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DECISION TO WORK IN THE FORMAL AND INFORMAL SECTOR: EMPIRICAL EVIDENCE FROM EAST JAVA PROVINCE

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ABSTRACT

This study examines individual determinants of entering employment in the formal and informal sectors in East Java Province. This study uses the 2014 Indonesian Family Life Survey (IFLS) (wave 5) microdata. The analysis used in this study is logistic regression analysis. The results of this study indicate that the level of education as measured by years of schooling and wages has a significant positive effect on the decision of workers to work in the formal and informal sectors. It means that individuals with higher levels of education and high wages have a greater tendency to work in the formal sector than in the informal sector.

Keywords: *Work Sector; Logit Model; East Java*

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ABSTRAK

Studi ini bertujuan untuk mengkaji determinan individu untuk memasuki pekerjaan di sektor formal dan informal di Provinsi jawa Timur. Studi ini menggunakan data mikro yang diperoleh dari Indonesian Family Life Survey (IFLS) tahun 2014 (gelombang 5). Analisis yang digunakan dalam studi ini adalah analisis regresi logistik. Hasil studi ini menunjukkan bahwa tingkat pendidikam yang diukur dengan lama sekolah dan upah berpengaruh positif secara signifikan terhadap keputusan tenaga kerja bekerja di sektpr formal dan informal. Hal ini bermakna bahwa individu dengan jenjang pendidikan yang lebih tinggi serta tingkat upah yang tinggi mempunyai kecenderungan lebih besar untuk bekerja disektor formal dbandingkan sektor informal.

Kata Kunci: *Sektor Kerja; Model Logit; Jawa Timur*

JEL: C00; J40

Introduction

East Java Province is the province with the second largest population on the island of Java. The total population in East Java Province in 2020 reached 39,955.9 thousand people (BPS, 2020a). The large population will also lead to an increase in workers. As a result of the increasing number of workers in East Java Province, job creation has become an essential issue for developing the employment sector.

In this regard, it should be noted that there are two categories of employment according to the International Labor Organization (ILO), namely jobs in the formal and informal sectors. Formal work includes workers whose primary job status is as a businessman, assist-

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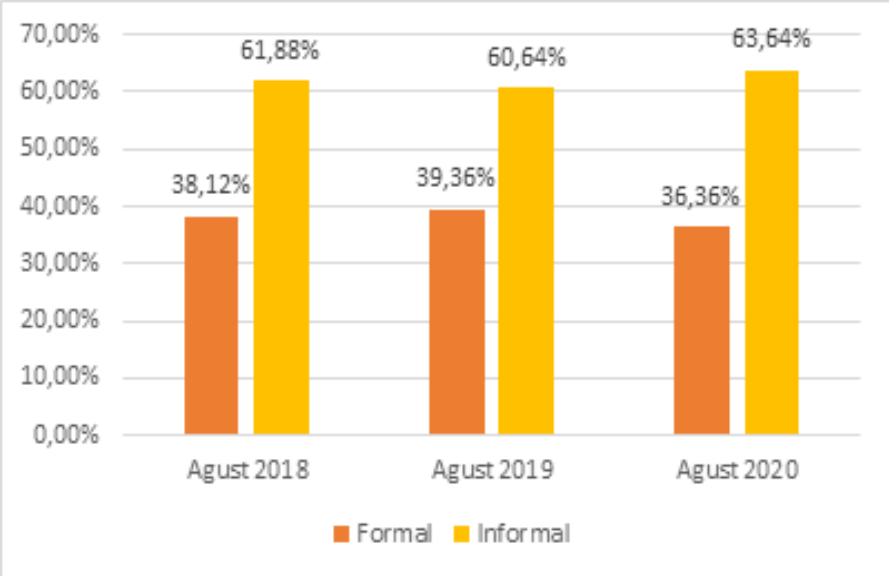
ed by permanent workers and workers/employees/employees, on the other hand, informal work includes self-employed workers; trying to be administered by temporary workers; casual workers; and family/unpaid workers (BPS, 2020b).

The figure below presents the percentage of formal and informal workers in East Java Province from August 2018 to August 2020. The figure shows that formal workers have decreased compared to August 2019, 3 percent. On the other hand, informal workers have increased compared to August 2019. It means that the informal sector has a great ability to absorb workers who are not accommodated in the formal sector.



Source: Badan Pusat Statistik (2021)

Figure 1: Percentage of Formal and Informal Workers in East Java Province

One of the reasons for the increase in the number of workers working in the informal sector is the creation of insufficient job opportunities (Antyanto, 2014). As a result, the labour market conditions are dominated mainly by workers who work in the informal sector with low levels of education and skills. However, the informal sector also plays an essential role as a safety valve for employment problems that can reduce the social explosion caused by the increasing number of job seekers.

The literature study by Fields (2005) argues that employment in the informal sector is worse than in the formal sector but better than unemployment. The Field Study also labels informal sector jobs as "upper-tier" and "easy-entry". Upper-tier is those who voluntarily choose jobs in the informal sector. Meanwhile, "easy-entry" is defined as an individual's survival strategy because he is excluded from formal sector work.

In this regard, individuals need to understand the type of work better. This study examines the determinants of individual decisions in choosing the formal or informal employment sector in East Java Province based on individual perspectives.

Literature Review

Based on the literature review, several factors influence the workforce's decision to enter work in the formal or informal sector, including age and education level (Antyanto, 2014); gender (Doğrul, 2012); location (Uwamahoro & Mung'atu, 2018); wages (Almeida & Carneiro, 2021; Hohberg & Lay, 2015); and migration decisions (Singh & Kumar, 2021).

Antyanto (2014) analyzes the determinants of labour decisions in choosing the formal or informal work sector in Malang. The method used is quantitative explanatory with logistic regression method. The dependent variable is dummy, where 1=informal and 0=formal. Antyanto's study found that partially the age variable with education was significantly associated with the decision to enter the work sector. The age variable has a positive relationship with the choice of the work sector. It means that as age increases, the probability of working in the informal sector increases. On the other hand, the education variable is negatively associated with entering the work sector. It means that the higher the educational attainment, the fewer individuals or workers who decide to join the informal sector.

Another study by Doğrul (2012) analyzed the factors influencing urban Turkey's formal and informal sector employment. Using the multinomial logit method found that men dominate the formal sector while women occupy the informal sector. These results indicate discrimination in the labour market.

On the other hand, Uwamahoro & Mung'atu (2018) examines the determinants of worker participation in the informal sector in Rwanda, Kenya. Using logistic regression, women participated more in the informal work sector than men. In addition, most individuals living in rural areas are workers in the informal sector than individuals living in urban areas.

Another variable influencing an individual's decision to enter the formal or informal sector is wages. Ben Yahmed (2018) says that the informal sector has the characteristics of low wages. An empirical study by Almeida & Carneiro (2021) found that the wages received by individuals in the formal work sector were higher than those in the informal sector. The results of this study are supported by Hohberg & Lay (2015) , who found that wages are positively and significantly associated with work in the formal sector.

Other variables such as migration also affect the employment sector. Singh & Kumar (2021) analyzed the socioeconomic status of workers who migrated and worked in the informal sector in India. Using the interview method, it found that individuals who migrated from one state to another were only for work. Singh & Kumar also argue that the low level of education is one of the barriers for workers, which can impact their low wages. It forces workers to migrate or migrate to other areas to improve their lives.

Framework of thinking

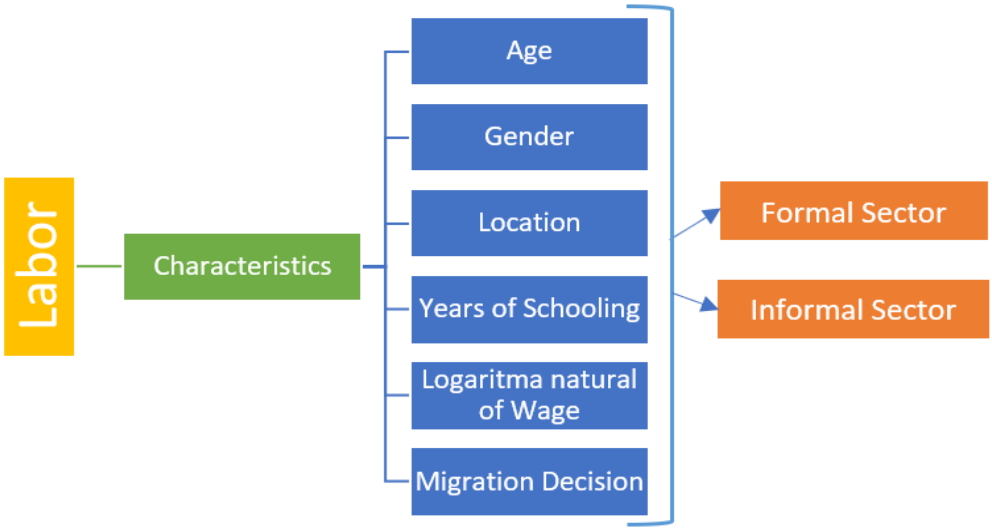


Figure 2: Framework of Thinking

The figure above shows the framework used in this research. To determine the various factors that influence individuals in entering the work sector, both formal and informal, the researcher refers to several literature studies that have been carried out.

Methodology

Research Approach

The approach used in this study is quantitative. A quantitative approach is an approach that tests objective theory by examining the relationship between variables. These variables will later be measured using specific instruments so that data in numbers can be analyzed using statistical procedures (Creswell & Creswell, 2018). The quantitative approach used in this study is the logit regression method with the dependent variable in a qualitative binary.

Method of Collecting Data

This study uses secondary data obtained from the Indonesia Family Life Survey (IFLS) provided by RAND Corporation. IFLS is a longitudinal survey data at the household, individual, community, and facility levels in 13 provinces in Indonesia. The sample represents approximately 83 percent of Indonesia's population and contains more than 30,000 living in 13 of the 27 Provinces. The IFLS survey consists of five waves, including IFLS-1 conducted in 1993; IFLS-2 was implemented in 1997 and 1998; IFLS-3 was conducted in 2000; IFLS-4 was implemented in 2007; and IFLS-5 was implemented in 2014 (RAND, 2018).

This study uses the results of the IFLS-5 survey or was conducted in 2014. The reason for using IFLS-5 data is that the latest information is available in that period. Data collection is based on criteria of working age and working status. (RAND, 2018).

Empirical Model

The empirical model used in this study will estimate the individual determinants. The model is estimated using logit regression. The practical model used is as follows:

$$L_i = \ln(P_i \mid 1 - P_1) = \beta_0 + \beta_1 age_i + \beta_2 gender_i + \beta_3 Dlocation_i + \beta_4 years\ of\ schooling_i + \beta_5 \ln wage_i + \beta_6 Dmigration_i + \varepsilon_i \quad (1)$$

Keterangan:

L_i	: Logit
$\ln(P_i \mid 1 - P_1)$	: The odds ratio of individual decisions to work in the formal or informal sector. P_i=1 is an individual's decision to work in the formal sector, while P_i=0 is an individual's decision to work in the informal sector.
β_0	: Intercept
β_{1-6}	: Regression coefficient
Age	: Individual age (year)
Gender	: Dummy gender of Head of Household, 1=male, 0=female
DLocation	: Dummy location of residence, 1=city, 0=village
Years of SchoolingHH	: Length of school (years)
Lnwage	: Wages
Dmigration	: Dummy decision to migrate, 1=Yes, 0=No

Variable Operational Definition

The operational definition of variables is intended to explain the variables used to facilitate understanding. The variables used in this study are as follows:

Table 1: Variable Operational Definition

No	Variable Name	Operational definition	Category Scale	Source Questions in IFLS5
Dependent Variable				
1.	Work Sector	The respondents' activities to earn income to fulfil their daily lives consist of the formal and informal sectors.	1=Formal 0=Informal	BOOK IIIA, TK section
Independent Variable				
2.	Age	Age when the survey was conducted (years)	Numeric (continuous)	Book K, AR section
3.	Gender	Gender	1=male 0=female	Book K, AR section
4.	Location	Location of residence	1=urban 0=rural	Book K, SC section
5.	Years of Schooling	The highest education completed which is converted into years of schooling (years).	Numeric (continuous)	Book K, AR section
6.	Lnwage	Salary or net income for the past 12 months received by the child when he entered the labor market.	Ratio	Book 3A, TK section
7.	Migration	Dummy migration where the workforce has the status of migratory and non-migrating status.	1=Migrate 0=Not migrating	Book 3A, MG section

Analysis Method

The analytical method used in this study is logit regression analysis. The reason for using this method is that the dependent variable is binary. Logit regression aims to determine the probability of a response (Wooldridge, 2018). The logit model in this study aims to determine the individual's probability of continuing higher education as seen from several factors on the independent variable.

Systematically, the probability of an individual wanting or not to continue higher education is expressed by (Gujarati dan Porter, 2009: 554).

$$P_i = \frac{1}{1 + e^{-(\beta_1 + \leftarrow \beta_2 X_i)}} \tag{2}$$

The equation can be written as follows:

$$P_i = \frac{1}{1 + e^{-Z_i}} = \frac{e^Z}{1 + e^Z} \tag{3}$$

Where $Z_i = \beta_1 + \beta_2 X_i$

In equation (3) is a logistic distribution function. If is the probability of an event occurring or an individual's decision to continue higher education, then the probability of not occurrence of an event $(1 - P_i)$ is:

$$1 - P_i = \frac{1}{1 + e^{Z_i}} \tag{4}$$

The equation can be written as follows:

$$\frac{1}{1 - P_i} = \frac{1 + e^{Z_i}}{1 + e^{-Z_i}} = e^{z_i} \tag{5}$$

$P_i/(1-P_i)$ as the odds ratio of an event, i.e. the risk of the possibility of an event occurring to the probability of not occurring. This study means the probability of individuals entering the formal work sector against the possibility of individuals entering the informal work sector. Then equation (3) can be simplified to:

$$P_i = \frac{1}{1 + e^{-P_i}} = \frac{e^{P_i}}{1 + e^{P_i}} \tag{6}$$

If equation (5) is transformed through the natural logarithm, the following results will be obtained:

$$L_i = \ln \frac{P_i}{1 - P_i} = Z_i = \beta_1 + \beta_2 X_i \tag{7}$$

L_i is a probability ratio that is not only linear on X_i but also on parameters.

Results and Discussion

The table below presents the statistics of the variables used in the study. The number of observations is 3,143. The Province variable has a minimum value of 31 and a maximum value of 36, which means that the value is the code for each province on the island of Java, namely DKI Jakarta Province (31); West Java (32); Central Java (33); DIY (34); East Java (35); and Banten (36). The work status variable indicates that the individual has a working status. The work sector variable is a dummy variable, having a minimum value of 0 = informal and 1 = formal. The age variable has an average of 39.94, with a minimum value of 15 years (working age) and a maximum value of 84 years. The gender variable has an average value of 0.878 which means that most respondents are male.

On the other hand, the years of schooling variable has an average value of 9.481 which means that individual educational attainment is only up to 9 years old. The location of residence has an average value of 0.747 which means that more respondents live in the city than in the village. The natural logarithm of wages has an average value of 16.35 with a standard deviation of 1.361. Finally, the migration dummy has an average value of 0.371, which means fewer respondents migrated than those who migrated.

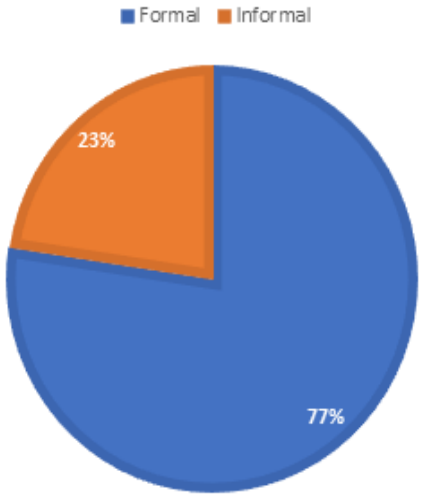
Table 2: Descriptive Statistics

Variables	Obs	Mean	Std. Dev	Min	Max
Province	3,143	33.18	1.547	31	36
Work status	3,143	1	0	1	1
Work sector (1=formal)	3,143	0.779	0.415	0	1
Age (year)	3,143	39.94	11.31	15	84
Gender (1=male)	3,143	0.878	0.327	0	1
Years of Schooling (year)	3,143	9.481	4.404	0	21

Variables	Obs	Mean	Std. Dev	Min	Max
Location (1=urban)	3,143	0.747	0.435	0	1
Natural logarithm of wages	3,143	16.35	1.361	8.700	20.72
Dmigration	3,143	0.371	0.483	0	1

Source: research data, processed

The figure below presents the percentage of workers working in the formal and informal sectors according to IFLS 5 of 2014 data in East Java Province. The figure shows that the number of decisions on workers working in the formal sector is 503 or 77 percent. In comparison, the number of decisions for workers working in the informal sector is 147 workers or 23 percent in the informal sector. In this regard, the formal sector becomes a priority for workers looking for a job. However, based on BPS data for 2020, the percentage of workers working in the informal sector is more than the informal sector. It means that the informal sector plays an essential role in creating job opportunities and reducing poverty in East Java Province.



Source: Indonesian Life Survey Family (2014)

Figure 3: Percentage of Workers in the Formal and Informal Sector in East Java Province in 2014 (IFLS 5)

The results of estimating the determinants of individual decisions to work in the formal and informal sectors in East Java Province and other provinces on the island of Java are shown in the table below.

Table 3: Logit Estimation Results Individual Decisions Working in the Formal and Informal Sector

Independent Variables	Dependent Variable: The decision to work in the formal or informal sector; 1=formal						
	Jawa	DKI Jakarta	Jawa Barat	Jawa Tengah	DIY	Jawa Timur	Banten
Constant	-7.401***	-6.953***	-8.055***	-9.528***	-4.164*	-5.763***	-10.82***
	(0.645)	(1.906)	(1.263)	(1.448)	(2.343)	(1.322)	(3.072)
age	-0.0181***	-0.0221*	-0.0254***	-0.00773	-0.0317**	0.00740	-0.0348
	(0.00478)	(0.0133)	(0.00939)	(0.0106)	(0.0161)	(0.0104)	(0.0228)
gender	-0.772***	-0.640	-0.392	-1.847***	-3.270***	-0.00390	0.376
	(0.162)	(0.509)	(0.307)	(0.389)	(0.897)	(0.295)	(0.632)
location	0.514***	Omitted	0.238	1.105***	0.364	0.347	0.472
	(0.106)	-	(0.233)	(0.212)	(0.388)	(0.219)	(0.498)
education	0.118***	0.0814**	0.134***	0.117***	0.217***	0.154***	0.0567
	(0.0132)	(0.0358)	(0.0275)	(0.0282)	(0.0477)	(0.0301)	(0.0617)
natural logarithm of wages	0.545***	0.567***	0.587***	0.698***	0.463***	0.329***	0.778***
	(0.0400)	(0.117)	(0.0800)	(0.0920)	(0.154)	(0.0799)	(0.171)
dmigration	-0.0292	0.121	-0.0952	0.104	-0.514	0.0259	0.0158
	(0.116)	(0.340)	(0.223)	(0.244)	(0.398)	(0.260)	(0.509)
Observations	3,143	439	855	661	304	650	234
Pseudo R2	0.2012	0.1366	0.2228	0.2721	0.2474	0.1463	0.2493

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: research data, processed

The table above presents the results of the logit regression estimation of individual opportunities to work in formal or informal sectors in East Java Province in particular and in Java in general. The value of the logistic regression coefficient varies between Java and the other six provinces. Based on the table, it is found that the variables of age, gender, location of residence, level of education, and wages are significantly associated with the decision to choose employment status throughout Java. However, when viewed from the whole of Java and other sub-provinces, only the variables of age, education level, and wages are associated with choosing the work sector. The variables of education level and wages are positively associative, while the age variable has a negative relationship with the selection of the work sector. It means that individuals with higher levels of education and higher wages have a higher chance of entering the formal sector. The logit regression coefficient cannot be interpreted directly to explain it in another interpretation, namely the odds ratio and marginal effect (Gujarati, 2004).

The odds ratio and marginal effect values are described in the table below and focused on East Java Province. The odds ratio value shows the possibility of each independent variable in influencing workers who work in the formal and informal sectors.

Table 4: Logit Estimation Results, Odds Ratio, and Marginal Effect of Individual Decisions to Work in the Formal and Informal Sector

Variables	Logit	Odds ratio	Marginal Effect (dy/dx)
Constant	-5.763***	0.003***	
	(1.322)	(0.004)	
age	0.00740	1.0074	0.0011
	(0.0104)	(0.0104)	(0.0015)
gender	-0.00390	0.9961	-0.0006
	(0.295)	(0.294)	(0.044)
location	0.347	1.4145	0.0524
	(0.219)	(0.310)	(0.033)
education	0.154***	1.167***	0.023***
	(0.0301)	(0.350)	(0.004)
natural logarithm of wages	0.329***	1.389***	0.049***
	(0.0799)	(0.1110)	(0.012)
dmigration	0.0259	1.0262	0.0039
	(0.260)	(0.266)	(0.039)
Observations	650	650	650
Pseudo R2	0.1463	0.1463	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: research data, processed

Based on the odds ratio results, partially, the education level variable measured by the length of school and wages has a significant positive relationship to employment sector decisions. The value of the odds ratio of the education variable is 1.167; this means that workers who have been in school longer have 1.167 times more likely to enter work in the formal sector than in the informal sector. On the other hand, the wage variable is also significantly

positively associated with choosing the work sector. The value of the odds ratio for the wage variable is 1.389; this means that the more wages given by workers increase by one unit, the individual's opportunity to enter work in the formal sector is 1.389 times greater than in the informal sector, assuming other variables are constant.

On the other hand, there is a marginal effect of each variable. The marginal effect interpretation shows the magnitude of the possibility of each independent variable seen from the marginal value. The education level variable coefficient value of 0.023 means that, on average, when the length of schooling increases by one unit, the probability of workers entering formal sector work increases by 0.023 points or 2.3 percent. These results follow Antyanto (2014) research that workers with higher education are more likely to choose jobs in the formal sector than the informal sector and vice versa.

Similar to the wage variable, the coefficient of the marginal effect of wages shows that on average, if wages increase by one unit, the probability that workers will work in the formal sector will increase by 0.049 points or 4.9 percent compared to the informal sector. This study is in line with research by Almeida & Carneiro (2021) and Hohberg & Lay (2015) which state that wages positively affect job selection decisions in the formal sector. It means that if the wages received by workers are higher, it will encourage them to choose to work in the formal sector rather than in the informal sector.

Conclusion

The conclusions that can draw from this study are the determinants of labour decisions in the formal sector throughout Java, including age, gender, location of residence, education level, and wages. However, if viewed according to the Province of East Java, the factors that influence the opportunities of workers in the selection of employment status are the level of education and wages. Because informal workers currently dominate East Java Province, the government needs to encourage improvements in education for prospective workers. The improvement in education aims to increase work productivity, which will be an opportunity to be able to enter the formal work sector and get higher wages for workers. On the other hand, it has been concluded that jobs in the informal sector earn lower wages. Therefore, the government plays a role in reducing opportunities for the informal sector by increasing the Regional Minimum Wage (UMR) and expanding employment opportunities in the formal sector.

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