

THE IMPACT OF LABOR MIGRATION ON EMPLOYMENT OPPORTUNITIES IN JAVA ISLAND

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Article Information: Received: June, 25 2026, **Published:** August, 10 2026

Abstract

This study examines the impact of labor migration on employment opportunities on the island of Java, Indonesia, using data from Survei Angkatan Kerja Nasional (SAKERNAS) August 2022. This study aims to compare the characteristics of migrant and non-migrant workers, identify factors influencing migration decisions, and analyze the impact of migration on labor market outcomes. A quantitative approach was employed using the Propensity Score Matching (PSM) method to reduce selection bias and obtain more accurate causal estimates. The results indicate that migrants generally possess better human capital, including higher educational attainment, work experience, and participation in job training, and tend to be younger than non-migrants. Individual characteristics were found to significantly influence migration decisions. However, the findings consistently show that migration has a negative and significant impact on employment opportunities. Migrants are less likely to be employed than non-migrants with similar characteristics, reflecting intense competition in the labor market as well as structural constraints in urban areas. This study highlights a paradox in which better human capital does not always guarantee better employment outcomes and offers important implications for labor market policy and regional development.

Keywords: Migration, Employment, Opportunities, Propensity Score Matching, Labor Market

INTRODUCTION

As Indonesia's primary economic and political center, Java accounted for 56.48% of the national Gross Domestic Product (GDP) in 2022. Its superior infrastructure, public services, and massive investment concentration create a strong pull factor, driving workforce migration from outside Java and outlying regions into its major cities in search of better economic opportunities. The high level of economic activity on Java does not always correlate directly with maximum labor absorption. Labor issues such as high unemployment rates, the dominance of the informal sector, and inequities in access to job opportunities remain major concerns. Therefore, it becomes crucial to empirically examine whether the decision to migrate genuinely enhances an individual's probability of securing employment amidst this highly competitive market.

Table 1. Open Unemployment Rate in Java Island, 2022 (Percent)

Province	February	August
DKI Jakarta	8.00	7.18
Jawa Barat	8.35	8.31
Jawa Tengah	5.75	5.57
D.I. Yogyakarta	3.73	4.06
Jawa Timur	4.81	5.49

Banten

8.53

8.09

Source: Badan Pusat Statistik (BPS), 2022

Data on unemployment rates in Java in 2022 shows that regions with high economic activity, such as Jakarta, West Java, and Banten, have relatively high unemployment rates. This indicates that even though a region may have significant economic appeal, it does not necessarily mean it can effectively absorb the labor force. The imbalance between the number of job seekers and available job openings.

Has led to increasingly fierce competition in the labor market, particularly in urban areas in this situation, labor mobility has become a significant phenomenon and requires analysis through a theoretical approach. Several studies indicate that individuals' decisions to migrate are generally driven by economic factors; specifically, disparities in conditions and potential across regions in Indonesia serve as a key driver of migration. Additionally, an individual's perception of their environment also serves as a key trigger for migration (Wirawan, 2023). Furthermore, high levels of employment opportunities and wages constitute the primary considerations for migrants when making the decision to relocate (Syahrain, 2019).

Table 2. Population by Region, Lifetime Migration Status, and Sex, 2022

Province	Migrant			Non-Migrant		
	Male	Female	Total	Male	Female	Total
DKI Jakarta	1.632.846	1.697.611	3.330.457	3.743.023	3.606.471	7.349.494
Jawa Barat	2.673.023	2.511.791	5.184.814	22.394.203	21.826.791	44.220.994
Jawa Tengah	576.826	582.784	1.159.610	18.038.042	17.834.758	35.872.800
Yogyakarta	274.473	319.774	594.247	1.587.612	1.580.011	3.167.623
Jawa Timur	486.884	486.118	973.001	20.038.872	20.138.100	40.176.973
Banten	1.177.444	1.122.850	2.300.294	5.063.597	4.888.094	9.951.691

Source: Statistics Indonesia Census, 2022

Based on the table, the number of non-migrant workers in various provinces on the island of Java is still significantly higher than the number of migrants. However, the number of migrants remains substantial, particularly in provinces that serve as economic hubs, such as West Java, Banten, and Jakarta. West Java is the province with the largest number of migrants, followed by Banten and Jakarta, indicating that these regions are the primary destinations for migration. Additionally, the ratio of male to female migrants is balanced across all provinces, suggesting that labor migration is not dominated by a single gender but involves the entire workforce.

This situation highlights the strong economic pull of urban areas and underscores that migration is a crucial aspect of labor dynamics on the island of Java. It reflects rational decision-making, driven by the concentration of economic activities in cities that attract residents from rural areas. Theoretically, migrants generally possess advantages such as being of working age, having a higher level of education, and possessing economic motivation; thus, migration is viewed as a form of investment to secure good job opportunities.

Nevertheless, empirically, the increase in migration has made job competition in cities even more intense. Not all migrants succeed in finding suitable employment, so some are forced to work in the informal sector or remain unemployed. This situation creates a paradox, in which the advantages possessed by migrants do not always guarantee better job opportunities at their destination. Furthermore, high migration rates in a region impact the quality of life for the community, as high population density leads to various challenges in socioeconomic aspects, security, community well-being, and land scarcity (Utami, 2025). If, in the long term, this situation is not balanced by structural improvements in the national labor market system, the sharp rise in migrant workers could serve as an indicator of the government's failure to foster inclusive economic development (Astuti et al., 2025).

To analyze the impact of migration on employment opportunities, it is not sufficient to simply compare migrants with non-migrants, as differences in characteristics can lead to selection bias. Therefore, methods such as Propensity Score Matching (PSM) are necessary to ensure more accurate estimates. This method is used to match migrants and non-migrants with similar characteristics based on a specific probability value or propensity score, so that the comparison is more balanced and the estimated impact of migration on employment opportunities is more accurate.

To date, research has generally relied on descriptive methods or linear regression for analysis, which can lead to selection bias issues that have not yet been optimally addressed. However, questions regarding employment opportunities are crucial for assessing the success of migration, as the ability to secure employment significantly influences an individual's improved well-being after migrating. The novelty of this study lies in the use of the Propensity Score Matching (PSM) method; this method was chosen because previous research has not extensively examined the impact of migration on employment opportunities.

This study is important because it not only examines the phenomenon of labor migration on the island of Java but also employs a more appropriate analytical approach. There are several questions this study aims to answer, including: first, how the characteristics of the migrant workforce compare to those of the non-migrant workforce on the island of Java; second, what factors influence the workforce's decision to migrate; and third, how migration impacts employment opportunities for the workforce on the island of Java. Based on these questions, this study aims to compare the characteristics of migrants and non-migrants, identify the factors driving migration, and measure the impact of migration on employment opportunities. This study is expected to contribute to the formulation of labor policies, particularly in managing migration flows and enhancing the effectiveness of labor absorption.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

Employment Status

According to the Badan Pusat Statistik (BPS), employment status is defined as the condition of a person who has worked for at least one hour in the past week with the intention of earning or helping to earn income or profit. A person who is temporarily not working due to illness or leave is considered employed. In labor market analysis, employment status is often used as a key indicator to measure an individual's success in accessing the labor market.

Migration

In this study, migration is used as a treatment variable that is hypothesized to influence an individual's chances of finding employment. Migration refers to the movement of people to settle in a new location across administrative boundaries (internal migration) or political/national borders (international migration). Migration is one of the ways people respond to various pressures stemming from economic, social, and environmental conditions. Consequently, individuals will consider their best options to improve their well-being. In addressing these conditions, people have three choices: moving to another region to seek better economic opportunities, remaining in their home region because they feel they can still meet their basic needs, or choosing to stay but engaging in periodic mobility to seek employment in other areas.

Gender

Gender is a demographic characteristic that influences participation in the labor market. In Indonesia, certain business opportunities present significant differences between men and women. According to the Central Statistics Agency (2023), labor force participation rates in Indonesia show a significant disparity, with data indicating that men have a much higher participation rate than women. This is influenced by social norms, the division of labor within households, and women's limited access to formal employment.

Age

Age is an indicator of whether a person is in the working-age population or not. People in the working-age population tend to have more employment opportunities than those who are not. The working-age population referred to here consists of people aged 15 to 64. Individuals in this age group have a higher labor force participation rate.

Marital Status

Marital status is one of the factors that influence a person's decision to work. Married people typically have greater financial responsibilities than those who are unmarried. In Indonesia, marital status is closely tied to one's position within the family. Married people—especially men—typically have a stronger motivation to earn a living.

Work Experience

Work experience refers to all the activities, knowledge, skills, and professional positions a person has held over a specific period in the past. This work experience illustrates how that person has performed tasks and adapted to their work environment in the past. In Indonesia, work experience is one of the key factors in the recruitment process. Someone with work experience tends to find it easier to secure a job because they are considered to have higher productivity compared to those with no work experience at all.

Higher Education

Education is a key factor in determining the quality of human resources, which in turn affects an individual's ability to compete in the job market. Individuals who pursue higher education typically demonstrate better critical thinking skills and possess superior competencies. In Indonesia, education plays a crucial role in determining access to the job market. People with higher levels of education generally have greater opportunities to secure quality jobs.

Job Training

Job training is a key tool for developing specific skills aligned with the needs of the current job market. This type of training can enhance an individual's skills in both technical and non-technical areas. In Indonesia, job training serves as a key instrument for improving the quality of the workforce. Individuals who participate in job training have a greater chance of entering the workforce because they are considered to possess relevant skills.

Residential Area

Residential areas reflect spatial disparities in access to employment opportunities. There are differences between urban and rural areas in terms of economic structure and job availability. In Indonesia, urban areas offer higher formal employment opportunities due to the prevalence of industrial and service sectors in these regions. In contrast, rural areas remain dominated by the agricultural sector, which has limited capacity for labor absorption.

The Dynamics of Migration Decisions

Migration is a societal response to disparities in conditions between regions, particularly in economic and social aspects. Population movement generally occurs due to limited job opportunities in the region of origin and the hope of securing better employment and income in the destination region. Economic factors are the primary determinants of migration decisions, as individuals are driven to move to regions offering broader employment opportunities (Septiani, Sihalo, & Sita, 2021). Additionally, regions with higher levels of economic development tend to act as magnets for migrants because they provide greater opportunities for improved well-being (Cahya, 2023).

Furthermore, macro-level factors such as labor market conditions and wage levels in a region can also influence migration flows. These differences create a unique appeal for destination areas. However, migration does not always yield to the expected outcomes. Empirical findings indicate that population movement does not consistently indicate an increase in well-being, suggesting a potential mismatch between migrants' expectations and the reality they face in destination areas (Saputra, 2021).

Migration and employment opportunities in the labor market

The increase in the labor force resulting from migration flows has the potential to contribute to economic activity if these workers can be optimally absorbed. However, if the increase in the labor force is not matched by growth in employment opportunities, this situation may intensify competition for jobs and increase the risk of unemployment.

In the context of urban areas, migration is often viewed as an opportunity for individuals to secure jobs with relatively higher wages. However, at the same time, the rising number of job seekers due to migration can also place pressure on the local labor market (Maulina & Amalia, 2023). Furthermore, an individual's success in securing employment is heavily determined by the quality of human capital, such as educational attainment and skills, making the alignment between labor force characteristics and market needs a crucial factor (Septiani, Sihaloho, & Sita, 2021).

Propensity Score Matching (PSM) approach in impact analysis

Propensity Score Matching (PSM) is a quasi-experimental method used to estimate the difference in outcomes between program beneficiaries and non-beneficiaries attributable to a specific program. Propensity Score Matching (PSM) has the advantage of reducing bias between the treatment and control groups and can reduce the dimensions of covariates to a single value, namely the propensity score. Studies examining the effects of migration on employment status often face selection bias issues, given that individuals who migrate tend to have different characteristics compared to those who do not. These differences such as age, educational level, and skills can independently influence employment opportunities, making it difficult to identify the pure effect of migration.

To address this issue, this study employs the Propensity Score Matching (PSM) approach, which enables the creation of a comparison group with characteristics that are relatively comparable between migrants and non-migrants. Consequently, the observed differences in employment status can better reflect the impact of migration, rather than being solely due to differences in individual characteristics. The use of this approach is relevant given that previous research findings indicate that migration does not always have a direct impact on improved well-being or employment opportunities (Saputra, 2021; Maulina & Amalia, 2023).

The Influence of Individual Characteristics on Migration Decisions

According to human capital theory, individuals do not only focus on the limited job opportunities in their current region but must consider broader geographical areas to maximize their return on their skills. Individual characteristics—encompassing socio-demographic and human capital factors such as education, work experience, marital status, and age—are the basis that affirms an individual's capability and readiness to move. Individuals must be sensitive to economic disparities, and job market demands both in their hometowns and destination regions. This migration decision is based on the expectations built by individuals to achieve better career prospects and income. By accumulating higher education and training, individuals can access wider job markets and improve their living standards. According to the findings of labor economics studies, individual characteristics are significantly correlated with the probability of migration, while age acts as a natural constraint.

H1: Individual characteristics (such as education, work experience, marital status, job training, area of residence, age, and gender) have a significant influence on migration decisions.

The Influence of Migration on Employment Opportunities

Employment problems may arise from massive migration activities that continue to evolve over time, especially in economically concentrated areas like Java Island. The influx of labor without considering the availability of local job vacancies, intense labor market competition, and skill mismatches resulting from regional displacement are some aspects of employment problems. Effective human capital utilization through migration can attract better income for individuals and increase their welfare. However, the migration process often creates an adaptation phase where individuals might experience frictional unemployment. Migration has a negative influence on

immediate job retention due to intense competition in destination areas, according to labor market studies. The employment opportunities of individuals in high-growth regions is greatly influenced by their migration status, according to similar findings in regional economic research.

H2: Migration has a negative influence on employment opportunities

RESEARCH METHODS

This study employs a quantitative approach using secondary data derived from Survei Angkatan Kerja Nasional (SAKERNAS) August 2022, focusing on individuals within the labor force in Java Island. The study adopts an observational causal-comparative design to analyze the impact of migration on employment opportunities. The dependent variable in this research is employment status, which represents the probability of working, while migration status serves as the main independent (treatment) variable, categorized into migrants and non-migrants. In addition, several covariates are included, namely gender, marital status, level of education, work experience, participation in job training, area of residence, and age, which are used to control for individual characteristics that may influence both migration decisions and employment outcomes.

The population of this study consists of all individuals in the labor force across six provinces in Java Island. The sample is obtained through a filtering process based on the availability of complete and consistent data for all research variables, resulting in a total of 236,277 observations. This selection ensures that only relevant and reliable data are included in the analysis.

Conceptual and Operational Definitions of Variables

Propensity Score

Propensity score is defined as the conditional probability of receiving treatment given a set of observed covariates (Rosenbaum & Rubin, 1983). Similar propensity score values between treatment and control groups indicate comparable characteristics, allowing for more balanced and unbiased comparisons. The propensity score model is defined as:

$$P(\mathbf{X}) = \Pr(D = 1 | \mathbf{X}) = \frac{e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k}}{1 + e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k}} \quad (1)$$

Where D is the migration status, in which a value of 1 indicates a migrant and 0 indicates a non-migrant. The variable X represents a vector of covariates, where X_1 denotes sex, X_2 denotes marital status, X_3 denotes education, X_4 denotes work experience, X_5 denotes job training, X_6 denotes area of residence, and X_7 denotes age.

Average Treatment Effect on the Treated (ATT)

The Average Treatment Effect on the Treated (ATT) is defined as the average effect of a treatment on individuals who receive the treatment (Rosenbaum & Rubin, 1983). A positive ATT value indicates that the treatment increases the outcome, while a negative value implies that the treatment reduces the outcome. The Average Treatment Effect on the Treated (ATT) is expressed as:

$$ATT = E[Y_1 - Y_0 | D = 1] \quad (2)$$

Where Y_1 represents the observed outcome, namely the employment probability for the migrant group, while Y_0 represents the counterfactual outcome, which is the employment probability if the migrants had not migrated. The condition $D = 1$ indicates that the estimation focuses on the treated group, namely migrants.

Data Analysis Techniques

Descriptive Statistical Analysis

The purpose of descriptive statistics in the analysis of this study is to provide an overview of the characteristics of the labor force in Java Island based on variables such as gender, marital status, education level, work experience, job training participation, area of residence, and age. This analysis also highlights the differences in characteristics between migrant and non-migrant groups as a preliminary understanding before further econometric analysis.

Ordinary Least Squares (OLS) Estimation

Before estimating the impact using Propensity Score Matching (PSM), this study first applies Ordinary Least Squares (OLS) estimation as a baseline model for comparison. Ordinary Least Squares (OLS) is a method used to estimate the parameters of a linear regression model by minimizing the sum of squared differences between the observed and predicted values of the dependent variable (Jeffrey Wooldridge, 2013). Two model specifications are employed: Model 1 regresses migration status on employment outcomes without control variables, while Model 2 includes all covariates to control for observable characteristics.

Propensity Score Matching (PSM) Estimation

This study applies to the Propensity Score Matching (PSM) method by first estimating propensity scores using a logistic regression model based on observable characteristics such as education, age, work experience, training, gender, marital status, and region. These scores are then used to match individuals in the treatment (migrant) and control (non-migrant) groups to create comparable samples, followed by testing the common support assumption to ensure sufficient overlap in score distributions. The quality of matching is subsequently evaluated through covariate balancing tests, using t-tests and standardized bias measures, supported by visual diagnostics to confirm that differences between groups are minimized. Once these assumptions are satisfied, the analysis proceeds to impact estimation using the Average Treatment Effect on the Treated (ATT), employing multiple matching techniques such as Nearest Neighbor, Radius Caliper, and Kernel Matching. Statistical significance testing and bootstrapping are also conducted to ensure the robustness and consistency of the estimates, allowing the results to be interpreted as a valid causal effect after addressing potential selection bias.

RESULTS AND DISCUSSION

Empirical Estimation Results

Descriptive Statistical Analysis

In this study, descriptive analysis was used to obtain an overview of the characteristics of the research subjects. The data used is based on a filtered sample of 236,277 individuals from the August 2022 Survei Angkatan Kerja Nasional (SAKERNAS).

Table 3. Descriptive Statistics

Covariate (X)	Migration Status		Total (%)
	Non-Migrant (0)	Migrant (1)	
Sex (X_1)			
Male (0)	118.224	2.941	51,28%
Female (1)	112.203	2.909	48,72%
Marital Status (X_2)			
Never Married (0)	75.902	1.595	32,80%
Married/Ever Married (1)	154.525	4.255	67,20%
Highest Education (X_3)			
Primary (SD/SMP)	146.287	2.474	62,96%
Senior High School	37.055	1.347	16,25%
Vocational High School	26.414	1.018	11,61%
Diploma	4.695	223	2,08%
Higher Education (S1/S2/S3)	15.976	788	7,10%
Work Experience (X_4)			
No (0)	98.545	1.760	42,45%
Yes (1)	131.882	4.090	57,55%
Job Training Participation (X_5)			
No (0)	193.427	4.161	83,63%
Yes (1)	37.000	1.689	16,37%
Area of Residence (X_6)			
Rural (0)	91.354	1.779	39,42%
Urban (1)	139.073	4.071	60,58%

Mean Age (X_7)	42,56 Year	34,70 Year	42,37 Year
Total N	230.427	5.850	236.277 (100%)

Source: BPS, SAKERNAS August 2022, processed

Based on the descriptive statistical table, it can be described as follows: The labor force in Java Island is predominantly male (51.28%), married (67.20%), holds a basic level of education (62.96%), and resides in urban areas (60.58%). When analyzing the respondents based on migration status, the data shows that migrants are significantly younger, with an average age of 34.70 years, compared to non-migrants who average 42.56 years. Furthermore, migrants possess a higher educational profile and a greater proportion of job training participation. This indicates that migrants are individuals equipped with superior human capital.

Ordinary Least Squares (OLS) Estimation

Before implementing the Propensity Score Matching (PSM) method, the Ordinary Least Squares (OLS) estimation was used as a baseline.

Table 4. OLS Regression Estimation

Independent Variable	Without Controls (M_1)		With Controls (M_2)	
	Coeff	Std. Error	Coeff	Std. Error
Migration Status (Treatment)	0,0091	(0,0083)	-0,0365***	(0,0074)
Sex (X_1)	–	–	0,2906***	(0,0023)
Marital Status (X_2)	–	–	0,1868***	(0,0027)
Highest Education (X_3) – Ref: Primary (SD/SMP)				
Senior High School	–	–	0,0433***	(0,0033)
Vocational High School	–	–	0,1217***	(0,0040)
Diploma	–	–	0,1359***	(0,0088)
Higher Education (S1/S2/S3)	–	–	0,2080***	(0,0051)
Work Experience (X_4)	–	–	0,0475***	(0,0024)
Job Training Participation (X_5)	–	–	0,0405***	(0,0035)
Area of Residence (X_6)	–	–	0,0704***	(0,0023)
Age (X_7)	–	–	0,0012***	(0,0001)
Constant (cons)	0,5929***	(0,0013)	0,2518***	(0,0041)
R-squared	0,0000		0,1603	
Number of Observations (N)	236.277		236.277	

*Note: Figures in parentheses are Robust Standard Errors. *** significant at 1% level; ** at 5% level; * at 10% level.

Source: BPS, SAKERNAS August 2022, processed

The regression equation obtained from the initial Ordinary Least Squares (OLS) test reveals a drastic shift in the migration status coefficient. In the model without controls, the migration variable showed a positive but statistically insignificant coefficient (0.0091). However, when individual characteristics were introduced as control variables, the coefficient turned negative (-0.0365) and became highly significant. This confirms the occurrence of Omitted Variable Bias (OV), where the innate superior characteristics of migrants initially obscured the true negative impact of migration. Consequently, the Propensity Score Matching (PSM) method is utilized to robustly resolve this selection bias.

Propensity Score Estimation and Hypothesis 1 Test Results

In this study, the logistic regression (Logit) model was used to estimate the propensity score to determine the probability of an individual to migrate.

Table 5. Propensity Score Estimation Stage (Logit Model)

Independent Variable	Coefficient	Std. Error	z-stat	P>z
Sex (X_1)	0,0869**	0,0354	2,45	0,014
Marital Status (X_2)	0,8624***	0,0524	16,43	0,000
Highest Education (X_3)– Ref: Primary (SD/SMP)				
Senior High School	0,4170***	0,0454	9,17	0,000
Vocational High School	0,2076***	0,0521	3,98	0,000
Diploma	0,7753***	0,1063	7,29	0,000
Higher Education (S1/S2/S3)	0,7748***	0,0632	12,26	0,000

Work Experience (X_4)	0,7010***	0,0423	16,54	0,000
Job Training Participation (X_5)	0,3101***	0,0445	6,96	0,000
Area of Residence (X_6)	0,1889***	0,0352	5,36	0,000
Age (X_7)	-0,0521***	0,0019	-26,62	0,000
Constant	-3,2402***	0,0584	-55,39	0,000

*Note: *** significant at 1% level; ** at 5% level; * at 10% level.

Source: BPS, SAKERNAS August 2022, processed

The first hypothesis, according to which individual characteristics have a significant influence on migration decisions, has been validated. Based on the propensity score estimation table, the z-statistic test results demonstrate variables such as Higher Education (12.26), Work Experience (16.54), and Job Training (6.96) show strong positive significance. Meanwhile, the probability value (Sig.) for all individual characteristic variables is $0.000 < 0.05$. Conversely, age presents a negative z-statistic (-26.62) with a significance of 0.000. This statistically proves that individual characteristics play a crucial role in influencing migration decisions, thus Hypothesis 1 (H1) is accepted.

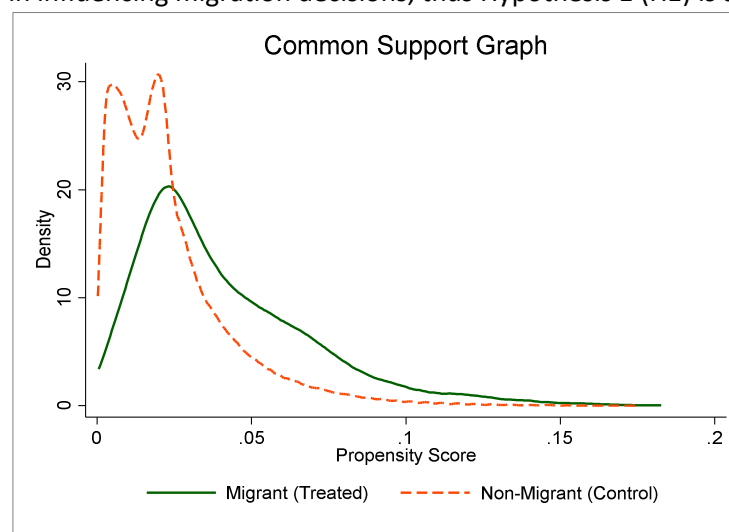


Figure 1. Common Support Graph

Following the score estimation, the quality of the data was visually assessed using a kernel density plot. The graph illustrates a substantial overlap in the propensity score distribution between the treated and control groups, particularly between scores of 0 and 0.15, ensuring that valid matches can be made.

Covariate Balancing Evaluation

In this study, a covariate balancing test was used as a fundamental procedure to ensure the effectiveness and quality of the matching process. This evaluation aims to verify that the distribution of observable individual characteristics between the treated and control groups is well-balanced before estimating the true causal impact.

Table 6. Impact of Migration on Employment Opportunities – Covariate Balancing Test (ATT)

Variable	Sample	Mean		%bias	%reduct	t-test	
		Treated	Control			t	p> t
Sex (X_1)	Unmatched	0,497	0,487	2,1		1,56	0,119
	Matched	0,497	0,496	0,3	86,8	0,15	0,882
Marital Status (X_2)	Unmatched	0,727	0,671	12,4		9,13	0,000
	Matched	0,727	0,728	-0,2	98,2	-0,12	0,901
Highest Education (X_3)	Unmatched	2,231	2,097	39,2		32,17	0,000
	Matched	2,230	2,226	0,3	99,2	0,15	0,877
Work Experience (X_4)	Unmatched	0,699	0,572	26,6		19,39	0,000
	Matched	0,699	0,699	-0,1	99,6	-0,06	0,952
Job Training Participation (X_5)	Unmatched	0,289	0,161	31,1		26,19	0,000
	Matched	0,288	0,286	0,5	98,4	0,25	0,806

Area of Residence (X_6)	Unmatched	0,696	0,604	19,4		14,28	0,000
	Matched	0,696	0,697	-0,3	98,7	-0,14	0,888
Age (X_7)	Unmatched	34,707	42,567	-52,9		-35,47	0,000
	Matched	34,715	34,716	0,0	100,0	-0,00	0,999

Source: BPS, SAKERNAS August 2022, processed

Based on the covariate balancing table, the unmatched sample exhibited significant mean differences across variables ($p < 0.05$). For instance, variables such as 'Age' and 'Work Experience' initially showed a massive bias between the treated and control groups. However, in the matched sample, all individual characteristic variables attained a significance level above 0.05 ($p > 0.05$). Moreover, the standardized bias reduction (%reduct) reached between 86.8% and 100%. This statistical evidence indicates that the differences in characteristics between the treated and control groups have been successfully minimized.

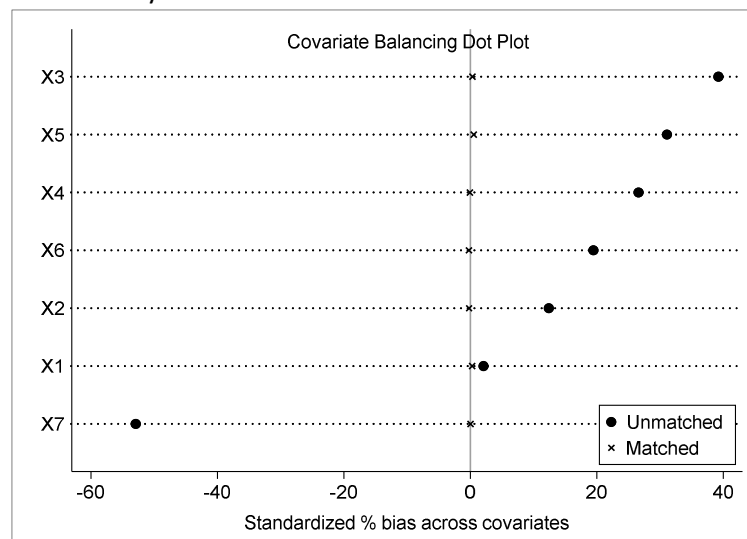


Figure 2. Covariate Balancing Dot Plot

Furthermore, based on the covariate balancing dot plot graph, the effectiveness of the matching process can be assessed visually. In the unmatched condition, the dots representing the standardized bias of the variables were scattered far from the zero-line, indicating high initial imbalance. After the matching process, the dots shifted and concentrated tightly around the zero line. This visual evidence, combined with the statistical table, signifies that the groups are highly comparable and the selection bias has been successfully eliminated.

Average Treatment Effect on the Treated (ATT) and Hypothesis 2 Test Results

In this study, the Average Treatment Effect on the Treated (ATT) approach was used to estimate the causal impact of migration on employment opportunities. The following are the results of the estimation with ATT:

Table 7. Estimated Impact of Migration on Employment Opportunities (ATT)

Method	Mean of Matched Treated	Mean of Matched Controls	ATT	t-stat
	Employment Probability			
Nearest Neighbor (1) ties	0,5917	0,6543	-0,0626	-8,25
Radius Caliper (0,01)	0,5917	0,6367	-0,0450	-6,86
Kernel Matching	0,5917	0,6155	-0,0238	-3,65

Source: BPS, SAKERNAS August 2022, processed

Based on the ATT estimation table, all three matching methods (Nearest Neighbor, Radius Caliper, and Kernel Matching) consistently show a negative and significant ATT value. This confirms the robustness of the estimation results. Specifically, the Nearest Neighbor matching method shows an ATT value of -0.0626. This indicates that the probability of working for migrants is 0.5917

compared to 0.6543 for matched non-migrants. This is evidenced by the t-count test result of -8.25. Additionally, the significance level (Sig.) obtained from 50 bootstrapping replications is $0.000 < 0.05$. This means that migration has a significant negative influence on employment opportunities. Therefore, Hypothesis 2 (H2) is accepted.

Discussion of the Findings

The Influence of Individual Characteristics on Migration Decisions

The results of the propensity score estimation indicate that individual characteristics have a significant influence on migration decisions. Variables such as higher education level, work experience, and job training show a strong and statistically significant positive influence on the probability of migration, while age has a negative influence. This suggests that individuals with better human capital tend to have higher mobility and are more likely to migrate in search of better economic opportunities.

These findings align with human capital theory, which posits that migration is a form of investment decision aimed at maximizing return on skills and education. Individuals with higher levels of education and training tend to be more confident in competing in broader labor markets, thereby increasing their likelihood of migrating. On the other hand, the negative effect of age reflects that younger individuals are more flexible and more willing to take risks associated with migration.

Furthermore, marital status and residential areas also significantly influence migration decisions, indicating that socio-demographic and spatial factors play a crucial role. Individuals who live in urban areas or have family responsibilities tend to make more strategic migration decisions. Overall, these results support the first hypothesis (H1) that individual characteristics have a significant influence on migration decisions.

The Impact of Migration on Employment Opportunities

Estimation results using the Average Treatment Effect on the Treated (ATT) consistently show that migration has a negative and significant impact on employment opportunities. Across all matching methods, migrants have a lower probability of being employed compared to non-migrants with similar characteristics. This suggests that migration does not directly guarantee better employment outcomes. These findings can be explained by the high level of competition in urban labor markets, particularly in regions with high economic concentration, such as Java. The influx of migrants increases the labor supply, which is not always matched by the availability of jobs. Consequently, migrants often face difficulties in securing employment, especially in the formal sector.

Furthermore, these results also indicate a mismatch between migrants' expectations and labor market realities. Although migrants generally possess better human capital, such as higher education and skills, these advantages do not always directly translate into employment. This situation can lead to temporary unemployment or absorption into the informal sector. These findings align with labor market theory, which states that an increase in the labor force without corresponding job growth will intensify competition and reduce employment opportunities. Furthermore, these findings also support previous empirical research indicating that migration does not always improve well-being or employment opportunities. Thus, the second hypothesis (H2), which states that migration has a negative effect on employment opportunities, is accepted.

Interpretation and Theoretical Implications

The results of this study reveal a significant paradox in the dynamics of labor migration. On the one hand, migrants' possess better human capital characteristics, which in theory should increase their employment opportunities. On the other hand, empirical findings indicate that migration reduces the probability of employment.

This paradox indicates that structural factors in the labor market play a crucial role. The concentration of economic activity in urban areas creates a strong pull of migration, but the labor

market's limited capacity to absorb workers leads to inefficiency. Consequently, migration is not only an economic opportunity but also a source of pressure within the labor market. From a theoretical perspective, this study confirms that migration decisions are rational and influenced by individual characteristics, yet the outcome is highly dependent on external conditions such as labor market structure and job availability. This indicates that increasing human capital alone is insufficient, it must be accompanied by equitable regional development and job creation.

Policy Implications

The findings of this study have important implications for labor and regional development policies. First, the government needs to promote the equitable distribution of economic activity across regions to reduce the concentration of migration to urban areas. Second, policies focused on job creation, particularly in the formal sector, are essential to absorb the growing labor force. Additionally, strengthening job training programs aligned with market needs can help reduce skill mismatches. Finally, a better labor market information system is needed so that individuals can make more informed appropriate migration decisions.

CONCLUSION

This study concludes that individual characteristics such as educational attainment, work experience, job training, marital status and region of residence significantly influence migration decisions, while age has a negative impact. Migrants generally possess higher human capital compared to non-migrants, suggesting that migration is a rational decision aimed at improving economic opportunities. However, empirical findings indicate that migration has a significant negative impact on employment opportunities, as migrants tend to face greater difficulty in securing employment compared to comparable non-migrants, suggesting that an increase in the labor supply in urban areas intensifies labor competition and limits labor absorption. These findings imply the need for more balanced regional development, the expansion of employment opportunities particularly in the formal sector and better alignment between labor skills and labor market needs. Nevertheless, this study is limited using cross-sectional data, which cannot capture the long-term effects of migration, as well as the potential influence of unobserved variables such as individual motivation or social networks. Therefore, future research is advised to use longitudinal data and incorporate additional variables to better understand the dynamics of migration and employment.

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