

**SRIWIJAYA INTERNATIONAL JOURNAL OF DYNAMIC
ECONOMICS AND BUSINESS**
<http://ejournal.unsri.ac.id/index.php/sijdeb>

**Determinants of Labor Migration to International Labor
Markets: A Study of Sumatra Island**

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Abstract: This study investigates the determinants of labor migration from Sumatra Island, focusing on key factors such as per capita income, provincial minimum wage, unemployment rates, and education levels. Using panel data from 2017 to 2021 across ten provinces, the analysis employs a random effects model to assess these variables' impact on migration patterns. The results reveal that the provincial minimum wage significantly influences labor migration, while per capita income, unemployment rates, and education levels do not show a substantial effect. Despite relatively higher wages in provinces such as Riau and West Sumatra, economic instability persists, prompting workers to seek better opportunities abroad. These findings emphasize the pivotal role of wage disparities in driving labor migration from Sumatra, particularly toward international labor markets, underscoring the need for more equitable economic policies to mitigate the pressures of outbound migration.

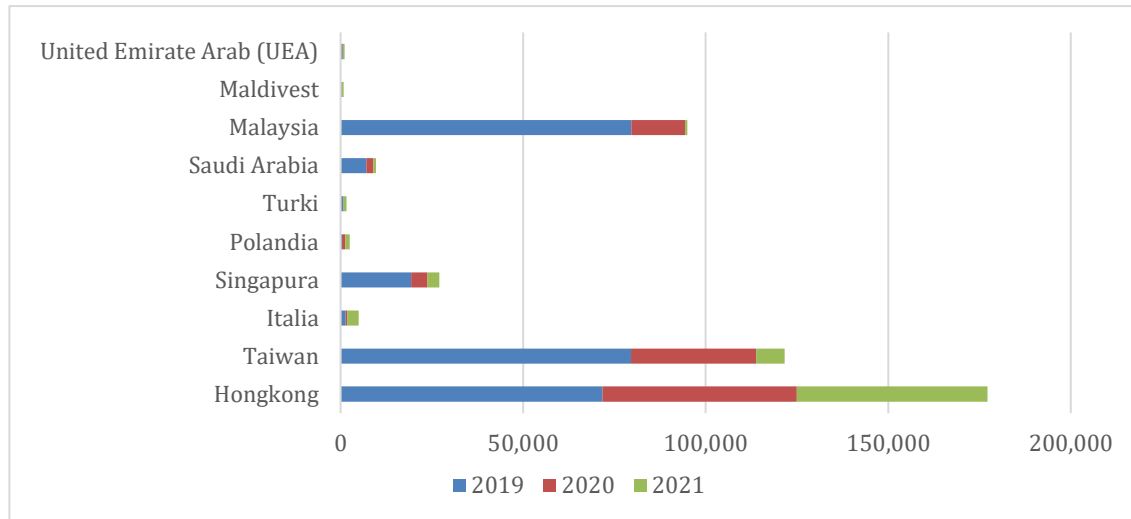
Keywords: Indonesian Migrant Workers, GRDP Per Capita, Minimum Wage,
Unemployment, Education

Introduction

International labor migration has emerged as a significant phenomenon in the global economic landscape. With the changing dynamics of the world economy, countries worldwide are experiencing a notable shift in the distribution of labor (Triandafyllidou, 2024; Wadley, 2021). Amidst technological advancements and increased global connectivity, the international labor market has become a magnet for individuals seeking new opportunities and better livelihoods (Kasana, 2020; Triandafyllidou, 2024; Wadley, 2021). Indonesia, with its long history of labor migration, plays a pivotal role in this context. Within the realm of international labor migration, Sumatra Island holds particular significance. Not only is it one

of the largest islands in Indonesia, but it also possesses unique characteristics that influence the dynamics of labor migration.

Figure 1. **Placement of Indonesian Migrant Workers by Country Period 2019 to 2021**



Source: BP2MI, 2022

Data from the National Agency for the Placement and Protection of Indonesian Migrant Workers (BP2MI, 2022) reveals a significant decline in Indonesian workers seeking employment abroad over the past three years. For example, the number of Indonesian Migrant Workers (TKI) in Malaysia dropped from 79,659 in 2019 to only 563 in 2021. Similarly, in Singapore, the number decreased from 19,356 in 2019 to just 3,217 in 2021. This trend highlights a substantial shift in labor migration patterns that warrants further investigation.

Several factors influence individuals' decisions to migrate from Sumatra Island to international labor markets. First, local economic conditions play a crucial role. High unemployment rates and limited economic opportunities in their home regions drive individuals to seek better employment abroad (Castelli, 2018; Venhorst & Cörvers, 2018). Economic inequality further exacerbates this migration flow, with individuals pursuing higher wages in international markets. In addition to economic factors, social and political determinants also shape labor migration. Demographic shifts, such as population growth or urbanization, influence labor mobility, as do government policies that regulate migration flows. Bilateral agreements between Indonesia and destination countries can either facilitate or restrict the flow of migrant workers from Sumatra (Heifetz & Jaffe, 2023; Deng et al., 2021; Kasana, 2020).

Poverty remains a key driver of migration. Limited employment opportunities, low income levels, and inadequate education are closely tied to Sumatra's poverty, forcing many individuals to look for work abroad (De Brauw & Giles, 2018). The low participation in the labor force and low-quality education further worsen the situation. Despite some governmental interventions aimed at reducing unemployment and poverty through job creation and educational programs, migration remains a critical escape for many Sumatrans (Bal & Palmer, 2020; Karduri, 2023; Kwilinski et al., 2022).

Furthermore, the nexus between unemployment and poverty is reinforced by the low quality of education, hindering individuals from competing for available jobs (Dewanto, 2020). Despite job opportunities being available, individuals with limited education struggle to secure employment. Consequently, the government has implemented various programs to address unemployment and poverty, encompassing educational initiatives, job creation, and socio-economic support for the impoverished (Maksum et al., 2020; Bansak et al., 2017; Rozhkov et al., 2021).

Despite the extensive body of research on international labor migration in Indonesia, there is a noticeable gap in the literature when it comes to the specific case of Sumatra Island. Much of the prior research has focused on other regions, such as Java and Bali, which have distinct economic, social, and political characteristics compared to Sumatra (Tirtosudarmo, 2021). The migration patterns from Sumatra, which is geographically closer to key labor-receiving countries like Malaysia and Singapore, may be shaped by unique local factors that have not been fully explored in the broader literature. This regional distinction calls for more focused research on Sumatra's labor migration dynamics, as findings from other regions may not be applicable to its context.

One key gap in existing studies is the overwhelming focus on economic factors, such as wages and employment opportunities, while underemphasizing the interaction between economic, social, and political determinants in shaping migration decisions. For instance, while studies have examined how economic inequality and unemployment influence migration, few have investigated how government policies, demographic trends, and bilateral agreements with neighboring countries like Malaysia and Singapore interact with these economic factors (Heifetz & Jaffe, 2023; Kasana, 2020). This lack of an integrated approach limits our understanding of the full spectrum of influences on migration decisions from Sumatra.

Moreover, most studies on labor migration tend to overlook the critical role of education in determining who migrates and why. Research on Indonesia as a whole has highlighted low-quality education as a barrier to securing employment domestically (Dewanto, 2020), but there has been limited focus on how this affects migration specifically from Sumatra. This gap is particularly relevant given Sumatra's unique socioeconomic conditions, including poverty and lower educational attainment compared to other parts of Indonesia.

In response to these gaps, this study has selected a set of key variables—per capita income, provincial minimum wage, unemployment rates, and education levels—that are essential for providing a comprehensive understanding of the factors influencing labor migration from Sumatra. These variables were chosen because they represent a multifaceted approach to studying migration, capturing both economic drivers (income and wages), social conditions (education levels), and labor market dynamics (unemployment rates). This holistic analysis will provide insights into the complex interplay of these factors, which has not been adequately explored in the context of Sumatra.

This study seeks to address this gap by analyzing the determinants of labor migration from Sumatra Island, focusing on a comprehensive set of factors including per capita income, provincial minimum wage, unemployment rates, and education levels. By examining this issue, we aim to contribute to the existing body of knowledge on migration while

providing policymakers with the necessary insights to develop effective and sustainable migration policies that ensure the well-being of migrant workers. This research will also bring to light the experiences of migrant workers from Sumatra, offering a nuanced understanding of the dynamics shaping their migration decisions.

Literature Review

Labor Market

The labor market involves the interaction between workers and employers, where the exchange of labor for wages occurs. In this market, the determination of wage rates is influenced by the forces of supply and demand for labor. On one hand, the supply of labor represents individuals who are willing and able to work. Factors such as population demographics, education levels, and participation rates affect the quantity of labor supplied. Additionally, individual preferences, including desired wages and job conditions, also impact the supply curve (Assaad et al., 2019; Krause & Sawhill, 2017; Perez-Arce & Prados, 2021; Tirtosudarmo, 2021).

On the other hand, the demand for labor represents the needs of firms and employers for workers to produce goods and services. Factors such as business expansion, technological advancements, and changes in consumer demand influence the quantity of labor demanded by firms. As businesses seek to maximize profits, they evaluate the productivity of labor relative to its cost, which affects their demand for workers. The equilibrium wage rate, where the quantity of labor supplied equals the quantity demanded, is determined at the intersection of the supply and demand curves in the labor market. At this equilibrium point, both workers and employers are satisfied with the prevailing wage rate (Garcia-Louzao & Ruggieri, 2023).

Changes in either labor supply or demand can shift the equilibrium wage rate. For example, an increase in demand for labor due to economic growth or technological innovation may lead to higher wages and lower unemployment rates. Conversely, a decrease in demand for labor, such as during an economic recession or industry decline, may result in lower wages and higher unemployment. Overall, the interplay between labor supply and demand shapes the dynamics of the labor market and influences the determination of wage rates (Brinca et al., 2021).

Meanwhile, the unemployment rate reflects the proportion of the workforce without a job but actively seeking employment. Factors such as skills, education, and discrimination also play significant roles in the labor market dynamics. Governments often intervene in labor market regulation through various policies, such as minimum wage laws and training programs, aiming to create a fair and sustainable environment for both workers and companies (Grigoli et al., 2020).

Population Migration

Population migration, particularly International Labor Migration, involves the movement of individuals from their home regions to destination areas across national borders with the aim of employment, yielding various benefits, particularly economic ones. This migration is typically driven by two primary forces: push factors originating from the individual's place

of origin, and pull factors exerted by opportunities and conditions in destination areas (Geddes et al., 2019).

Push factors encompass conditions in the individual's home region that motivate or compel them to seek opportunities elsewhere. These may include factors such as limited job prospects, low wages, economic instability, political turmoil, conflict, lack of educational or healthcare resources, environmental degradation, or natural disasters. These adverse conditions prompt individuals to seek better prospects and livelihoods in other regions or countries (McMichael et al., 2020).

Conversely, pull factors represent the attractions and opportunities offered by destination areas that entice individuals to migrate. These factors often include higher wages, better job opportunities, improved living standards, political stability, access to education and healthcare, favorable living conditions, family reunification, and cultural or lifestyle preferences. Destination areas that offer these incentives become magnets for migrants seeking to improve their economic prospects and quality of life (O'Reilly, 2022).

Understanding the interplay between push and pull factors is crucial for comprehending the dynamics of population migration, particularly international labor migration. Policies and interventions aimed at managing migration flows, promoting development, and addressing root causes of migration must take into account both sets of factors to effectively address the complexities and challenges associated with population movements.

Hypotheses

Several economic and social factors, such as per capita income, provincial minimum wage, unemployment rate, and education level influence labor migration. Higher per capita income generally reduces migration as individuals feel more financially secure in their home regions. Conversely, low minimum wages can push workers to seek higher incomes abroad. Additionally, a high unemployment rate often forces people to look for job opportunities overseas due to the lack of employment locally. On the other hand, a higher education level allows workers to secure better jobs domestically, thus decreasing the motivation to migrate. These variables are crucial to investigate as they significantly affect labor migration decisions, and understanding their impact can aid in creating more effective policies.

- **H₀:** Per capita income, provincial minimum wage, unemployment rate, and education level have no significant effect on labor migration in Sumatra.
- **H₁:** Per capita income, provincial minimum wage, unemployment rate, and education level have a significant effect on labor migration in Sumatra.

Research Methods

This research on the determinants of per capita income, provincial minimum wage, unemployment, and education level on labor migration in Sumatera Island uses panel data method with quantitative analysis. In this study, the dependent variable used is Labor Migration, while the independent variables used are Per Capita Income, Provincial Minimum Wage, Unemployment, and Education Level. The focus of the research location chosen in

this study is the province on the island of Sumatra including Aceh, Riau, Bengkulu, Jambi, West Sumatra, North Sumatra, Lampung, South Sumatra, Riau Islands, Bangka Belitung. The period selected in this study is from 2017 to 2021. The econometric model in the study can be written as follows:

$$LNTKI_{it} = \alpha + \beta_1 LNPDRB_{it} + \beta_2 LNUMP_{it} + \beta_3 LNTPT_{it} + \beta_4 LNRTLS_{it} + e_{it} \dots\dots (1)$$

Where, TKI is Indonesian Labor Migration (TKI), PDRB is Per capita income, UMP is Provincial Minimum Wage, TPT is Open Unemployment Rate, RTLS is Education Level, α Constant, $\beta_1, \beta_2, \beta_3, \beta_4$ is coefficient of independent variable, e is Error Term, i is cross-section data, and t is time series data.

Findings

Results

In panel data analysis, multiple linear regression models such as the Common Effect Model, Fixed Effect Model, and Random Effect Model are commonly used to examine relationships between variables. Selecting the most appropriate model requires tests like the Chow test, Hausman test, and Lagrange Multiplier test.

The Common Effect Model assumes that all individuals in the panel share the same coefficients for the independent variables. The Fixed Effect Model accounts for individual-specific effects by including individual dummy variables, while the Random Effect Model treats individual-specific effects as random variables with a specific distribution.

To select the most appropriate model in panel data analysis, several tests are typically employed, such as the Chow test, Hausman test, and Lagrange Multiplier test. The Chow test is used to compare the stability of coefficients across subgroups, while the Hausman test helps differentiate between the Fixed Effect Model and the Random Effect Model based on the correlation between individual effects and regressors. The Lagrange Multiplier test detects the presence of omitted variable bias. These tests help ensure that the chosen model is the most suitable for the analysis.

Table 1. Overview of Best Model Selection

Test Method	Probability	Conclusion
Chow	0,0000	H0: CEM (p value >0,05)
		H1: FEM (p value <0,05)
		Result: H0 rejected; Best model FEM
Hausman	0,0577	H0: REM (p value >0,05)
		H1: FEM (p value <0,05)
		Result: rejected H1; Best model REM
LM	0,0000	H0: CEM (p value >0,05)
		H1: REM (p value <0,05)
		Result: H0 rejected; Best model REM

Source: Data calculated by the author, 2023

Based on the results presented in Table 1, the optimal model for this analysis is the Random Effect Model (REM). The Chow test, which assesses the stability of coefficients across subgroups, initially indicated the Fixed Effect Model (FEM) as the preferred option by rejecting the null hypothesis (H0) of the Common Effect Model (CEM). However, both the Hausman test and the Lagrange Multiplier (LM) test contradicted this result. The Hausman test, which distinguishes between FEM and REM based on the correlation between individual effects and regressors, did not reject the null hypothesis (H0) in favor of REM. Similarly, the LM test, used to detect omitted variable bias, rejected the null hypothesis (H0) of CEM. Therefore, the consistent preference for REM across these tests confirms that it is the best-fit model for this analysis.

Table 2. Random Effects Regression Model Results

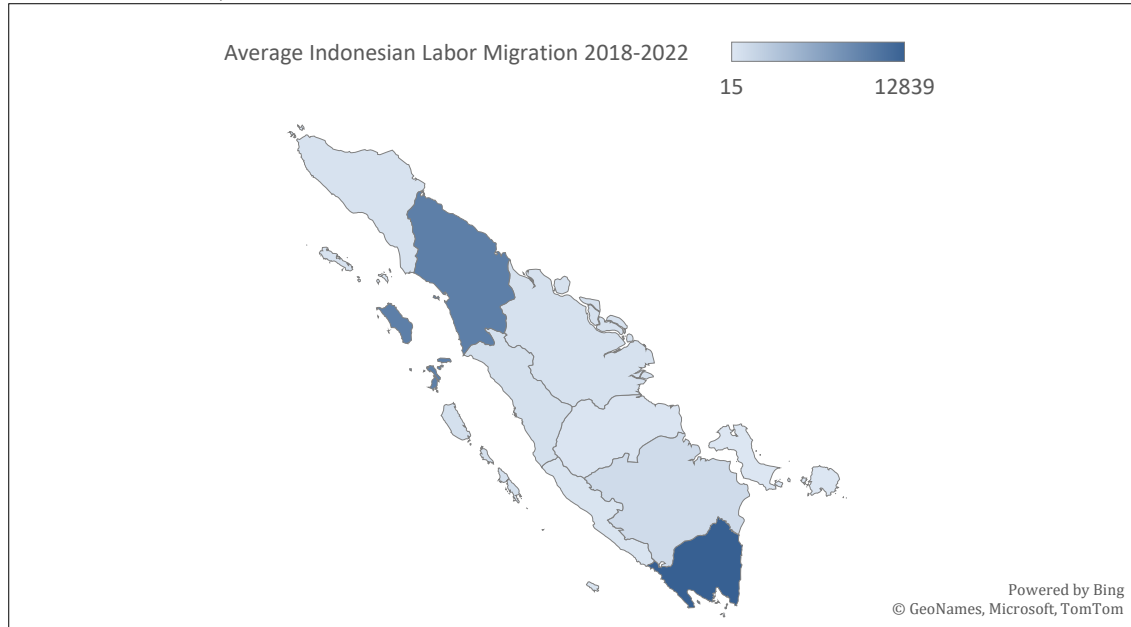
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	153.8587	31.85223	4.83039	0.0000
LN_PDRB?	-0.068636	1.455309	-0.04716	0.9626
LN_UMP?	-9.676663	2.232561	-4.33433	0.0001
LN_TPT?	0.084043	1.326228	0.06337	0.9498
LN_RTLS?	-1.970288	7.277813	-0.27073	0.7878
R-Squared	0.350663			
Adjusted R-squared	0.292944			
F-statistic	6.07537		Durbin-Watson stat	2.308292
Prob(F-statistic)	0.00053			

Source: Data calculated by the author, 2023

The random effect panel data regression model offers insights into the factors affecting Indonesian Labor Migration (TKI) as the dependent variable. Conversely, the coefficient for LN_PDRB is -0.068636 with a probability of 0.9626, suggesting its lack of significant influence on TKI at the same significance level. In contrast, LN_UMP, with a coefficient of -9.676663 and a probability of 0.0001, demonstrates a significant impact on TKI at the 0.05 significance level. However, LN_TPT's coefficient is 0.084043 with a probability of 0.9498, indicating its insignificance in affecting TKI at the 0.05 significance level. Similarly, LN_RTLS has a coefficient of -1.970288 with a probability of 0.7878, suggesting its lack of significant impact on TKI at the same significance level. Therefore, the analysis suggests that LN_UMP plays a significant role in influencing Indonesian Labor Migration (TKI) within this random effect model at the 0.05 significance level, while LN_PDRB, LN_TPT, and LN_RTLS do not exhibit significant impacts at this level of significance.

Discussion

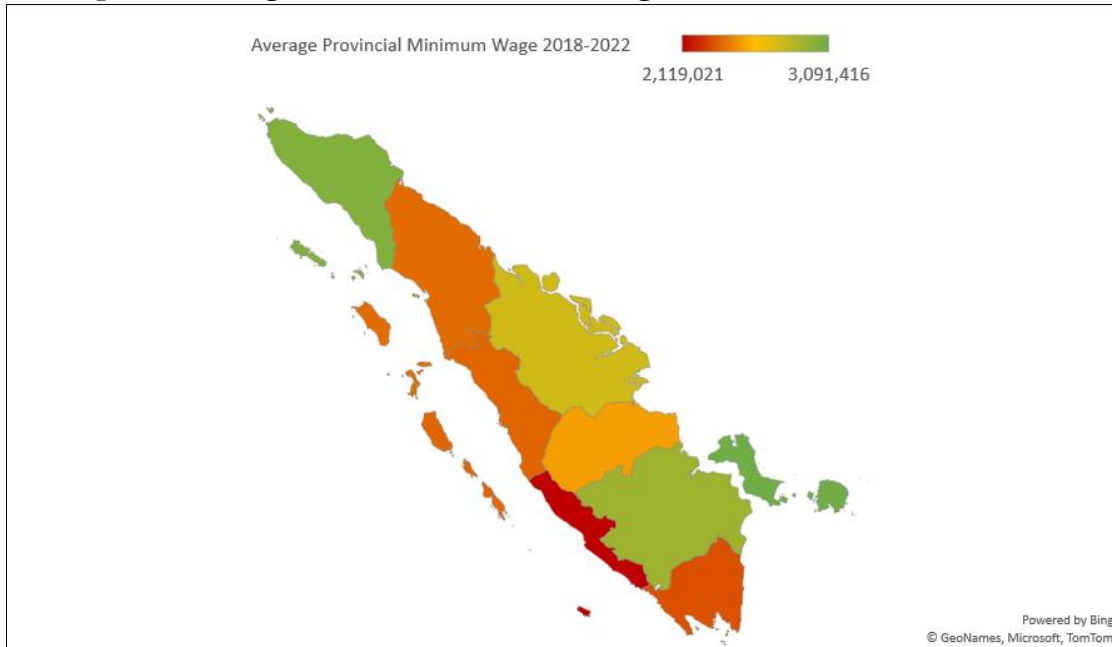
Figure 2. **Average Migration of Indonesian Workers to the International Labor Market, on Sumatra Island 2018-2022**



Source: Statistics Indonesia, 2023

From 2018 to 2022, international labor migration from Sumatra Island's provinces exhibited notable diversity in participation levels. Aceh and Riau recorded moderate averages of 424 and 511 workers, respectively, while Bengkulu and Jambi had lower averages of 235 and 199 workers, respectively. Conversely, West Sumatra stood out with a relatively higher average of 630 workers. However, the most significant contributions came from North Sumatra and Lampung, with averages of 9,880 and 12,839 workers, respectively, indicating substantial outbound migration from these regions. South Sumatra also had a considerable average of 1,033 workers migrating internationally. In contrast, Riau Islands and Bangka Belitung reported lower averages of 527 and 15 workers, respectively. This data underscores the varied levels of engagement in international labor migration across Sumatra Island, with North Sumatra and Lampung emerging as significant contributors to the migrant workforce during the specified period.

Figure 3. Average Provincial Minimum Wage in Sumatera Island 2018-2022



Source: Statistics Indonesia, 2023

The wage disparity among provinces in Sumatra Island from 2018 to 2022 has undoubtedly been a significant factor driving labor migration to international markets. This trend is rooted in the economic realities faced by individuals and families in provinces with lower average minimum wages, such as Aceh, Bengkulu, and Jambi. The relatively low domestic wages in these regions likely create financial challenges for residents, leading them to seek better-paying opportunities elsewhere.

Even in provinces with slightly higher minimum wages, such as Riau and West Sumatra, the average wages may still not be sufficient to meet the needs of individuals and their families. This suggests that economic conditions within these provinces may not be conducive to providing adequate financial stability for residents, further incentivizing them to explore opportunities abroad where remuneration is comparatively higher (Alvarez et al., 2021; Libanova, 2019; Siregar, 2022).

The allure of higher wages in the international labor market becomes particularly compelling for workers from Sumatra Island. The prospect of earning a better income abroad not only offers the promise of improved financial well-being but also the potential to support their families back home and achieve a higher standard of living. This motivation drives many individuals to pursue employment opportunities overseas, despite the challenges and risks associated with migration.

From a policy perspective, addressing wage disparities among provinces within Sumatra Island is crucial for mitigating the push factors driving labor migration. Efforts to raise minimum wages, improve working conditions, and stimulate economic growth in regions with lower wages can help alleviate the need for individuals to seek employment abroad. Additionally, investing in education, skills training, and job creation initiatives can provide residents with viable alternatives to international migration, promoting sustainable

development within Sumatra Island (Creighton et al., 2023; De Brauw & Giles, 2018; Kirwin & Anderson, 2018).

Furthermore, there is a need for policies that safeguard the rights and welfare of migrant workers, including measures to prevent exploitation and ensure fair treatment in the international labor market. Strengthening support systems for returning migrant workers, such as reintegration programs and access to social services, is also essential for facilitating their successful reintegration into their communities upon their return.

Based on the results of the research, the analysis of the determinants of labor migration in Sumatra Island requires further elaboration. The results show that the provincial minimum wage has a significant negative impact on labor migration. This means that in provinces with higher minimum wages, workers are less likely to migrate abroad, likely due to better economic opportunities domestically. However, per capita income, unemployment rates, and education levels do not show significant impacts on migration decisions.

The lack of significance for per capita income may suggest that individual household income does not vary enough across provinces to drive migration decisions strongly. Similarly, the unemployment rate did not influence migration, which could indicate that even when unemployment is high, workers do not automatically seek international opportunities, possibly due to other factors such as migration costs or family ties. Education levels were also insignificant, which may point to the fact that the decision to migrate internationally may be less influenced by formal education and more by immediate economic needs.

Thus, the results imply that wage disparities across provinces, especially in regions like Riau and West Sumatra, are key drivers of migration, while other economic and social factors play less of a role. This emphasizes the need for policymakers to focus on improving wage structures and economic stability across Sumatra Island to manage migration more effectively.

Conclusion

This study investigated the factors influencing labor migration from Sumatra Island, focusing on per capita income, provincial minimum wage, unemployment rates, and education levels. The results reveal that provincial minimum wages are the most significant determinant of labor migration, with higher wages reducing the likelihood of workers seeking employment abroad. Other variables, such as per capita income, unemployment rates, and education levels, did not show significant effects, suggesting that migration decisions are more influenced by wage structures and immediate financial conditions than by broader economic indicators or educational attainment.

These findings offer important implications for policymakers. Raising provincial minimum wages in economically weaker regions could help reduce labor migration by improving domestic economic opportunities. Since unemployment rates and education levels did not significantly affect migration, policies aimed solely at improving labor market conditions or education may not be sufficient. A more focused approach to wage policies and income security is necessary to address labor migration effectively.

The implications of the research findings suggest several policy measures. First, there's a clear need for policymakers to address the disparity in minimum wages across provinces, particularly in regions where wages are relatively low. This could involve implementing measures to raise minimum wages or providing incentives for businesses to offer better compensation packages. Additionally, efforts should be made to enhance the domestic job market, creating more opportunities for employment within Indonesia. Investing in education, skills training, and infrastructure development can help stimulate economic growth and create jobs, reducing the dependency on overseas employment. Moreover, there's a necessity for policies that safeguard the rights and welfare of migrant workers, including measures to prevent exploitation and ensure fair treatment. Strengthening support systems for returning migrant workers, such as reintegration programs and access to social services, is also crucial. Overall, a comprehensive approach that addresses the push and pull factors driving labor migration is essential for sustainable development and inclusive growth.

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