

Regional Disparities in Time to First Formal Employment among Educated Youth in Java Island

Ketimpangan Regional dalam Waktu Tunggu Memperoleh Pekerjaan Formal Pertama pada Pemuda Terdidik di Pulau Jawa

Syfriza Davies Raihannabil

Department of Statistics, Politeknik Statistika STIS

Info Artikel

Diterima : 4 November 2025
Direvisi : 1 Desember 2025
Disetujui: 24 Desember 2025

Keywords:

Educated Youth
Formal Employment
Regional Disparities
Survival Analysis
Unemployment

Kata Kunci:

Analisis Tahan Hidup
Ketimpangan Regional
Pekerjaan Formal
Pemuda Terdidik
Pengangguran

Corresponding Author:

Syfriza Davies Raihannabil
212212893@stis.ac.id
089527090329

Abstract

This study aims to identify socio-demographic factors that influence the duration of educated youth transition to their first formal employment. It also compares the effects of these factors across regions with high and low unemployment rates on Java Island. A quantitative approach using survival analysis is employed to examine the time to first formal employment. The analysis uses an Accelerated Failure Time (AFT) framework. Model selection is based on the Akaike Information Criterion (AIC), with a shared frailty specification to account for unobserved regional heterogeneity. The socio-demographic variables include gender, age, marital status, highest level of education, ownership of an internship certificate, and recent migrant status. The district minimum wage (UMK) is incorporated as a shared frailty variable. This study utilizes microdata from the National Labor Force Survey (SAKERNAS) provided by BPS Statistics. The results indicate that the log-normal AFT model is the most appropriate for both -low and high- unemployment regions. Gender, age, highest level of education, and recent migrant status are significantly affect the time to first formal employment in both regional groups. Marital status and ownership of an internship certificate are some significant factors that influence only in low-unemployment regions. The transition of educated youth in low-unemployment areas into formal employment is quicker and has a greater numbers of transition than those in high-unemployment areas. The shared frailty model, which includes district minimum wages (UMK), improves estimation accuracy by capturing unobserved regional differences.

Abstrak

Penelitian ini bertujuan untuk mengidentifikasi faktor-faktor sosiodemografis yang memengaruhi durasi transisi pemuda terdidik menuju pekerjaan formal pertama. Selain itu, penelitian ini membandingkan pengaruh faktor-faktor tersebut antara wilayah dengan tingkat pengangguran tinggi dan rendah di Pulau Jawa. Pendekatan kuantitatif dengan menggunakan analisis survival diterapkan untuk mengkaji waktu tunggu memperoleh pekerjaan formal pertama. Analisis dilakukan menggunakan model *Accelerated Failure Time* (AFT). Pemilihan model didasarkan pada *Akaike Information Criterion* (AIC), dengan *shared frailty* untuk menangkap heterogenitas regional yang tidak teramati. Variabel sosiodemografis yang digunakan meliputi jenis kelamin, usia, status perkawinan, tingkat pendidikan tertinggi, kepemilikan sertifikat magang, dan status migran risen. Upah Minimum

Kabupaten/Kota (UMK) dimasukkan sebagai variabel *shared frailty*. Penelitian ini memanfaatkan data mikro Survei Angkatan Kerja Nasional (SAKERNAS) yang disediakan oleh Badan Pusat Statistik (BPS). Hasil penelitian menunjukkan bahwa model AFT *log-normal* merupakan model yang paling cocok, baik untuk wilayah dengan tingkat pengangguran rendah, maupun tinggi. Jenis kelamin, usia, tingkat pendidikan tertinggi, dan status migran risen berpengaruh signifikan terhadap waktu tunggu memperoleh pekerjaan formal pertama pada kedua kelompok wilayah. Sementara itu, status perkawinan dan kepemilikan sertifikat magang hanya berpengaruh signifikan di wilayah dengan tingkat pengangguran rendah. Transisi pemuda terdidik di wilayah berpengangguran rendah menuju pekerjaan formal pertama lebih cepat dan memiliki proporsi yang lebih besar dibandingkan wilayah berpengangguran tinggi. Penerapan *shared frailty* yang memasukkan UMK mampu meningkatkan akurasi estimasi dengan menangkap perbedaan regional yang tidak teramati.

INTRODUCTION

Unemployment is a key indicator in assessing global labor market conditions and poses a significant structural challenge for developing countries, including Indonesia. Unemployment is directly linked to economic growth and social stability, so high unemployment rates can hamper national productivity, increase the country's fiscal burden, and exacerbate long-term socio-economic inequality (Kreinin and Aigner 2022; Soliman and Beram 2025). In the context of sustainable development, unemployment is a crucial indicator in the Sustainable Development Goals (SDGs), particularly Goal 8, which targets inclusive economic growth and the creation of decent work for all (UN 2025). Achieving SDG 8 depends heavily on a country's capacity to create productive and decent jobs that can strengthen social cohesion and support the transition to a sustainable economy (Lou et al. 2024). On the other hand, inequality in job creation and the mismatch between economic growth dynamics and labor-market needs exacerbate unemployment rates, especially in the informal sector and developing regions (Siddiquee et al. 2022).

High unemployment rates not only reflect a lack of job opportunities but also indicate labor-market inefficiencies due to mismatches between workers' education levels and job requirements (Huertas and Raymond 2024). This structural mismatch is further complicated when economic sectors fail to absorb higher education graduates, leading to an oversupply of educated labor, a phenomenon that has increased, particularly in semi-skilled or unskilled jobs, following the pandemic (Bauer 2024). Increasing educational attainment does not automatically guarantee access to decent work, as the positive effects of additional education are significant only when there is a match between education and job requirements (Huertas and Raymond 2024). An excess of labor with mismatched skills, even resulting in crowding out of less-skilled labor, can worsen the distribution of jobs across educational levels (Sun et al. 2023). In developing countries, skills mismatch is also associated with high levels of informality and labor turnover, as workers who are not suited to formal employment tend to shift to the informal sector (Flórez and Gómez 2024). This structural mismatch between education and employment leads to educated unemployment, that reflects a severe imbalance between the education

system and the labor market's actual needs (Misra et al. 2024). Generally, individuals attend school through the upper secondary level and beyond in the hope of entering productive, decent formal employment. However, cross-country studies show that graduates' skills often do not match the labor market requirements, particularly in the informal sector, thus exacerbating unemployment rates (Liu et al. 2025).

Java Island is the region with the highest level of educational progress in Indonesia. It is characterized by the availability of adequate educational infrastructure, broad access to secondary and higher education levels, and high levels of study continuity in the formal education system compared to other regions (Susilo et al. 2023; Maulana and Nuraini 2025; Ningsih et al. 2024). Based on Figure 1a, Java Island has the highest average length of schooling among regions outside Java, at 9.53 years (BPS 2024). This condition indicates that access to formal education in Java is

relatively more equitable and affordable compared to other regions outside Java. However, based on Figure 1b, there is only the Special Region of Yogyakarta that has succeeded in reducing the open unemployment rate to below the figure set in the 2023-2045 Long-Term Manpower Plan (RTKJP), which is 4% (Kemnaker 2023). Meanwhile, five other provinces on Java Island still have open unemployment rates that fall short of the RTKJP 2023-2025 target (BPS 2025). This situation suggests that increasing educational attainment without synchronizing employment policies can lead to greater economic inefficiency and increasing social inequality (Balmaceda 2025). This situation also indicates the potential for overeducation, in which university graduates work in positions that do not align with their academic qualifications, thereby reducing labor market efficiency and national productivity (Ege and Erdil 2023).

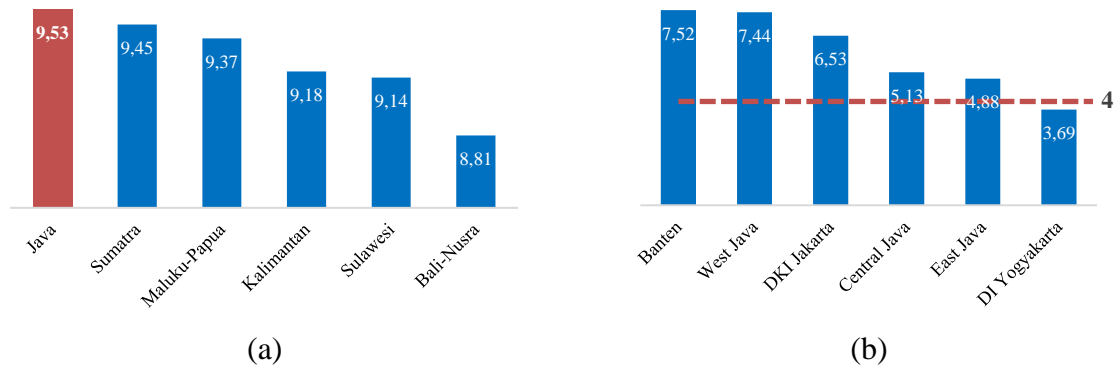


Figure 1. Conditions of Education and the Labor Market in Indonesia and Java: (a) Average Length of Schooling; (b) Open Unemployment Rate.

Source: BPS

Java plays the role as the center of Indonesia's economic activity and the main destination for educated labor migration, so that persistent educated youth unemployment poses an urgent policy challenge. Prolonged transitions to formal employment among educated youth is not only reduce the returns of education investment but also increase the risk

of long-term labor market scarring, informality, and social inequality. Understanding the factors that determine the duration of the transition to first formal employment is therefore crucial for designing targeted labor-market and education policies, particularly in regions with differing unemployment conditions.

Significant differences in open unemployment rates across provinces indicate the need for separate analyses to capture specific local characteristics. Regions with high unemployment are generally exhibit significant regional disparities in human capital and low labor absorption, resulting in delayed economic recovery (Suparman and Muzakir 2023). Conversely, regions with low unemployment tend to have more adaptive ecosystems, supported by educational infrastructure, high-quality public services, and strong alignment between educational outputs and local industrial needs (OECD 2020). Therefore, this study employs a two-model analysis approach: there are one for high-unemployment regions and the other one for low-unemployment regions. This approach has the potential to capture different determinants and avoid aggregation bias arising from heterogeneous local characteristics that are not adequately reflected in aggregate analyses, such as those based on the entire island of Java.

This study reviewed several prior studies on the educated workforce. Sanjaya & Marhaeni conducted a study in Badung Regency to examine the determinants of unemployment duration of educated workers during the COVID-19 pandemic, using social network variables and parental socioeconomic characteristics, and employing moderated regression (Sanjaya and Marhaeni 2023). Then, Sholatia et al. (2022) analyzed factors influencing job search duration of educated workers in Jambi City, using multiple linear regression to examine individual demographic characteristics. Furthermore, a study conducted by Syoer aimed to analyze the determinants of educated unemployment in East Kalimantan based on individual demographic characteristics, as well as training and work experience, using logistic regression (Syoyer 2022). Furthermore, Jolianis et al. (2021) analyzed unemployment duration among educated workers in Indonesia from demographic and labor-supply perspectives using logistic regression. Subsequent research conducted by Alharis & Yuniasih used

multilevel logistic regression to examine the determinants of unemployment among educated young people in Banten at the individual level, using individual socio-demographic variables, and at the district/city level, using population and GRDP variables (Alharis and Yuniasih 2022). Another study conducted by Sari examined the job search duration of educated workers in Lebong Regency based on individual demographic variables using multiple linear regression (Sari 2022).

There are several gaps remain in previous research. First, although educated unemployment has been widely studied, limited attention has been given specifically to educated youth, who are particularly vulnerable to unemployment due to limited work experience, skill mismatches, and intense competition in the early labor market. Second, most existing studies have been conducted outside Java or treated it as a homogeneous labor market, despite Java's role as the center of national economic activity and a major destination for labor migration. Third, previous studies have predominantly relied on linear or binary measures of unemployment duration, which fail to capture the dynamic nature of the transition to formal employment. Addressing these gaps, this study is original in its focus on educated youth and its explicit comparison between regions with high and low unemployment rates within Java Island. By accounting for regional heterogeneity through separate models, the study avoids aggregation bias and provides more context-sensitive evidence for labor market policy formulation. Furthermore, this study introduces methodological novelty by applying survival analysis to examine the duration of unemployment, allowing simultaneous consideration of both the timing of entry into formal employment and the probability of remaining unemployed over time. Therefore, this study aims to identify the socio-demographic characteristics that significantly influence the transition duration of educated young workers to formal employment and to

compare these influences across regions with high and low unemployment rates in Java.

RESEARCH METHODS

Data and Data Sources

This study examines the educated young workforce in Java, using data from the 2023 National Labor Force Survey (SAKERNAS) by BPS. The sample includes 1958 respondents from low-unemployment areas and 2081 respondents from high-unemployment areas.

Survival time (t) measures how long the educated young workforce remains unemployed before getting their first formal job. The study uses right-censored type III data: individuals enter upon graduating from school or college, and observations end with the 2023 SAKERNAS enumeration. The event is getting a first formal job, while censoring applies to those still seeking work at the observation deadline. Table 1 details the research variables.

Table 1. Description of Research Variables

	Variable	Category	Code
Dependent	Employment Status	Formally Employed	1
		Not Formally Employed	0
Time (t)	Duration of Job Search		Months
	Gender	Male	1
		Female ^{*)}	0
	Age		Years
		Marital Status	Never Married
		Ever Married ^{*)}	0
		Independent	Highest Education
D1/D2/D3	2		
High School ^{*)}	0		
	Internship Certificate	Have	1
		Does Not Have ^{*)}	0
	Recent Migrant Status	Recent Migrant	1
		Non-Recent Migrant ^{*)}	0
Frailty	District/City Minimum Wage	Low	1
		Medium	2
		High	3

Note: ^{*)} Reference category

Source: National Labor Force Survey (SAKERNAS), BPS.

Kaplan-Meier

The Kaplan-Meier method is a nonparametric method that estimates the conditional probability of survival from an event at a specific time point. This method is nonparametric because it does not require a specific probability distribution for survival time. It needs a log-rank test to see the difference between two or more Kaplan-Meier curves (Kleinbaum and Klein 2012).

Statistical hypothesis:

$$H_0 : S_1(t) = S_2(t)$$

$$H_1 : S_1(t) \neq S_2(t)$$

Test statistic:

$$LR_{stat} = \frac{(O_1 - E_1)^2}{Var(O_1 - E_1)} = \frac{(O_2 - E_2)^2}{Var(O_2 - E_2)} \sim \chi^2_{(1)} \tag{1}$$

Where O_1 and O_2 are the number of observed events in groups 1 and 2, while E_1 and E_2 are the expected number of events in groups 1 and 2. The null hypothesis (H_0) is rejected if $LR_{stat} > \chi^2_{(1;0,01)}$ or the p-value < 0.01 , which indicates a significant difference in survival probability between groups 1 and 2.

Accelerated Failure Time (AFT) Model

The Accelerated Failure Time (AFT) model assumes that the influence of covariates on survival time is multiplicative. Mathematically, this model is expressed as a linear regression model after a logarithmic transformation of the random variable survival time (t). The AFT model assumes a linear relationship between the log of survival time and the covariates (Kleinbaum and Klein 2012). If it is the survival time, X is a vector of covariates, and β is a vector of regression coefficients, the general form of the AFT model can be written in equation (2), where the time (t) function can be written in equation (3).

$$Y = \ln t = \mu + \beta^t X + \sigma W \quad (2)$$

$$t = \exp (\mu + \beta^t X + \sigma W) \quad (3)$$

Where μ is the intercept, σ is the scale parameter, and W is the error term, which is assumed to have a logistic distribution.

Model Specification

Model specification aims to select the model that best fits the distribution of survival times, including the exponential, Weibull, log-logistic, and log-normal distributions (Kleinbaum and Klein 2012). The AFT models for each of these distributions are presented in Table 2.

Table 2. AFT Model of Each Distribution

Distribution	AFT Model
Exponential	$t = [-\ln S(t)] \exp \left(\beta_0 + \sum_{i=1}^k \beta_i X_i \right)$
Weibull	$t = [-\ln S(t)]^{\frac{1}{p}} \exp \left(\beta_0 + \sum_{i=1}^k \beta_i X_i \right)$
Log-Logistic	$t = \left[\frac{1}{S(t)} - 1 \right]^{\frac{1}{p}} \exp \left(\beta_0 + \sum_{i=1}^k \beta_i X_i \right)$
Log-Normal	$t = \exp (\sigma z) \exp \left(\beta_0 + \sum_{i=1}^k \beta_i X_i \right)$

Source: (Kleinbaum and Klein 2012)

Model selection is carried out by comparing the Akaike's Information Criterion (AIC) values of the null model in each AFT model with the exponential, Weibull, log-logistic, and log-normal distributions. The AIC calculation formula can be written in equation (4).

$$AIC = -2 \log \text{likelihood} + 2p \quad (4)$$

Where p is the number of parameters. The distribution that produces the smallest AIC value in the null model is the most suitable.

Simultaneous Test

Simultaneous tests aim to determine whether at least one independent variable has a significant influence on the dependent variable (Kleinbaum and Klein 2012). The simultaneous

test in this study used the Likelihood Ratio Test (LRT).

Statistical hypothesis:

$$H_0 : \beta_1 = \beta_2 = \dots = \beta_k = 0$$

$$H_1 : \text{There is at least one } \beta_j \neq 0 ; j = 1, 2, \dots, k$$

Test statistic:

$$\chi^2 = -2 \ln L_0 - (-2 \ln L_1) \sim \chi^2_{(k)} \quad (5)$$

Where L₀ is the likelihood in the null model, while L₁ is the likelihood in the model containing all independent variables, the null hypothesis (H₀) is rejected if χ² > χ²_(k;0.01) or the p-value < 0.01. It means there is at least one independent variable that has a significant influence on the dependent variable.

Partial Test

The purpose of a partial test is to determine the significance of the influence of each independent variable on the dependent variable partially (Kleinbaum and Klein 2012). The partial test in this study uses the Wald test approach.

Statistical hypothesis:

$$H_0 : \beta_j = 0$$

$$H_1 : \beta_j \neq 0$$

Test statistic:

$$W_j = \left[\frac{\hat{\beta}_j}{se(\hat{\beta}_j)} \right]^2 \sim \chi^2_{(1)} \quad (6)$$

The null hypothesis (H₀) is rejected if $W_j > \chi^2_{(1;0,01)}$ or the *p-value* < 0.01, which means the *j*-th independent variables have a significant effect on the dependent variable.

Shared Frailty

Shared frailty is an extension of the survival model that accommodates correlations or dependencies between individuals within a given group. In the shared frailty model, each individual in a group is at risk of experiencing an event influenced by the same unmeasured factors (shared unobserved risk) (Kleinbaum and Klein 2012).

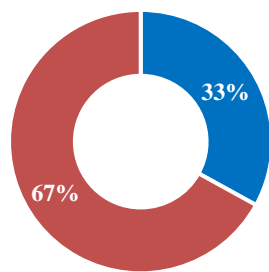
This study uses shared frailty, specifically the Regency/City Minimum Wage (UMK), to

analyze the duration of the educated young workforce until they find their first formal job on the island of Java. The use of UMK as a component of shared frailty in the survival model is based on the assumption that UMK reflects uniform labor-market conditions within a region but is unobservable. Factors such as labor bargaining power, access to information, and local employment policies can influence the duration of collective job searches. Therefore, including UMK as a frailty term allows the model to accommodate heterogeneity across regions. Structural differences across regions, including minimum-wage policies, can lead to unobserved variations in formal employment opportunities (Drange and Telle 2015; Schymik 2018).

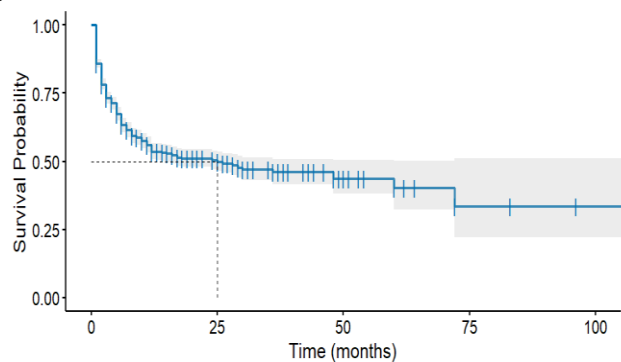
RESULTS AND DISCUSSION

Overview of the Duration from Educated Young Workers to Getting Their First Formal Job

The distribution of the duration from education to first formal job in areas with low unemployment rates on Java Island can be illustrated by the donut chart and Kaplan–Meier curve in Figure 2



(a)



(b)

Figure 2. Overview of the Duration of the Educated Young Workforce to Getting First Formal Job in Areas with Low Unemployment Rates on Java Island: (a) Employment Status; (b) Kaplan–Meier Curve of Formal Job Search Duration.

Source: Data Processing Results

Based on Figure 2a, we find that in areas with low unemployment rates on the island of Java, 33% of the educated young workforce has found formal employment (blue), while the remaining 67% have not yet found formal employment (red). Figure 2b shows that the probability of the educated young workforce in areas with low unemployment on the island of Java finding formal employment within 25 months is approximately 50%. This condition is indicated by the median point on the Kaplan-Meier curve, where the survival probability is

0.5. Thus, half of the educated young workforce in this group has successfully entered formal employment within 25 months of graduating from school/college. This curve also shows a gradual decline in the survival probability, indicating that more individuals are shifting to formal employment over time.

Meanwhile, the duration of the educated young workforce until finding their first formal job in areas with high unemployment on the island of Java is illustrated by the donut chart and Kaplan-Meier curve in Figure 3 below

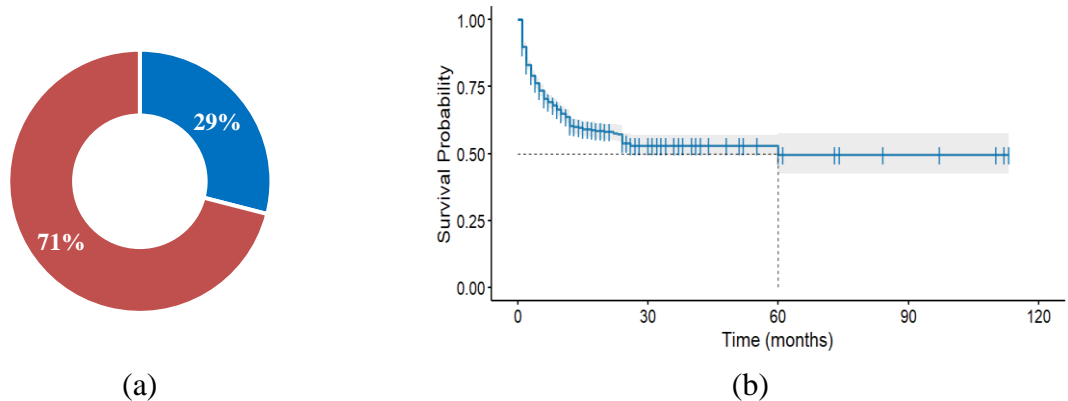


Figure 3. Overview of the Duration of the Educated Young Workforce to Getting Their First Formal Job in Areas with High Unemployment Rates on Java Island: (a) Employment Status; (b) Kaplan-Meier Curve of Formal Job Search Duration.

Source: Data Processing Results

Figure 3a shows that in areas with high unemployment rates on Java, 29% of the educated young workforce has found formal employment (blue), while 71% have not (red). Figure 3b shows that the probability of educated young workers in areas with high unemployment on Java obtaining formal employment within 60 months is approximately 50%. This condition is indicated by the median point on the Kaplan-Meier curve, where the survival probability is 0.5. Therefore, half of the educated young workers in this group have successfully entered formal employment within 60 months of graduating from school/college. This curve also shows a gradual decline in survival probability over time, indicating that as

time passes, more individuals transition to formal employment.

In general, a comparison of areas with low and high unemployment rates on Java indicates that educated young workers in low-unemployment areas tend to find formal employment more quickly. This condition is reflected in the shorter median time, 25 months, compared to 60 months in areas with high unemployment. Furthermore, the proportion of educated young workers who have obtained formal employment is higher in areas with low unemployment (33%) than in areas with high unemployment (29%). These findings suggest that healthier and more competitive labor market conditions play an important role in accelerating the transition of educated young workers into formal employment.

Overview of the Socio-Demographic Characteristics of the Young Educated Workforce. A description of the socio-demographic characteristics of the young

educated workforce in areas with low unemployment rates on the island of Java is shown in Table 3.

Table 3. Socio-Demographic Characteristics of the Young Educated Workforce in Areas with Low Unemployment Rates

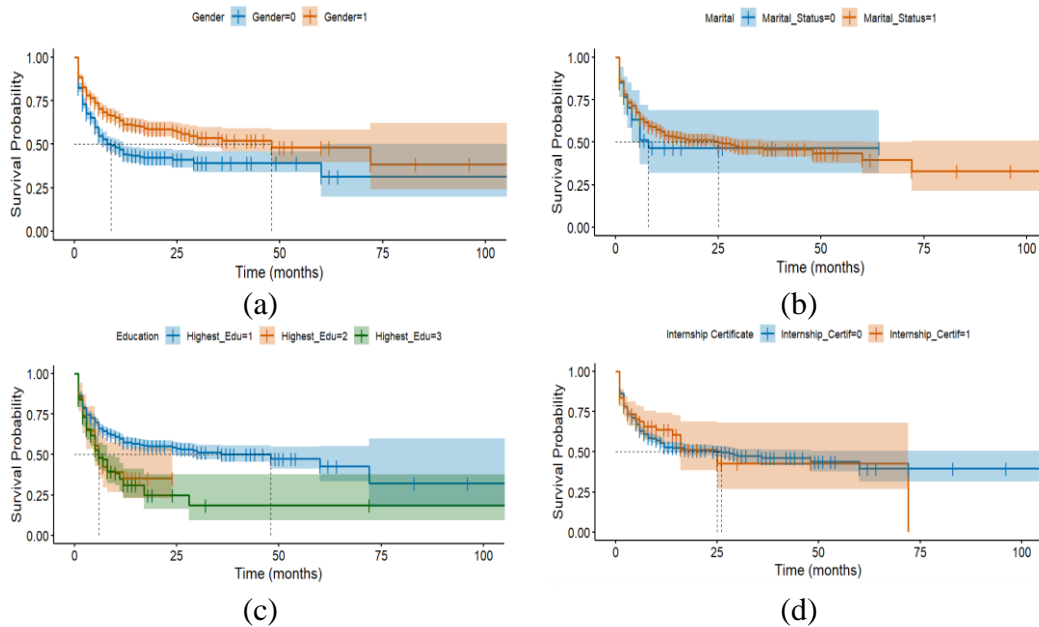
Variable	Category	Event	Censored
Gender	Male	28%	72%
	Female ¹⁾	39.9%	60.1%
Marital Status	Never Married	33.4%	66.6%
	Ever Married ¹⁾	34.4%	65.6%
Highest Education	D4/S1	31.1%	68.9%
	D1/D2/D3	48.3%	51.7%
	High School ¹⁾	46.9%	53.1%
Internship Certificate	Have	28.6%	71.4%
	Does Not Have ¹⁾	34%	66%
Recent Migrant Status	Recent Migrant	44.8%	55.2%
	Non-Recent Migrant ¹⁾	33.1%	66.9%

Note: ¹⁾ Reference category

Source: Data Processing Results.

Based on Table 3, in low unemployment areas on Java Island, both by gender, marital status, highest education, ownership of internship certificates, and recent migrant status, the majority of educated young workforce fall into the censored category, namely those who have not obtained formal employment.

Figure 4 illustrates the time between the educated young workforce entry until they were getting first formal job, by socio-demographic characteristics, in low unemployment areas in Java.



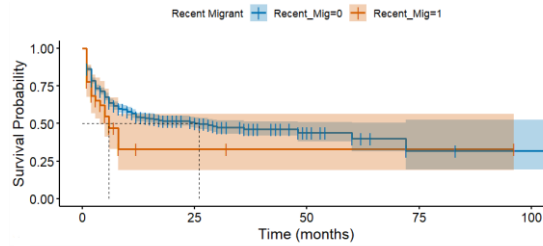


Figure 4. Overview of the Duration of the Educated Young Workforce to Getting First Formal Job in Low Unemployment Areas in Java Island: (a) Gender; (b) Marital Status; (c) Highest Education; (d) Ownership of Internship Certificate; (e) Recent Migrant Status.
Source: Data Processing Results

Based on Figure 4, in low unemployment areas on Java Island, the duration of the young educated male workforce, with a high school education/equivalent, and non-recent migrant status until getting their first formal job is longer than that of women, with a D4/S1 and D1/D2/D3 education, and recent migrant status. Then, there is no difference in the duration of

the young, educated workforce between those who are and are not married, and between those who have and do not have an internship certificate until getting their first formal job. Meanwhile, Table 4 presents a description of the socio-demographic characteristics of the young, educated workforce in high unemployment areas on Java Island.

Table 4. Socio-Demographic Characteristics of the Young Educated Workforce in High Unemployment Areas

Variable	Category	Event	Censored
Gender	Male	25.6%	74.4%
	Female ¹⁾	33.8%	66.2%
Marital Status	Never Married	29.3%	70.7%
	Ever Married ¹⁾	23.3%	76.7%
Highest Education	D4/S1	43.8%	56.2%
	D1/D2/D3	44.4%	55.6%
	High School ¹⁾	43.8%	56.2%
Internship Certificate	Have	26%	74%
	Does Not Have ¹⁾	29.5%	70.5%
Recent Migrant Status	Recent Migrant	40%	60%
	Non-Recent Migrant ¹⁾	28.8%	71.2%

Note: ¹⁾ Reference category

Source: Data Processing Results

Based on Table 4, in high unemployment areas on Java Island, across gender, marital status, highest education, ownership of internship certificates, and recent migrant status, the majority of the educated young workforce is in the censored category, namely those who have not obtained formal employment.

The distribution of the duration between education and the first formal job by socio-demographic characteristics in high unemployment areas on the Java Island is shown in Figure 5.

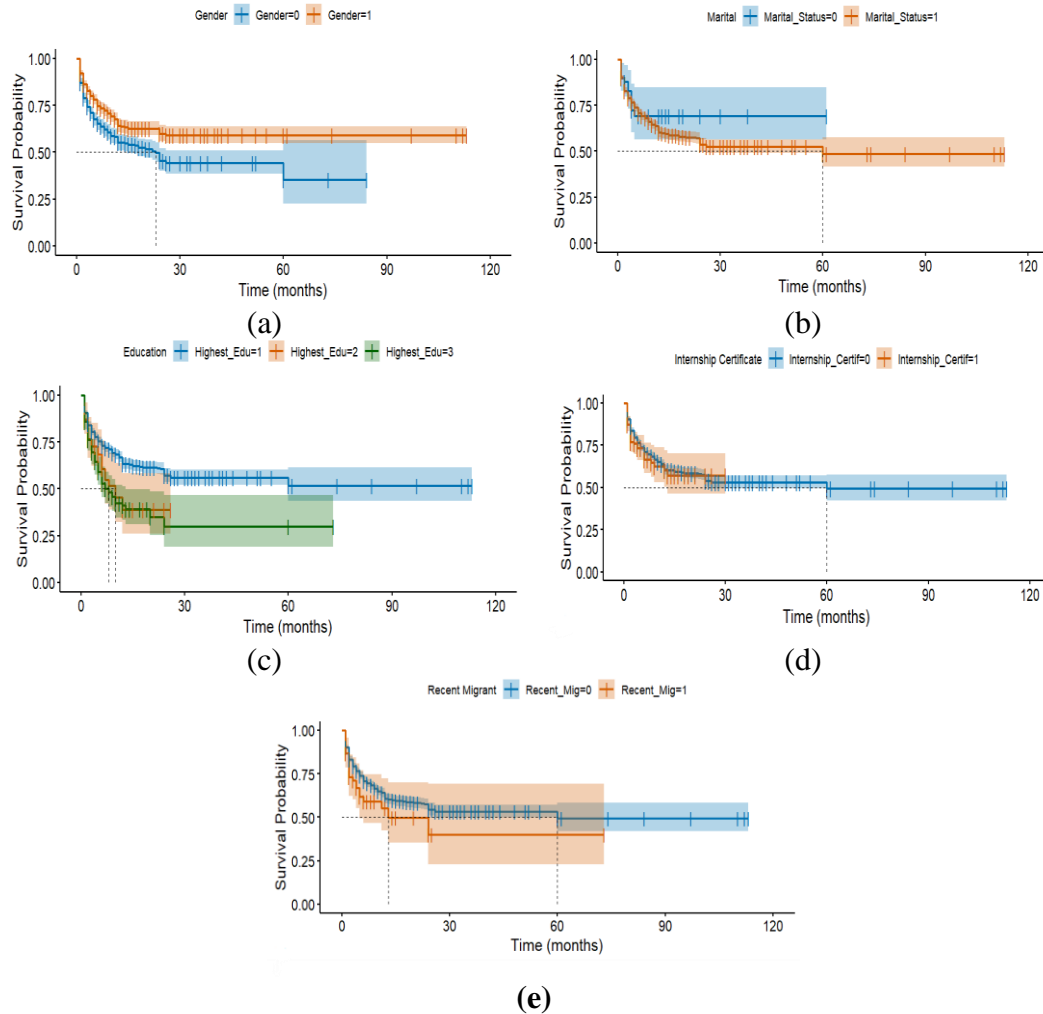


Figure 5. Overview of the Duration of the Educated Young Workforce to Getting First Formal Job in High Unemployment Areas in Java Island: (a) Gender; (b) Marital Status; (c) Highest Education; (d) Ownership of Internship Certificate; (e) Recent Migrant Status.
Source: Data Processing Results

Based on Figure 5, in high unemployment areas on Java Island, it can be indicated that the duration of the young educated male workforce, with a high school education/equivalent, and non-recent migrant status until getting their first formal job is longer than that of women, with a D4/S1 and D1/D2/D3 education, and recent migrant status. Then, there is no difference in the duration of the young, educated workforce between those

who are and are not married, and between those who have and do not have an internship certificate until getting their first formal job.

Log-Rank Test

A log-rank test was enforced to determine whether there are significant differences in the resistance curves between groups; the results are shown in Table 5.

Table 5. Log-Rank Test Result

Variable	Model 1		Model 2	
	χ^2	p-value	χ^2	p-value
Gender	39.4	<0.001***	23.5	<0.001***
Marital Status	0.4	0.5	0.8	0.4
Highest Education	30.2	<0.001***	36.6	<0.001***
Internship Certificate	0.1	0.8	1.4	0.2
Recent Migrant Status	5.7	0.02**	2.6	0.1

Note: Model 1: Low Unemployment Rates Areas; Model 2: High Unemployment Rates Areas; Significant at: ***1%; **5% alpha. Source: Data Processing Results.

Based on Table 5, the log-rank test results for gender and highest education, in both model 1 and model 2, show p-values < 0.05. It indicates a significant difference in the resilience curves. Then, the log-rank test results for the variables of marital status and internship certificate ownership, in both model 1 and model 2, show p-values > 0.05. It indicates no significant difference in the resilience curves. Meanwhile, the log-rank test results for the recent migrant status variable in model 1 show a p-value < 0.01. It indicates a significant difference in the resilience curve. However, the log-rank test in

model 2 yields a p-value > 0.05. It indicates no significant difference in the resilience curve.

Model Specification

Model specification aims to select the most appropriate model by assessing its fit based on the Akaike Information Criterion (AIC). The distribution that yields the smallest AIC value in the null model is the most appropriate. The AIC values for each distribution in the null model are shown in Table 6.

Table 6. AIC Value of Each Distribution in the Null Model.

Distribution	AIC Value	
	Model 1	Model 2
Exponential	5214.426	5165.579
Weibull	5081.914	5061.747
Log-Logistic	4967.358	4983.181
Log-Normal	4878.616	4901.917

Note: Model 1: Low Unemployment Rates Areas; Model 2: High Unemployment Rates Areas Source: Data Processing Results

Based on Table 6, the log-normal distribution, for both model 1 and model 2, has the smallest AIC value among the other distributions, namely 4878.616 and 4901.917, respectively. Thus, the log-normal distribution is the most suitable for this study, both for model 1 and model 2.

The Influence of Socio-Demographic Characteristics on the Duration of the

Educated Young Workforce to Getting Their First Formal Job

The influence of socio-demographic characteristics on the duration until the educated young workforce obtains their first formal job in low unemployment rates areas on Java Island can be shown using the AFT model with a log-normal distribution, without shared frailty (Table 7) and with shared frailty (Table 8).

Table 7. Model 1 without Shared Frailty

Variable	Kategori	$\hat{\beta}$	S.E.	$\hat{\gamma}$	p-value
<i>Intercept</i>					
Gender	Male	0.402	0.093	1.495	<0.001***
	Female ¹⁾				
Age		0.340	0.031	1.405	<0.001***
Marital Status	Never Married	0.483	0.268	1.621	0.071*
	Ever Married ¹⁾				
Highest Education	D4/S1	-1.253	0.259	0.286	<0.001***
	D1/D2/D3	-1.535	0.176		
	High School ¹⁾				
Internship Certificate	Have	0.100	0.163	1.105	0.537
	Does Not Have ¹⁾				
Recent Migrant Status	Recent Migrant	-0.504	0.262	0.604	0.054*
	Non-Recent Migrant ¹⁾				
Log(scale)		0.463	0.029		<0.001***
Scale Parameter				1.590	
χ^2				169.50	
Prob. (χ^2)				<0.001***	

Table 8. Model 1 with Shared Frailty

Variable	Kategori	$\hat{\beta}$	S.E.	$\hat{\gamma}$	p-value
<i>Intercept</i>					
Gender	Male	0.402	0.077	1.495	<0.001***
	Female ¹⁾				
Age		0.340	0.031	1.405	<0.001***
Marital Status	Never Married	0.483	0.190	1.621	0.011**
	Ever Married ¹⁾				
Highest Education	D4/S1	-1.253	0.154	0.286	<0.001***
	D1/D2/D3	-1.535	0.075		
	High School ¹⁾				
Internship Certificate	Have	0.100	0.030	1.105	0.001**
	Does Not Have ¹⁾				
Recent Migrant Status	Recent Migrant	-0.504	0.014	0.604	<0.001***
	Non-Recent Migrant ¹⁾				
Log(scale)		0.463	0.040		<0.001***
Scale Parameter				1.590	
χ^2				169.50	
Prob. (χ^2)				<0.001***	

Note: ¹⁾ Reference category; Model 1: Areas with Low Unemployment Rates; Significant at: ***1%; **5%; *10% alpha. Source: Data Processing Results.

Based on Tables 7 and 8, the standard error for each regression coefficient of the independent variable in Model 1 with shared frailty is smaller than in Model 1 without shared frailty. Furthermore, marital status, internship certificate ownership, and recent migration status, which were insignificant in Model 1 without shared frailty, become significant in Model 1 with shared frailty.

Based on Table 8, the p-value for the Likelihood Ratio Test is < 0.01 (rejecting H0),

It indicates that at least one independent variable has a significant influence on the duration of educated young workers' transition to formal employment in low unemployment rates areas on Java Island. Then, the results of partial testing through the Wald test, obtained p-value of all independent variables is < 0.05 which means that gender, age, marital status, highest education, ownership of internship certificate, and recent migrant status partially have a significant effect on the duration of the educated

young workforce to get their first formal job in low unemployment rates areas on Java Island. In addition, log (scale) yields a p-value < 0.01, which indicates that $\ln(p) \neq 0$ or $p \neq 1$. These results indicate that the scale parameter in the log-normal AFT model is significant. It suggests that the duration of formal job search varies and should be taken into account in the model. The estimated scale parameter is 1.590.

Similarly, in high unemployment rates areas on Java Island, the AFT model with a log-normal distribution, both without shared frailty (Table 9) and with shared frailty (Table 10), are used to analyze the influence of socio-demographic characteristics on the duration until the educated young workforce obtains their first formal job.

Table 9. Model 2 without Shared Frailty

Variable	Kategori	$\hat{\beta}$	S.E.	$\hat{\gamma}$	p-value
<i>Intercept</i>					
Gender	Male	-3.571	0.744	1,361	<0.001***
	Female ^{r)}	0.308	0.099		
Age		0.318	0.033	1,374	<0.001***
Marital Status	Never Married	0.057	0.313	n.s.	0.855
	Ever Married ^{r)}				
Highest Education	D4/S1	-1.317	0.272	0,268	<0.001***
	D1/D2/D3	-1.706	0.190		
	High School ^{r)}				
Internship Certificate	Have	-0.096	0.170	n.s.	0.572
	Does Not Have ^{r)}				
Recent Migrant Status	Recent Migrant	-0.314	0.272	n.s.	0.248
	Non-Recent Migrant ^{r)}				
Log(scale)		0.524	0.030		<0.001***
Scale Parameter				1.690	
χ^2				142.81	
Prob. (χ^2)				<0.001***	

Table 10. Model 2 with Shared Frailty

Variable	Kategori	$\hat{\beta}$	S.E.	$\hat{\gamma}$	p-value
<i>Intercept</i>					
Gender	Male	-3.571	0.302	1.361	<0.001***
	Female ^{r)}	0.308	0.120		
Age		0.318	0.018	1.374	<0.001***
Marital Status	Never Married	0.057	0.330	n.s.	0.863
	Ever Married ^{r)}				
Highest Education	D4/S1	-1.317	0.164	0.268	<0.001***
	D1/D2/D3	-1.706	0.214		
	High School ^{r)}				
Internship Certificate	Have	-0.096	0.082	n.s.	0.239
	Does Not Have ^{r)}				
Recent Migrant Status	Recent Migrant	-0.314	0.136	0.731	0.021**
	Non-Recent Migrant ^{r)}				
Log(scale)		0.524	0.015		<0.001***
Scale Parameter				1.690	
χ^2				142.81	
Prob. (χ^2)				<0.001***	

Note: r) Reference category; Model 2: Areas with High Unemployment Rates; Significant at: ***1%; **5%; *10% alpha. Source: Data Processing Results.

Based on Tables 9 and 10, the standard errors for most of the regression coefficients of the independent variables in Model 2 with shared frailty are smaller than in Model 2

without shared frailty. Furthermore, the recent migration status, which was insignificant in Model 2 without shared frailty, becomes significant in Model 2 with shared frailty.

Based on Table 10, the p-value for the Likelihood Ratio Test is < 0.01 (rejecting H_0). It indicates that at least one independent variable has a significant influence on the duration of educated young workers' transition to formal employment in high unemployment rates areas on Java Island. Then, the results of partial testing through the Wald test, obtained p-value of the variables of gender, age, highest education, and recent migrant status < 0.05 . It means gender, age, highest education, and recent migrant status partially have a significant effect on the duration of the educated young workforce until getting their first formal job in high unemployment rates areas on Java Island. Meanwhile, the p-values for marital status and ownership of internship certificates are > 0.05 . It indicates that neither variable has a significant effect on the duration of the educated young workforce until obtain their first formal job in high areas unemployment rates on Java Island. In addition, $\log(\text{scale})$ yields a p-value < 0.01 . It indicates that $\ln(p) \neq 0$ or $p \neq 1$. These results indicate that the scale parameter in the log-normal AFT model is significant, which suggests that the duration of formal job search varies and should be taken into account in the model. The estimated scale parameter is 1.690.

A comparison of modeling with and without shared frailty shows that in both Model 1 and Model 2 add shared frailty improves estimation accuracy by reducing standard errors and revealing the significant influence of previously undetected variables. This finding suggests that shared frailty captures unobserved heterogeneity across UMK groups, potentially influencing the transition duration of educated young workers to formal employment. Therefore, the influence of socio-demographic characteristics on the transition duration to first formal employment among educated young

workers in Java is interpreted through a model incorporating shared frailty in UMK.

Gender significantly influences the time it takes young educated workers to find their first formal job in low and high unemployment rates areas on Java Island, with acceleration factors of 1.495 and 1.361, respectively. This result indicates that male educated young workers have a longer formal job search time, 1.495 times longer in areas with low unemployment and 1.361 times longer in areas with high unemployment, compared to female workers. This finding aligns with research by E. Susilo, who found that women tend to have shorter job search durations than men (Susilo 2022). Furthermore, research by Amalia & Nugrahadi also shows that women are more likely than men to find work (Amalia and Nugrahadi 2021). Women tend to have a narrower job transition window due to social pressure, leading them to make quicker decisions to accept available jobs than men do, even though they have fewer options. Meanwhile, men tend to delay career decisions while waiting for more suitable opportunities, thereby lengthening their job search time (Bandiera et al. 2025; Raihannabil et al. 2025).

Age significantly influences the time it takes for educated young workers to find their first formal job in low and high unemployment rates areas on Java Island, with acceleration factors of 1.405 and 1.374, respectively. These results indicate that the older the young workers, the longer it takes them to find formal employment, 1.405 times longer in low unemployment areas and 1.374 times longer in high unemployment areas than for younger workers. This finding aligns with Friska's research, which found that the unemployment rate for younger workers, such as those of working age, is lower than for older workers (Friska 2021). Companies tend to prefer younger workers because they are considered more adaptable to technological changes and work dynamics. Furthermore, young workers are considered more trainable and have the

potential for long-term development within the organization. This preference shows that the older job seekers are facing longer job search times than the younger ones (Torm 2020).

Marital status significantly influences the time it takes for educated young workers to find their first formal job in low unemployment rates areas on Java Island, with an acceleration factor of 1.621. This finding indicates that in low unemployment rates areas, educated young workers who have never married have a longer formal job search time, 1.621 times longer than those who have ever married. This finding aligns with research by E. Susilo that found that individuals who have ever married tend to have shorter job search times than those who have never married (Susilo 2022). This condition may be due to economic pressures and family responsibilities that push them to work quickly. Marital status increases the urgency to find work, significantly reduce the risk of unemployment (Damaske et al. 2024). However, marital status does not significantly affect the time it takes educated young workers to secure their first formal job in high unemployment rates areas in Java. This phenomenon may occur, in the context of high unemployment, because the structural barriers such as limited job opportunities and intense competition are universal, which makes individual factors such as marital status less determinant. In a saturated labor market, i.e., high unemployment areas, both married and unmarried individuals were facing the same risks and difficulties in securing formal employment (Schulz and Siuda 2023).

Highest education significantly influences the time it takes for educated young workers to find their first formal job in low and high unemployment rates areas on Java Island, with acceleration factors of 0.286 and 0.268, respectively, for D1/D2/D3 education levels, also 0.215 and 0.182, respectively, for D4/S1 education levels. These results indicate that educated young workers with a D1/D2/D3 education have a shorter formal job search time, 0.286 times faster in low unemployment rates

areas and 0.268 times faster in high unemployment rates areas, compared to those with a high school diploma or equivalent. Furthermore, educated young workers with a D4/S1 education have a shorter formal job search time, 0.215 times faster in low unemployment rates areas and 0.182 times faster in high unemployment rates areas compared to those with a high school diploma or equivalent. This finding differs from previous studies, such as those by Friska and E. Susilo, which found that job seekers with higher education had longer job search times than those with lower education (Friska 2021; Susilo 2022). However, the results of this study align with Becker's human capital theory, which states that the higher a person's education level, the greater their chances of finding employment due to increased skills and productivity (Becker 1975). Job seekers with higher education have shorter job search times because employers perceive them as more competent and better prepared for work (Abdurohman et al. 2024). Furthermore, human capital, such as higher educational qualifications, increases a job seeker's chances of being invited for an interview and accelerates the formal recruitment process (Ng et al. 2023; (Raihannabil et al. 2025a).

Owning an internship certificate significantly influences the time it takes for educated young workers to find their first formal job in low unemployment rates areas on the island of Java, with an acceleration factor of 1.105. These results indicate that in low unemployment rates areas, educated young workers with internship certificates have a 1.105-fold longer formal job search time than those without. This finding may be due to the fact that not all internship certificates convey a strong positive signal to employers, particularly if the internship experience is administrative or irrelevant to industry needs (Di Paolo and Matano 2022). This situation can lead job seekers with internship certificates to have higher expectations for their desired jobs, thereby prolonging their job search. A mismatch

between internship experience and labor market needs can lead to an overqualification effect that actually hinders the transition to formal employment (Gomez et al. 2023). However, ownership of an internship certificate did not significantly affect the time it took educated young workers to find their first formal job in high unemployment areas on Java Island. This phenomenon may be due to highly competitive labor market conditions and limited formal vacancies, which means job seekers, both with and without internship certificates, face similar structural barriers. The phenomenon of overqualification, where mismatches between qualifications and jobs often lead to career compromise, suggests that an inappropriate internship signal is not a guarantee of an accelerated transition to formal employment, especially in saturated markets (Chen et al. 2021; Khan et al. 2022).

Recent migrant status significantly influences the time it takes educated young workers to find their first formal job in areas with low and high unemployment rates on Java Island, with acceleration factors of 0.604 and 0.731, respectively. These results indicate that educated young workers with recent migrant status have a shorter formal job search time, 0.604 times in areas with low unemployment and 0.731 times in areas with high unemployment, compared to non-recent migrants. This finding aligns with research by Amalia and Nugrahadi (2021), which found that recent migrants are more likely to find work than non-recent migrants. Status as a recent migrant accelerates their search for formal employment because they tend to have higher levels of human capital, such as education and relevant job skills. Furthermore, they have broader social networks, which can help them access job openings faster (Abdurohman et al. 2024).

CONCLUSION

Gender, age, education level, and recent migrant status directly affect how long educated

young people in Java take to get their first formal job, regardless of unemployment rates. Marital status and having an internship certificate only matter in areas with low unemployment. Older, unmarried male job seekers with internship certificates take longer to find formal jobs. Job seekers with D1/D2/D3 and D4/S1 education and recent migrants find jobs faster.

A comparison of areas with high and low unemployment rates shows a significant difference in the duration of the transition to formal employment: the educated young workforce in low unemployment areas obtains formal employment faster and in higher proportions than in high unemployment areas. The difference in the significance of the influence of variables between high and low unemployment rates areas also indicates that the effectiveness of individual socio-demographic characteristics in accelerating the transition to formal employment is strongly influenced by the context of the unemployment rate in a region. It indicates that individual characteristics do not always have a uniform impact depending on labor market conditions. Based on a comparison between modelling with and without shared frailty, the model with shared frailty at the UMK level was found to be more accurate because it captures unobserved heterogeneity across UMK groups that influences the transition duration of the educated young workforce to formal employment.

SUGGESTIONS

The government should design integrated policies to accelerate the transition of young workers into formal employment. Priorities include gender-responsive career training and counselling, incentives for young adults, and targeted support for unmarried job seekers in low unemployment areas. The government must also expand access to higher education, strengthen skills-based curricula, and redesign internships to meet industry needs.

Policymakers should boost job mobility by sharing cross-regional labor-market data and supporting recent migrants, as these steps help young people enter the workforce more quickly

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