Kalimantan is an Indonesian province whose lots of various and abundant natural resources, such as crude oil and gas, gold, silver and coal. Nowadays, coal resources is the largest contributor for GDRP in East Kalimantan. Figure 1 shows GDRP contribution of East Kalimantan based on constant price from 2005 until 2009. Based on the figure, Mining and Excavation sector is economy pillar in East Kalimantan. Then it is followed by Manufacture Industry, Commerce, Restaurant, Hotel, Agriculture, and Service sectors. Regarding the largest GDRP contribution, it is

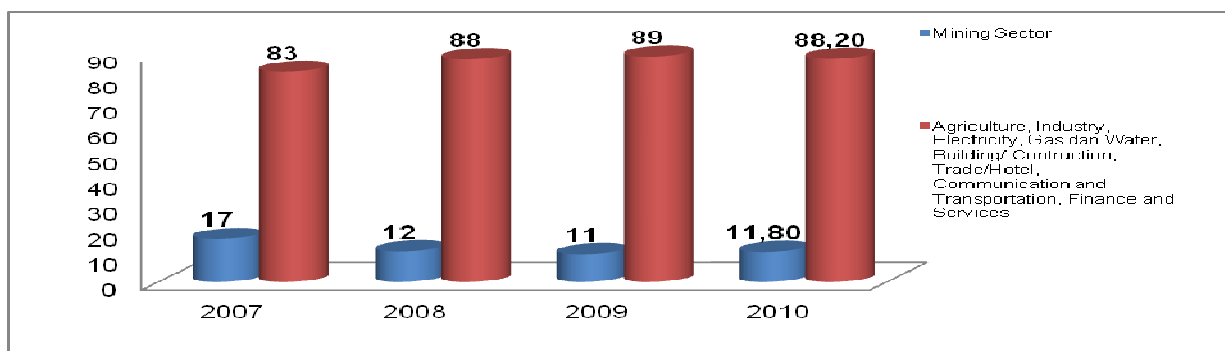
Mining & Excavation sector that is the largest contributor according to business venture in 2010. It gives 48,19% of contribution, and it is followed by Manufacture Industry (24,05%), Commerce, Restaurant and Hotel (8,46%), Agriculture (5,60%), and Service sector (4,29%).



Source: East Kalimantan BPS (processed)

**Figure 1: Produk Domestik Regional Bruto According to Venture Based on Constant Price in 2000**

Although Mining and Excavation gives large contribution for PDRB, labour absorption in Mining and Excavation sector in East Kalimantan is relatively small and keep decreasing. In 2007, the labour absorption was 17%, and it became 12% in 2008. The labour absorption decreased further into 11% in 2009. On the other hand, labour absorption for non-mining sector increased (Figure 2). In general, economy condition in East Kalimantan shows that economic activities in mining sector have more rapid development than its labour absorption. In other words, the economic growth rate in mining sector relatively runs faster than the labour absorption.



Source: East Kalimantan BPS, 2010

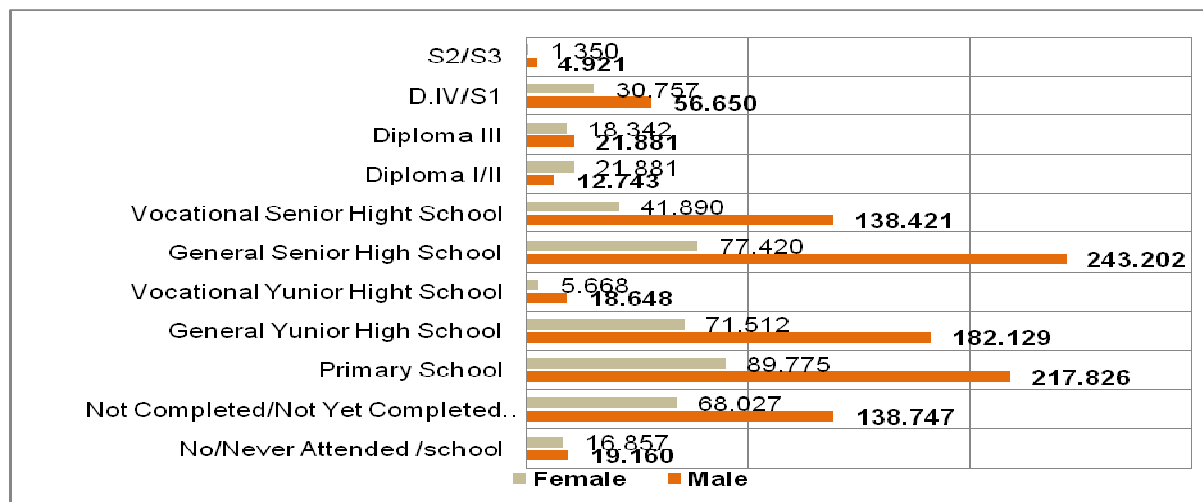
**Figure 2: Labour Absorption in Mining Sector at East Kalimantan Province for 2007-2010**

However, the percentage of labours in mining sector in East Kalimantan is relatively larger than the percentage of labours in mining sector in other provinces in Indonesia. Generally, labours in Indonesia mining sector is about 2% compared with other sectors. Considering explanation before, it is important to conduct a study concerning mining sector's labours in East Kalimantan.

Works done in mining sectors, especially in formal sector, generally uses *Capital Intensive*. It is different from non-mining sector which tend to use *Labour Intensive*. By knowing optimum labour utilization, it needs to understand the need or supply of labour which could be described through worker characteristic analysis. Therefore, this sector could be developed to increase its absorption for labours through skill and expertise enhancement for local labours (East Kalimantan BPS, 2010).

According to its *Capital Intensive* nature, this sector needs worker whose appropriate education background. High educated citizen could be source for the development of East

Kalimantan. Yet, there will be an abundance of labours in labour market which could create unemployment if the number of job vacancy is not equal to the number of labour.



Source: East Kalimantan BPS, 2010.

**Figure 3: People with 15 years old and above according to Highest Education completed in 2010**

Figure 3 shows that most productive people in East Kalimantan consist of senior high school graduates. In other words, their education background is senior high school. The senior high school consists of general senior high school and vocational high school. Actually, there are many people whose low education background. They only graduated from elementary school and junior high school. Since the government of Indonesia established 9-Years Compulsory Study Program at the beginning of 1990s, people whose low education background are dominated by older people. Meanwhile, the number of people who graduated from university or diploma is still low.

### 3. Review of Related Literature

The importance of vocational school has been discussed by many previous studies. A study conducted by Pugatch, Todd (2012) toward urban teenagers in South Africa shows that vocational school has important role in solving transitional difficulties occurring when they have finished from school and then start to work. Vocational school is assumed as “Safety Valve” for students whose transitional difficulties.

On the other hand, the result of a study done by Eichorst, Werner et al. (2012), shows the importance of vocational education and training (VET=Vocational Education and Training) for labours who are vocational school graduates and brings better understanding concerning VET all over the world with its three types of vocational systems that are school-based education, dual system in which school-based education was combined with company-based training, and informal training. There are many opinions stating that VET gives beneficial skill to prepare young generation into working class and improve their opportunity to have successful professional career (Quintini and Martin, 2006, Middleton et al, 1993).

The lack of skill between vocational skill and the availability of job sometimes becomes a problem of employment growth. According to the result of a study from Neuman, Shoshana; Ziderman, Adrian, 2003 toward newcomers, Jews from the East, Israeli Arabs, and women, vocational school gives positive effect toward income and vocational education generally does not cause higher wage. Yet, labours who have attended education and training would generally obtain higher income compared with those who have not attended (Rosholm, Michael; Nielsen, helena Skyt; Dabalén, Andrew, (2007).

Middleton et al. (1993) and Grubb and Ryan (1999) concluded that there is almost a consensus stating that income would increase after training. According to literature survey done by Middleton et al. (1993), the effect of training would be about 20% in most developing countries. Another reason why training could be interesting in that training could be shared between employer

and employee so that training could be beneficial for both for worker and producers. In previous study conducted by Biggs et al. (1995a), it reveals that training seems to bring benefit for businessmen by increasing output because training could improve labours' productivity in Kenya, Zimbabwe, and Ghana observed in 1992. The existence of individual labour gap in labour market caused by education gap could affect demand, supply and income of labours. For example, in European Union, formal education and profesional skill obtained during training determine job someone gets (Furia, et al. 2010).

In Indonesia, Newhouse and Suryadarma (2011) finds the importance of education level toward wage and type of job in Indonesia by using IFLS data. By using Linear Probability Model, they figure out that vocational education (SMK), especially in public school, has higher opportunity to work in formal sector, either it is for male or female students. However, regarding premium wage received by labours graduated from vocational school compared with those graduated from general general school, female labours graduated from vocational school receive higher wage. Meanwhile, there is no significant relationship between vocational education finished and wage received for male labours. In short, vocational education, especially for male labours, is still less competitive.

In addition, a survey conducted by World Bank (2010) in Indonesia shows that eventhough vocational education graduates have higher than general school graduates, this difference decreases day by day. Furthermore, labours graduated from vocational school and continuing to higher level of education get even lower wage from the ones graduated from general school and continuing to university. Unemployment level for vocational education graduates and general education graduates, however, tends to show the same number that is about 30%.

#### **4. Data and Research Method**

This study used data from Indonesian Labour Force Survey (Sakernas) 2010. Sakernas is a survey concerning working class in Indonesia collected annually, having cross-section in nature, and covering about 1% of population. The research method used in this study was multinomial logit through maximum likelihood technique in which its dependent variable consists of more than two options. There are:

**Y=1**; if labour absorption occurs in formal-mining sector

**Y=2**; if labour absorption occur in informal-mining sector

**Y=3**; if labour absorption occurs in non-mining sector (as comparison)

This study followed BPS to describe the definition of formal and informal sector Officially, Central Bureau of Statistics (BPS) Indonesia defines the difference between formal and informal sector activities based on combination between job status and type of labours' job. In Table 1, all fixed labours workers (not freelancers or unfixed labours) are considered as labours in formal sector.

**Table 1**  
**Definition of BPS for Formal and Informal Sectors**

Status	Types of Job				
	Profesional, Director, Manager	Seller, Labour	Agricultural Work	Production, Transportation, Unskilled	Others
Having own venture	Formal	Informal	Informal	Informal	Informal
Having own venture with family labours	Formal	Formal	Informal	Formal	Informal
Employers giving permanent labours	Formal	Formal	Formal	Formal	Formal
Employees	Formal	Formal	Formal	Formal	Formal
Freelancers, agricultural	Formal	Informal	Informal	Informal	Informal
Freelancers, non agricultural	Formal	Informal	Informal	Informal	Informal
Family labours	Informal	Informal	Informal	Informal	Informal

Source: BPS Indonesia

Moreover, all professional labours in managerial position are considered as formal labours not including those who are classified as family labours whose relatively small number or labours who daily help family without getting wage. Next, the other combinations are considered as labours in informal sector. These definition was used to distinguish between formal and informal sectors in mining sector in East Kalimantan.

There are four education variables used as main explanatory variable in this study. They are measured with:

1. **Edu<sub>1</sub>** : Holding General Senior High School = 1 and others = 0
2. **Edu<sub>2</sub>** : Holding Vocational Senior High School = 1 and others = 0
3. **Edu<sub>3</sub>** : Holding Diploma (Vocational college) = 1 and others = 0
4. **Edu<sub>4</sub>** : Holding University (General college) = 1 and others = 0

In addition, several control variables were used covering demography characteristic and economy characteristic as follows:

1. The number of dependants
2. Age of labours
3. Dummy in sex (male or female)
4. Dummy in residential location (municipal or villages)
5. Wage level
6. Dummy in regency/municipal

## 5. Empirical Finding and Discussion

Table 2 below shows regression result of Multinomial Logit for labour absorption in formal mining sector and informal mining sector. Non-mining sector is not showed in Table 2 because it was used for comparison (reference).

Variable of senior high school (SMA), a variable focused in this study, has positive number that is 0.235. It shows that senior high school education has higher probability to work in formal-mining sector than education levels under it. Comparing with vocational school, vocational school (SMK) graduates specifically have higher coefficient (0,502) than general school (SMA) graduates (0,235). It reflects that formal mining sector needs more labours whose particular special skill (SMK graduates) than labours whose knowledge from general school (SMA graduates). This result is line with the result of a study conducted by Newhouse and Suryadarma (2011) figuring out that SMK graduates have higher probability to work in formal sector.

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Based on the result of this study, it could be known that labours whose SMA education background have lower probability to work in formal-mining sector compared with vocational school's probability. On other words, labours who are SMA graduates still need extra and specific skill/experience to work in formal mining sector. Education and training will not only add their knowledge but also improve their working skill so that they their productivity will decrease in workplace. As the study result of Furia, et al, (2010) states, in European Union, what people obtain from formal education and professional skill during training process will determine their suitable job.

**Table 2.**

**Regression Result of Multinomial Logit in Formal-Informal Sector**

Variables	Formal Sector		Informal Sector	
	Coefficient	P. Value	Coefficient	P. Value
Number of dependant	0.121	0.011**	0.871	0.420
Sex	1.430	0.000***	2.201	0.000***
Senior High School (SMA)	0.235	0.029**	0.189	0.409
Vocational High School (SMK)	0.502	0.000***	0.204	1.000
Diploma Education	-1.050	0.000***	-33.819	1.000
University Education	-1.465	0.000***	-33.044	1.000
Age	-0.077	0.003***	-0.032	0.473
Age <sup>2</sup>	0.000	0.169	0.000	0.925
Residential Location	1.015	0.000***	0.683	0.013**
Wage	1.679	0.000***	1.292	0.000***
Pasir Regency	1.533	0.000***	1.384	0.003***
West Kutai Regency	1.377	0.000***	1.660	0.001***
Kutai Regency	1.788	0.000***	1.649	0.000***
East Kutai Regency	1.447	0.000***	0.662	0.238
Berau Regency	0.452	0.025**	0.515	0.280
Malinau Regency	1.628	0.000***	2.302	0.000***
Bulungan Regency	0.853	0.001***	0.629	0.265
Nunukan Regency	-1.990	0.003***	0.033	0.967
Penajam Regency	-0.526	0.093**	0.328	0.564
Tana Tidung Regency	1.588	0.000***	0.802	0.261
City of Balikpapan	0.259	0.893	-0.243	0.642
City of Tarakan	-1.048	0.001***	-1.521	0.148
City of Bontang	0.367	0.051**	0.226	0.639

(dependant==non mining is outcome base or reference)

Source: Sakernas 2010: edited.

\*\*\*Significant at 0,01 level. \*\*Significant at 0,05 level. \*Significant at 0,1 level.

Moreover, in college level, the number of labours who are diploma graduates (vocational college) is negative, and it is -1.050. Labours who are university graduates (general college) also have negative number that is -1.465. As labours who are diploma and university graduates have negative number, it means that they tend not to enter formal-mining sector if it is compared with non-mining sector. It is interesting to observe that they have lower probability to work in formal mining sector than SMA or SMK. On other words, labours whose education background of high school have higher probability to be employed in formal mining sector than those whose education background of college. It is likely to happen because there is great need in labours whose particular skill in formal mining sector, whereas demand for college/university graduates is lower and they tend to work in non-mining sector. Furthermore, department of engineering is a major more needed than other majors. Those who are graduated from college are usually most needed for managerial or engineering level. Meanwhile, technicians and labours in lower level are filled by those who graduated from high school, especially vocational school (SMK).

In informal mining sector, meanwhile, variable of education is positive for SMA education (0.189) and for SMK (0.204), but this result is not significant. In addition, labours graduated from diploma have negative number (-32.819) like labours graduated from university (-33.044). This result is not significant as well. Explanation before shows that education is not main point to be considered informal mining sector. Education is likely to be more important only in formal mining sector. In addition, it happens because there are many demands for labours with low level of education to work in informal mining sector so that labours with higher level of education do not give significant effect.

Based on several control variables used in this study, the number of dependent variable is positive that is 0.121 showing that more dependant of labours have, the higher probability for labours to work in formal mining sector. It is related to the decreasing of their needs since there are more dependents. Formal sector is absolutely more promising in term of take home-pay obtained by labours if it is compared with informal sector or non-mining sector. Therefore, formal mining sector becomes 'main destination' for labours when their family's dependent are big. Meanwhile, the number of dependent variable is 0.087 showing positive number in informal mining sector. Yet, it does not give significant effect toward informal mining labour absorption since informal mining sector normally gives smaller wage that is not enough to support labours' life with their big dependent.

Moreover, variable of sex has positive numbers that are 1.430 and 2.201 showing that sex brings positive effect toward labours' probability to work in formal or informal mining sector. Positive numbers variable of sex has show that labour absorption for male labours is much higher than for female ones in formal mining sector, and it also happens if it is compared with non-mining sector. On other words, this result shows that male labours have higher probability to work in formal or informal sector than female labours. However, works available in formal sector are not actually for male labours only but also for female ones, whereas male labours are more dominating in formal mining sector.

Comparing between coefficient in formal mining and informal mining sector, coefficient in informal mining sector (2.201) is higher than coefficient in formal mining sector (1.430). It describes that difference in labour absorption between male and female labours in informal mining sector is higher. On other words, female labours' probability in entering informal mining sector is lower than their probability in entering formal mining sector. It is likely to happen because jobs in informal mining sector are related to with physical jobs different from jobs in formal mining sector, which most are not related to physical job, such as administration work.

Age variable is negative and significant toward probability of labour absorption for formal mining sector in East Kalimantan. Meanwhile, age<sup>2</sup> variable is not significant toward probability of labour absorption in formal mining sector and informal mining sector in East Kalimantan. This result indicates that age has linear relationship with probability to work in formal sector and does not have non-linear relationship. Negative relationship shows that the younger a labour is, the higher probability for a labour to work in formal mining sector. In addition, effect of age<sup>2</sup> variable toward probability of labour absorption in informal mining sector is insignificant is probably caused by various age among informal mining labours.



Variable of residential location (urban area/village) has positive and significant effect toward probability of labour absorption in formal and informal mining sector in East Kalimantan. It shows that labours coming from urban area have higher probability to work in formal and informal mining sector than non-mining sector.

Based on variable of residential location (urban area/village), coefficient in formal mining sector (1.015) is higher than coefficient in informal mining sector (0.683). It shows that labours coming from urban area have higher probability to work in formal mining sector. In short, this coefficient also shows that the availability of jobs in formal sector in village is smaller than in urban area.

Wage variable gives positive and significant effect toward probability of labour absorption in formal and informal mining sector. It shows that the amount of wage given to labours in formal and informal mining sector has become consideration for labours. Considering the amount of coefficient, wage in formal mining sector has greater impact compared with wage in informal mining sector.

## 6. Conclusion

This study investigated the impact of education toward labour absorption in mining sector in East Kalimantan by using Sakernas data in 2010. By using multinomial logit method, this study figures out that education has significant effect especially in labour absorption for formal mining sector. For high school level, vocational education (SMK) has positive and significant effect toward labour absorption in formal mining sector. The positive effect describes that demands for labours in formal mining sector are higher for labours whose vocational education. On the other hand, education gives negative effect toward labour absorption in formal mining sector for college education, and it shows that there are not many demands for labours graduated from higher education to work in formal mining sector. Most of college graduates in East Kalimantan work in non-mining sector. Moreover, for informal mining sector, education effect is insignificant describing that education is not an important point in labour absorption process, particularly in informal mining sector. Informal mining sector has become less attractive for those with higher education.

This study suggests that it needs to keep developing vocational education especially for high school level since there are big demands for labours whose vocational education in formal mining sector in East Kalimantan. This study shows that vocational education should not become second option for students to continue their education.

Informal sector clearly becomes “Safety Valve” for labours, particularly for those graduated from lower education. It needs to consider about advanced training or education that could be obtained for those who work in informal mining sector so that their wage or life could be better.

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