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**“The Effect of Host Country Economic Performance on
Indonesian Migrant Workers: A Sectoral Analysis”**

A Research Paper

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Table of Contents

| | |
|--|-----------|
| Chapter I. Introduction | 1 |
| 1.1 Research Background | 1 |
| 1.2 Research Problem | 2 |
| 1.3 Research Objectives | 4 |
| 1.4 Research Questions | 5 |
| Chapter II. Literature Review | 6 |
| 2.1 Previous Studies | 6 |
| 2.2 Theoretical Framework..... | 8 |
| 2.2.1 Neoclassical Economic Theory of Migration | 8 |
| 2.2.2 Dual Labour Market Theory | 8 |
| 2.2.3 Push and Pull Theories | 9 |
| 2.2.4 New Economics Of Labour Migration (NELM) | 10 |
| 2.2.5 Gravity Model of Migration | 10 |
| Chapter III. Data and Methodology | 12 |
| 3.1 Research Design | 12 |
| 3.2 Data Sources | 13 |
| 3.3 Analytical Framework..... | 14 |
| Chapter IV. Results and Discussion..... | 18 |
| 4.1 Total of IMW | 18 |
| 4.2 GDP Composition | 20 |
| 4.3 Descriptive Statistic Analysis..... | 23 |
| 4.4 Statistical Test Analysis..... | 25 |
| 4.4.1 Hausman Test..... | 25 |
| 4.4.2 Breusch-Pagan Lagrangian Multiplier Test | 26 |
| 4.4.3 Heteroskedasticity Test..... | 26 |
| 4.5 Regression Results Analysis | 28 |
| 4.5.1 Manufacturing Sector Analysis | 29 |
| 4.5.2 Agriculture Sector Analysis | 30 |
| 4.5.3 Industry and Services Sector Analysis | 31 |
| 4.5.4 Control Variable Analysis | 32 |
| 4.6 Discussion | 34 |
| 4.6.1 Theoretical Implication and Framework Development..... | 34 |
| 4.6.3 Skills Upgrading and Human Capital Requirements | 37 |
| Chapter V. Conclusion | 38 |
| References | 40 |

Chapter I. Introduction

1.1 Research Background

Indonesian labor migration represents one of the most important movements in the whole of Southeast Asia at the present time and has profound effects on the economy not only in countries of origin but also in countries of destination as well. The Indonesian worker migration has undergone considerable shifts from being a colonial migration to the current economic phenomenon shaped by globalization, technological change, and considerable wage differentials across different countries. For the shifts in the Indonesian migration of workers to be clearly understood, it is essential to examine different past cases and current economic determinants behind migrations.

The origins of Indonesian labor migration can be traced back in time to the colonial era itself. Thus, in 1890, Dutch colonial administrators began to embark on the organized migration of Indonesian workers to Suriname to fill the labor vacancies in agriculture that resulted from the abolition of slavery. Even though the economic and political context has changed significantly since that time, this early form of organized labor migration has influenced the current level of workforce mobility across the boundaries of the countries, even to today. The colonial migration process, even though it involved coercion and was exploitative in nature, has formed the current migration process to follow specific routes in the post-colonial era by establishing initial migration routes in the colonial era itself.

The transition from forced migration in colonial periods to voluntary labor migration in modern periods illustrates the dynamic nature of the global economy in different periods. When Indonesia gained independence, it was facing numerous challenges to develop as an independent state. For instance, there were no jobs in Indonesia, especially in rural areas where the growth in Indonesia population was outpacing the growth in employment opportunities. The growth in other neighbor countries economies was very high, resulting in a considerable demand for labor, especially in services that employed manual labor in the past.

Nowadays, there are observable relationships between migration flows and the economic status of the destination nation. Recent studies have recognized that migration choices are not simple and that they are made in accordance with globalization processes, working arrangements, and essential economic performance indicators in the host nation. Carling (2014) indicated that the prospects of being able to secure better-paid jobs with higher job security and more job opportunities, continue to attract migrants to cross over from developing countries such as Indonesia. De Haas (2010) asserts that contemporary labor migrations are determined by individual motivation and the essential economic inequalities between countries. The examination of the major wage inequalities driving migration: Indonesian maids in Hong Kong currently earn no less than 4,870 HKD per month, or IDR 10 million, which was significantly higher than what Indonesians were earning in Indonesia (BP2MI, 2024). Such massive wage inequalities, together with the differences in the performance of essential sectoral

GDP, provide enough economic motive for migrants to seek destination nation migration regardless of whether they choose it or not.

The number of Indonesian Migrant Workers has been increasing every year (Widyawati, 2018). The growth trend indicates that Indonesia has a rising number of citizens, with not enough employment opportunities in the country, especially in the countryside. There are currently job opportunities in other countries with a good salary and bonus package. The average salary of most migrants working in other countries is significantly higher than if they were working in their own nation. This is mainly because of the formulation of the minimum wage policy in other countries and the Gross Domestic Product per capita in other countries, which hire Indonesian workers. Certain jobs, most of which involve different skill sets, risks, and hazards, involve a secondary factor in explaining why there are wage discrepancies. These aspects determine an individual wage in general. There are industries that pay extra because workers face risks and challenges on a daily basis (Kalleberg, 2016).

However, to date, there has been little understanding of the way in which specific sectors in host countries might impact individual decisions to migrate. The considerable work being done has been concentrated on general economic indicators, which fail to identify the individual forces acting at the sector level, which might help or hinder migration in specific ways. This is very significant, in that labor markets occur in sectors, with unique signals of demand, methods of wage determination, and working conditions for each sector and level of human skill. These unintended findings point to the deficiencies in migration studies and are key to understanding the new forces in the global market for labor. There are three useful lessons to be drawn in terms of policy for understanding sectoral forces in migration studies. The first is to facilitate projections of shifts in migration flows based on host-country economic growth. The second is to improve protections for migrant workers and to identify the best locations to work for them. The third relates to the ability of Indonesian negotiators to offer bilateral agreements on Indonesian human resources suited to the new needs in host-country sectors.

1.2 Research Problem

There is currently a substantial shortcoming in contemporary migration literature if it primarily relies on macroeconomic variables such as total GDP volatility, aggregate unemployment in the destination nation, and average income level to explain migration phenomena primarily with respect to economic motivation. Such an approach neglects the interaction between individual shifts in economic productivity and migration patterns in destination countries in terms of multiple specialties in labor markets, which involve individual demand curves, wage schemes, skills, and working environments with varying effects on migration opportunities.

Recent literature has pointed out that there are three interlinked deficits that currently limit the explanatory power of migration performance models. The first is the endemic failure to examine the sectoral causes driving economic migration. Sectors and businesses differ in terms of demand profiles. For instance, the manufacturing sector might be interested in sets of work skills and is not necessarily linked to automation. At the same time, the service industry is interested in soft skills and even cultural code knowledge in general. The agriculture industry is structured around periodic needs and implicitly kneads with automation, while construction, fixated on transient tasks, is interested in sheer physical power and theatrical competence related to the scenery in question. The net effect is that aggregate data masks the level to which migration choices are driven by work related complexities in the productive topography of the destination state (De Haas, 2011).

Secondly, existing literature has primarily concentrated on conventional destination countries, targeting areas in well-established economic hubs such as the US, member states of the European Union, and affluent East Asia. Such geographic mentality hampers any holistic understanding on the impact of sectoral economic performance on migration flows at different levels of economic growth and industry composition. According to Bell, D. (2019), the characteristic economic needs of emerging countries can be different from post-industrial societies in terms of various sectors, thereby opening new avenues for Indonesian migrants overseas.

Thirdly, the fact that there is no comprehensive study that relates the indicators of economic performance in the host countries to the socio-demographic data of the migrants makes it difficult to grasp how macroeconomic aspects and individual attributes are intertwined to define migration streams. Indonesian migrant workers exhibit disparate characteristics with respect to education, skill portfolios, age structure, and provinces of origin, pointing to different sensitivities to opportunities in different sectors. For instance, the growth of the service industry can only attract semi-literate female domestic workers, while the growth of the industry can only attract a different set of younger workers with specialized skills from the construction industry.

Such discrepancies make it difficult for individuals at different levels to take well-informed decisions in migration. This, in turn, has a direct effect on the policies that govern bilateral relationships between countries. For instance, Indonesian institutions find it difficult to offer viable migration routes and training to fit the market because they aren't able to explain in simple terms the manner in which economic change impacts migration flows. On the other hand, countries which host Indonesian workers aren't able to access information to help them measure the flow of workers toward their countries, making it difficult to modify migration laws to fit different industry needs.

1.3 Research Objectives

The aim of this study is to examine in depth the significance of the fluctuation of the GDP in different sectors in host countries to the departure pattern among Indonesian migrant workers. The study goes beyond simple economic factors to examine the effect of different sectors in the economy, such as manufacturing, agriculture, industry, and the service sector, on the migrants' departure pattern, since each sector has different requirements that affect the departure pattern in its own unique way rather than relying on economic aggregates that tend to hide key variations in different sectors.

1. The identification of the economic sectors that most significantly affect the migration of Indonesian workers. This study analyzes whether the manufacturing, agriculture, industry, and services sectors attract or repel Indonesian workers, specifically focusing on counterintuitive results that suggest sectoral expansion is linked to reduced rather than increased Indonesian migration.
2. Evaluating the relationship between the demographic makeup of host countries and Indonesian workers' migration patterns. The purpose of this objective specifically tries to identify the effect of aging host populations in destination countries, indicated by the old age dependency ratio, on the labor requirements in the specific sector of care-intensive services, in which Indonesian workers are best positioned to work in, regardless of general economic growth indicators in destination countries.
3. Examining the effect of geographic distance and structural aspects on the migration processes of Indonesian migrants. This study investigates the role of geographic distances between Indonesia and the host countries as factors related to the cost of transport, information barriers, connectivity, and cultural and linguistic differences.
4. Formulating policy recommendations for the most effective use of Indonesian migrant workers. This study has been designed to produce policy recommendations that aim at improving the strategy of worker deployment based on the empirical evidence obtained during the course of this research

1.4 Research Questions

How does the economic performance of certain sectors in host countries affect the movement of Indonesian migrant workers?

Sub Research Questions:

1. Which economic sectors in the host country (manufacturing, agriculture, industry, services) show the strongest links to the flow of Indonesian migrant workers? Are there any sectors that show unexpected negative relationships even though the economy is growing?
2. How do changes in the population of the destination countries, especially the aging of the population, create specific labor needs that Indonesian workers can meet? How big is this effect on migration patterns?
3. How do the distance between countries and the overall state of the job market (unemployment rates) affect the flow of Indonesian migrant workers to different countries?
4. What policy consequences arise from the sectoral performance-migration relationships concerning strategic workforce allocation, skills development, and bilateral labor agreement discussions?

Chapter II. Literature Review

2.1 Previous Studies

Empirical research analyzing the correlations between economic performance indicators and migration trends has yielded several pertinent findings for this study. In this study, "economic performance" specifically means the contributions of manufacturing, services, and agriculture to national economic output, as measured by Gross Domestic Product (GDP) by sector. Such industry GDPs are important because they influence the labor requirements of specific sectors. This has significant effects on migration rates, especially in countries like Indonesia where the labor force can exceed the available job opportunities.

Stepanek (2021) progressed the analysis in the sector by incorporating the Overlapping Generations Computable General Equilibrium model in order to analyze the effect of population aging and the performance of sectors of the economy on the migration rates in the Czech Republic. Using the 350 demographic groups distinguished based on age, education, occupation, and sectors of the demographic group, the researcher clearly indicated the effect of the aging population towards a 6% reduction in the effective labor force in the labor market over a period of thirty years. This scenario assumes the lack of technological progress. The finding indicated that the variation among the sectors was very high. The researcher found that the immigration amounts would have needed to increase between 8,000 and 17,000 annually. This represents the 15% to 34% increase due to the adverse effect of the demographic change. This finding proves the importance of considering the transition in demographics, mainly the aging population factor, when incorporating the economic sectors' performance in the analysis used to explain the pattern of migration.

In 2014, Docquier, Peri, and Ruysen created a unique two-step empirical model focusing on international migration patterns between 138 sending countries and 30 main recipient countries between 2000 and 2010. By focusing on both the Gallup world poll results for migration intentions and the actual census figures representing the stock of actual migrants in each country, the authors identified the importance of the pre-existing network size and the average income per person at the destination country as determining factors for the number of potential migrants. The study showed that economic growth in the countries where people were moving was the main reason why people wanted to move. For example, GDP per capita growth had three to four times stronger effects on college-educated migration rates than on non-college-educated migration rates. The study revealed that free labor mobility policies within the EU and visa waiver agreements exerted only limited influence on transforming potential migrants into actual migrants, especially among the less educated. This suggests that policy liberalization alone may be inadequate to address the significant frictions in the migration process without concurrent economic growth that generates authentic opportunities for migrants.

Cutler and Davies (2007) show that job growth in certain sectors leads to very different results for migration and the economy. Using a computable general equilibrium model for Fort Collins, Colorado, they discover that high-wage sectors (such as computer manufacturing and bioengineering) yield the most significant in-migration, with employment multipliers of 1.8. At the same time, the expansion of the retail industry causes multipliers smaller than one (0.78), forcing the industry to compete for current workers. The results show that the expansion of high-wage industries might cause a reduction in real wages for low-income workers because of the oversupply of workers from migrated family members. On the other hand, expansion in the manufacturing industry and the retail industry might benefit low-income workers with explicit wage rises. This goes against the conventional migration study, which relies on aggregate employment data, to show that the way in which the economy grows, not only the amount of growth, has a great effect on migration shifts and income distribution. The sector-wise approach taken in the study has great significance in understanding that different sectors in the host nation convey different signals to Indonesian migrant workers.

Mayda (2010) conducted cross-national studies on the determinants of migration flows in 14 OECD countries between 1980 and 1995, making use of panel data. The results clearly showed that destination-country GDP per capita has a positive effect on migration flows, and that countries with higher economic performance tend to attract higher numbers of migrants. However, individual sectoral aspects of GDP were not explored in this study, even though it would be vastly important to take them into account, understanding that in most cases, labor market demand operates on the sectoral plane, with sectors such as construction or housekeeping requiring different sets of skills, attracting migrants in higher numbers in line with the needs determined by the industry in question. Istudor et al. (2020) conducted panel data analyses across the entire 28-membered EU between 2008 and 2018 to determine the well-developed interactive patterns of education, growth, and migration related to the influx of migrants from outside the union in terms of labor migration needs. The findings were one-sided: in most cases, sectoral growth in the GDP was far more appealing and enticing to migrants than aggregate growth in economic performance in general, with the services sector being far more appealing than manufacturing industries in most cases.

Similar studies on Indonesian migrant workers, such as the study conducted by Ananta and Arifin (2014), similarly suggest the trend because they were able to show that it was the health of specific sectors rather than the Gross Domestic Product that influenced the number, destination, and quality of the migrants sent out. The study on Indonesian labor migration to Malaysia, Singapore, and Hong Kong between 1995 and 2010 showed that the expansion of the manufacturing sector in these countries was primarily responsible for attracting Indonesian male migrants, while expansion in the service sector, specifically in domestic work, was responsible for attracting female migrants. The expansion in a specific sector brings about migrants because it provides employment opportunities in sectors that local citizens of the destination countries are not able to fill easily. When there is growth in a specific sector, there is a demand for more workers, which makes it very attractive to migrants who wish to migrate to another country. These studies together highlight the importance of sectoral GDP growth in understanding migration patterns, especially the driving effect of growth in various sectors on

the demand for labor, thereby shaping migration flows. However, there are areas in the literature that remain untouched yet are relevant to understanding migration flows. For example, migration studies on Indonesian migrant workers were grossly limiting in terms of the range of destination countries explored rather than exploring the range of destination countries in depth.

There has not been sufficient exploration in terms of understanding how sectoral GDP effect the migration, especially for Indonesian Migrant Workers (IMW). And also, other determinants, such as human development indicators, demography, distance, and employment condition, on the effect on Indonesia migration flows on destination countries. The current study addresses these knowledge gaps by exploring the growth of sectoral GDP in 13 destination countries between 2014 and 2023 to examine the driving effect of one sector on the demand for labor and migration flows for IMW.

2.2 Theoretical Framework

2.2.1 Neoclassical Economic Theory of Migration

The Neoclassical Economic Theory of Migration presented by Sjaastad (1962) provides valuable insights to understand migration from an economic viewpoint. The theory states that migrants move because they expect to earn higher income or enjoy enhanced life in the destination countries in the long run. The theory explains that migrants move from countries with low income, unemployment, or unfavorable economic conditions in the origin countries (push factors) to countries with favorable income, employment opportunities, and economic settings in the destination countries (pull factors). The theory provides insights related to human capital theory with respect to migration because migrants calculate the expected economic gain in terms of migration expenses, including travel, establishing, and forfeiting cultural and social ties in the origin countries (Massey, D. S., 2019).

When the theory is applied to Indonesia, neoclassical theory states that workers seek better jobs and higher pay in other countries. They seek employment in richer countries or areas where the economy is rapidly expanding and requires workers in specific occupations. The countries with expanding manufacturing or service sectors are typically richer in pay and employment opportunities, making them attractive to Indonesian workers with less work experience. According to the hypothesis, Indonesian migrant workers tend to choose countries whose sectors are growing at a faster wage rate than in Indonesia.

2.2.2 Dual Labour Market Theory

The Dual Labor Market Theory proposed by Piore in 1979 has another explanation for migration that considers the job market in the host country as very important. According to the theory, migration arises because of the existence of two sorts of labor markets: the primary labor market and the secondary labor market. The job in the primary labor market that provides

very good salaries and job security involves a lot of skills and demands a lot of education and experience. Such job opportunities attract the native population and also give them job security and other additional benefits in their occupation. The secondary jobs, on the other hand, pay low salaries and offer insecure jobs and tend to require less skills, and such jobs are typically taken by migrants. Such jobs can be related to construction jobs, agricultural jobs, and house maintenance jobs because there is high demand for workers in such jobs, but the locals in the place don't find them interesting due to low pay and poor working conditions.

The Dual Labor Market Theory explains that the primary labor market of rich countries, especially those with growing economies, needs unskilled workers from less-developed countries to satisfy the demand in the secondary market (Piore, M. J., 2018). The migrants, such as Indonesian workers, typically fill jobs that locals avoid. This goes to show that migration is not simply due to individual choices but because of the employment requirements of the migrants' native countries as well. For example, there are numerous employment opportunities in the service industry and construction sector in most European countries for Indonesian migrants. These sectors are still growing in most countries, so there is always a demand for unskilled migrants there. For Indonesia, most Indonesian migrants are still working in the secondary labor market in other countries, such as Malaysia, Singapore, and Hong Kong. The reason why Indonesian migrants keep coming to these countries is because these countries' economies keep growing, so they continue to recruit Indonesian migrants who seek higher earnings and better employment opportunities there. The Dual Labor Market Theory explains why it is essential for the economic growth of rich countries to hire migrants in the secondary labor market.

2.2.3 Push and Pull Theories

Push and pull theories of international migration are very useful tools in understanding why persons migrate from one nation to another. The theories explain that persons migrate owing to specific reasons that either impel them to leave their countries of origin or attract them to other countries (Wickramasinghe & Wimalaratana, 2016). Push factors can be referred to as negative events in one individual's own nation that prompt them to migrate, while pull factors can be referred to as positive events in other nations that attract them to migrate to those countries.

Morawska (2007) gives an example of push factors being the aspects that cause persons to leave their residences, such as bad conditions including poverty, political instabilities, violence, environmental problems, and a lack of employment opportunities. Lack of employment, low pay, and difficult living conditions are factors that might make one decide to migrate to improve one's life. Politics in terms of oppression, violence, and discrimination of the blamed group play a major factor in migration. Disasters in terms of natural causes such as natural disasters can result in the bad conditions to improve further.

The pull factors are the advantages and opportunities which individuals in other countries see. These range from higher salaries, more employment opportunities, stable governance,

quality education, and quality housing and living environments. Relatively thriving economies and stable political structures, together with good social support structures in the prospective countries, increase the opportunities for migration to take place there. Also, pre-established networks of migrants can serve as pull factors because they offer assistance to new migrants to help them integrate.

The push and pull theories help to clarify why there are so many migrants in foreign countries. These theories recognize that there are different motivations to migrate, which occur because of unfavorable conditions in one's own state and favorable prospects in the host state. When these motivations are considered carefully, it allows one to understand the true reasons for migration and to develop more efficient methods for controlling the migration process.

2.2.4 New Economics Of Labour Migration (NELM)

The New Economics of Labor Migration (NELM) model, proposed by Stark & Bloom in 1985, represents the transition from individual decision-making models of migration to household units of fundamental decision-making. Departing from neoclassical theory that explains migration in terms of individual utility maximization, through wage differentials, the NELM approach views households as units of decision-making that migrate out of risk management and income diversification strategies. The model further explains household migration strategies not only in terms of income maximization but also in terms of strategies to overcome relative deprivation in one's reference group and to overcome market failures in credit, insurance, and capital markets that impede economic development in the community of origin. The model is relevant to Indonesian migrant workers because, in most cases, it is the extended family that pools funds to cover the migration expenses of one member of the family who perceives foreign employment opportunities in terms of household investments rather than individual career choices.

The theory of NELM brings out clearly, according to Abreu (2012), that the importance of structures in the household is to place members in different geographic areas and sectors in order to minimize income losses. Indonesian families can understand the importance of the theory, where different members of the family can go to different locations to earn income. For instance, one can work in Malaysian manufacturing while others can work in Hong Kong in house helping roles. The theory tries to examine why there is income sent back to the country, with the aim of looking at the things that can be observed in terms of income being saved in terms of seeds, medication, or even house needs, hence migrating to fill the loopholes thereby acting as a safety net.

2.2.5 Gravity Model of Migration

The Gravity Model of Migration provides the essential paradigm upon which the effect of geographic separation on cross-border labor mobility can be understood. The Gravity Model of Migration was originally derived from Newton's Universal Law of Gravitation and reformulated to apply to human migration studies (Ramos, R, 2016). This theory shows the

flows of migration between the origin and destination countries are proportional to the economic masses of the countries in question and in inverse proportion to the separation between them. The simplified mathematical formulation of the model illustrates that the level of migration decreases with geographic separation. The rationale behind it is that it is expensive to be far from someone, with migrants being rational actors who must calculate the migration costs incurred to potentially seek better economic opportunities in other countries, where being far makes it even less rational to seek assistance or join forces with one relatives if they must regularly travel back to stay in touch, thereby adding migration-related psychological difficulties in migrating to different countries with different cultures and languages, which would pose less of an adaptation challenge to neighboring countries whose speakers can understand each other better because of geographic contiguity.

The gravity model is very informative in terms of explaining migration to and from Indonesia because Indonesia has geography that causes distances to other labor markets to be very different from one destination to another. The gravity model illustrates that migration streams are most likely to occur to the closest level, even if the wage in far locations is higher than in close locations (Schwartz, A, 1973). It can be concluded that migration policy is influenced by a very complex optimization process in which migrants calculate the pros of higher earning potentials in far locations while adding the cons in the form of migration distances in terms of lower costs, certainty of information, facilitating family maintenance, and absence of cultural difficulties in neighboring countries. The gravity model recommends to policy makers concerning bilateral migration agreements and recruiting activities to aim for locations that are close to each other and where migration most likely takes place in natural migration streams rather than in locations that are far in terms of natural gravitation challenges.

Chapter III. Data and Methodology

3.1 Research Design

The study applies extensive panel data analysis techniques to unravel the complex associations between the migration flows of Indonesian migrant workers and the sectoral economic performance of host countries. The application of panel data analysis in the study provides great advantages in migration studies in general, which involve combining cross-sectional data across different countries with data across time, thereby ensuring the control of any possible cross-sectional or time-series heterogeneity that can mask the analysis. As Hsiao (2022) defines panel data in simple terms, it can be referred to as the longitudinal study of persons or cross-sectional units over time or time series, where there are many observations for each individual. Cross-sectional units can be individuals, organizations, geographic locations, as well as countries. This report incorporates regression analysis. Ordinary Least Squares regression analysis has been used in the research because of the simplicity of applying and understanding the results obtained. These results are accurate and therefore very important in economic studies as well as other fields related to the analysis of the relationship between the variables involved (Moulton, 1986).

The model uses a variety of econometric techniques like Ordinary Least Squares, Fixed Effects Model, Random Effects Model, and Fixed Effects Model with robust standard errors to examine the main effects free from errors in specification. In addition to that, the model has fixed effects for the years to distinguish the macroeconomic shocks that influence all countries in a given year. Use of logarithmic transformation for the outcome variable helps in linearizing the relationship between the main effects and the other factors in the model to highlight the results in the form of percentage change (Hopkins. W. G., 2010).

The periods from 2014-2023 were selected to examine the relationship between migration and performance at various levels of the world economy during the phase of expansion from 2014 to 2019, the drastic contraction phase during the pandemic from 2020 to 2021, and the recovery phase from 2022 to 2023. This period analyses the relationship between the changes in the economy at the sector level and the variation in migration at the macroeconomic scenario. This explains the robust adaptability of the migration system. The cross-sectional sample consists of 13 main countries of host Indonesian migrants. These countries were chosen because they are important for migration especially for Indonesian, because those top destination for IMW and have statistics that can be compared. These countries, with varying economic maturity, geographical, and regulatory settings, offer us the unique opportunity to examine the nature of the effect of shifts in one economic sector on migration in different locations.

3.2 Data Sources

The study used secondary data sets that were gathered from recognized international organizations to ensure the data was accurate and consistent across different countries and periods in time. There is so much data on economic, demographic, and migration variables that can be gathered by pooling together different data sets. The most information we are interested in is on Indonesian migrant workers, where the data is taken from the Indonesian Migrant Workers Protection Data Information Centre, Ministry of Indonesian Migrant Workers Protection known as BP2MI. They have complete information on the flow of workers, demographic information, and host countries, giving us an accurate basis for our analysis. BP2MI data shows the total number of workers by year and destination country. This makes it possible to build the dependent variable for regression analysis.

The main independent variables there are economic performance, shown by sectoral GDP data. This including value added percentages for manufacturing, agriculture, industry, and services sectors, were obtained from World Bank's World Development Indicators database. The World Bank database provides standardized sectoral classifications following System of National Accounts (SNA) guidelines, ensuring comparability across countries. Sectoral GDP percentages represent each sectors contribution to total economic output, calculated as value-added in specific sectors divided by total GDP (Kuznets, S., 1971).

The control variables there are: human development index (HDI), old age dependency ratio (OADR), and unemployment rate (Unemp) data were obtained from World Bank databases, supplemented by United Nations Development Programme (UNDP) sources for HDI components. Moreover, for variable distance is obtain from distance calculator by distance.to. The HDI represents a composite measure of human development incorporating three fundamental dimensions: longevity (life expectancy at birth), education (mean years of schooling and expected years of schooling), and standard of living (gross national income per capita). And OADR is the ratio of dependents between people younger than 15 or older than 64 to the working age population those ages 15-64. Data are shown as the proportion of dependents per 100 working age population. The unemployment rate variable measures the percentage of the total labor force that is without work but available for and seeking employment, following International Labour Organization (ILO) definitions for individuals aged 15 and above. The Distance variable measures the distance in kilometers between Jakarta and the capital city of each destination country. This information has been obtained through the use of the online calculator at distance.to.

3.3 Analytical Framework

For the analysis of the numerical research, the regression method has been used. OLS regression has been used prolifically because of its simplicity, efficiency, and interpretability. This has made it very useful for many studies related to the field of economics and other social sciences (Moulton, 1986). The regression model used follows the following general form:

$$IMW_{it} = \alpha + \beta GDPsctr_{it} + \sum Z_i + \varepsilon_i$$

In the above equation, the “i” represents the numbers of the destination countries as cross-sections and “it” represents the time series used in the analysis. “ α ” represents the set of the constant values. “ β ” represents the set of the parameters concerned with the impact of economic performance and the flow of Indonesian migrant workers.” $\sum Z_i$ ” represents the set of the control variables. Finally, “ ε_{it} ” represents the specification errors of the equations.

In the given model structure, the dependent variable (IMW_{it}) represents the Indonesian migrant workers living in designated countries at given times. The main interest of the research focuses on the independent variable representing the economic performance of the host countries based on the sectors of GDP percentages ($GDPsctr_{it}$) classified into four sectors: Agriculture, Industry, Manufacturing, and Services. The model includes a vector ($\sum Z_i$) representing other control variables such as human development index (HDI), Old Age Dependency Ratio (OADR), Distance, and Unemployment rate (Unemp). Including these control variables helps isolate economic performance effects on total Indonesian migrant workers by accounting for other factors that might influence total IMWs in destination countries.

Sectoral GDP composition serves as the primary explanatory variable because different economic sectors generate distinct types of labor demand that differentially affect Indonesian migrant worker opportunities (Echevarria, C., 1997). Manufacturing sector growth may signal industrial expansion requiring factory workers, but if accompanied by automation and technological upgrading, it may reduce demand for low-skilled workers. The growth of the agricultural sector could also create more jobs in rural areas, but the trend toward mechanization may mean that fewer people need to do manual labor. Growth in the construction industry and other related fields may lead to a need for construction workers and other trades. The growth of the services sector, especially in domestic services, healthcare support, and hospitality, directly leads to job openings that Indonesian workers usually fill, especially in societies that are getting older and need care services and help around the house.

The Human Development Index (HDI) indicates the development level of a country based on factors such as education, health status, and living standards (Klugman, J., 2011). Working conditions and the related laws and services provided to the people in countries of high HDI are preferable for migrants compared to other countries because the cost of staying in such countries is higher. The HDI is associated with good institutional quality, which allows the rights of migrants to be upheld by the laws in the country. Some countries with very high HDIs,

however, might have stricter immigration laws and requirements that are difficult to meet for Indonesian migrants to enter such countries.

The Old Age Dependency Ratio (OADR) illustrates the number of older persons relative to the number of working persons in society. This clearly illustrates the kind of pressure being created through demography to require more workers in the labor market to offer assistance in the aforementioned areas (Wu, Z., & Li, N., 2003). With societies getting older, there is a growing need to assist in the care of older persons, house chores, accessing healthcare, and managing the household. Native workers often avoid these jobs because they have low social status and tough working conditions. Indonesian workers, especially women who work as domestic helpers, are good at filling these gaps in the care economy. A higher OADR should mean more Indonesian migrant workers, as seen by the large number of Indonesian domestic workers in places like Hong Kong, Japan, and Singapore, which are getting older quickly.

Geographic distance impacts migration via several mechanisms: it elevates travel expenses, generates informational obstacles regarding job prospects, complicates the maintenance of familial ties for migrants, and may diminish the efficacy of social networks that promote migration (Schwartz, A., 1973). Proximate destinations such as Malaysia and Singapore benefit from reduced migration costs, established migration networks, and cultural-linguistic affinities, whereas distant European or Middle Eastern destinations encounter intrinsic gravitational disadvantages, despite the potential for higher wages. In the regression analysis, distance is transformed using a logarithm ($\log_distance$) to account for the non-linear relationship between distance and migration flows. This is because the extra distance has less of a deterrent effect as the total distance increases.

The unemployment rate is a very important control variable because it shows how the job market is doing in the countries where people are going. High unemployment usually means fewer job opportunities for migrant workers, while low unemployment may mean that there aren't enough workers, which creates a need for foreign workers (DaVanzo, J., 1978). But the relationship could be complicated because most Indonesian workers are in secondary labor market segments (domestic work, construction, low-wage services) that have a steady demand that isn't affected by cyclical unemployment that mostly affects native workers in formal sectors. However, including unemployment controls for general labor market conditions enables the analysis to distinguish sectoral economic performance effects from overall employment dynamics.

To expand the equation and obtain the complete equation, the model can be written as:

$$\mathbf{LogIMW}_{it} = \alpha_i + \beta_1 \mathbf{GDPman}_{it} + \beta_2 \mathbf{GDPagr}_{it} + \beta_3 \mathbf{GDPind}_{it} + \beta_4 \mathbf{GDPser}_{it} + \beta_5 \mathbf{HDI}_{it} + \beta_6 \mathbf{OADR}_{it} + \beta_7 \mathbf{LogDistance}_{it} + \beta_8 \mathbf{Unemp}_{it} + \epsilon_{it}$$

Variable explanations from this equation are described as follows:

LogIMW = Log of Total Indonesian Migrant Workers

| | |
|-------------|--|
| GDPman | = Percentage of GDP value added on Manufacturing Sector |
| GDPagr | = Percentage of GDP value added on Agriculture, Forestry, and Fishing Sector |
| GDPind | = Percentage of GDP value added on Industry (Including Construction) Sector |
| GDPser | = Percentage of GDP value added on Services Sector |
| HDI | = Human Development Index |
| OADR | = Age dependency ratio, old (% of working-age population) |
| LogDistance | = Log of Distance between Indonesia and destination country (in kilometers) |
| Unemp | = Unemployment Rate |
| i | = Top 13 destination countries by IMWs there are (Brunei Darussalam, Hong Kong, Italy, Malaysia, Saudi Arabia, Singapore, South Korea, Turkiye, Hungary, Japan, New Zealand, Poland, Uni Emirate Arab) |
| t | = Years from 2014 to 2023 period |

In the study, the researcher uses multiple regression equations. The reason for the use of multiple regression equations is to ensure robust results and overcome econometric problems. The steps involve proceeding from basic estimation techniques to advanced fixed and random effects estimation. Fixed effects estimation will form the basis of the required estimation technique in the study. This estimation will enable the researcher to account for country fixed effects that can affect economic effects. According to Bell and Jones (2015), fixed effects estimation provides the best-estimated solution. This follows the ability to eliminate country effects due to unknown factors such as proximity, cultural ties, previous ties, language compatibility, and institutions.

Nonetheless, the fixed effects method has a very important limitation because the method cannot model the consequences of fixed variables since the model filters out all the country-specific fixed aspects (Pesaran and Zhou, 2018). In our case, the fixed aspect of the distance between Indonesia and each of the destination countries across the entire time span covered in our sample is the omitted variable in the fixed effects model. To overcome the mentioned limitation and incorporate the role of the distance factor toward the flow of Indonesian migrant workers based on the outcome of the migration performance, we choose to apply the RE estimation. The reason for estimating the model under both Fixed Effects and RE specifications jointly arises because of the differences between the two aforementioned estimation techniques because both models have advantages depending on the topic under discussion.

The fixed effect (FE) estimation technique involves transforming the data to eliminate all country-specific traits that remain constant through time. This involves comparing each country only to itself across time. The result in countries is to eliminate any bias in unobserved variables that remain constant throughout the period of study (Peel, M. J., 2014). These variables include geographic location, colonial ties, language affinities, cultural ties to Indonesia, migration channels, and bilateral arrangements that remain in place over an extended period. The major advantage of the FE technique is that it provides consistent results

even if there are correlations between fixed attributes and the variables in migration studies, where countries with higher GDP in manufacturing might have other cultural ties to Indonesia, among others. The disadvantage with FE is that any variable that is not model in the FE equation to remain constant in countries across time becomes an omitted variable in the equation. An example of such variables in the study is distance.

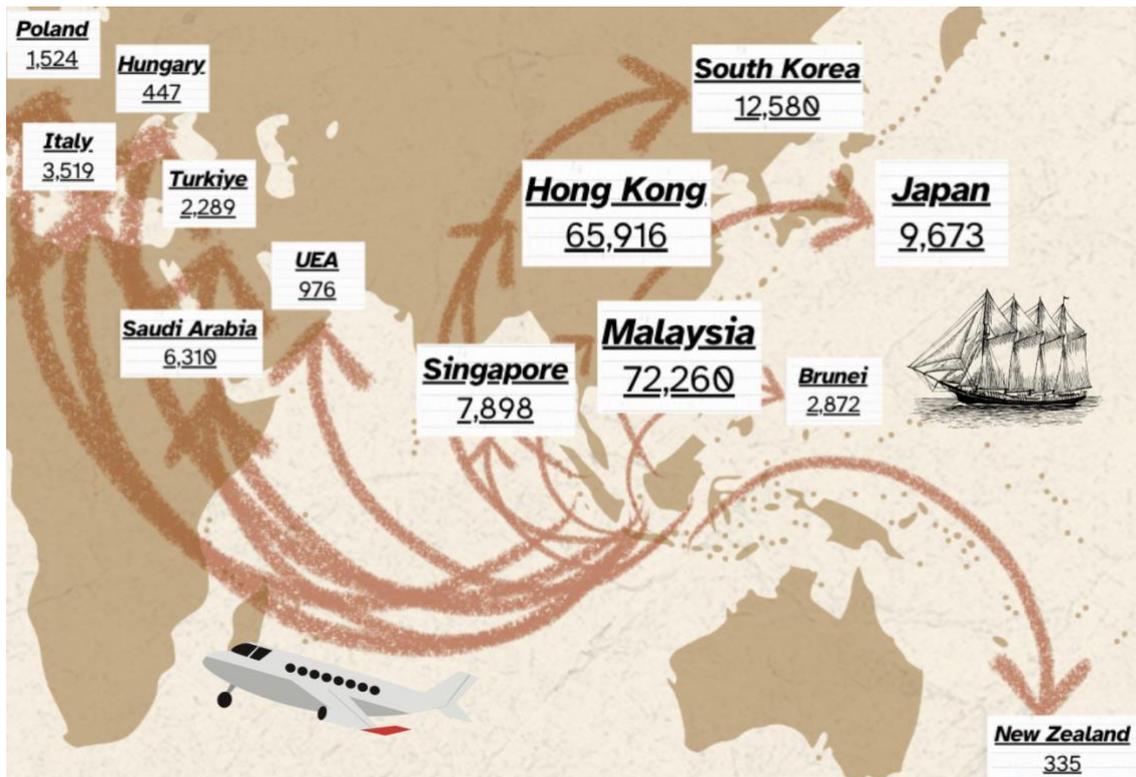
Random effects (RE) estimation takes a fundamentally different approach by treating country-specific characteristics as random draws from a probability distribution rather than fixed parameters to be eliminated. According to Bell & Jones (2015), RE assumes that the unobserved heterogeneity is not related to the variables in the equation, thus allowing for the inclusion of these random effects in the errors while estimating the coefficients of the time-invariant variables at the same time. Therefore, comparing the results of Fixed Effects and Random Effects models provides a complete understanding of the analysis: The Fixed Effects model provides unbiased results on the effect of sectoral GDP on migration by only considering the data within countries, thereby presenting the effect of economic structural change on migration flows across time periods. The effect of structural variables such as geographic distances and other differences between countries can be viewed in the context of total migration patterns in the destination countries through the Random Effects model, thereby identifying why countries with stronger economies always acquire more Indonesian migrants than others. These complementary approaches elucidate the dynamic intra-national mechanisms by which sectoral economic performance influences migration, as well as the stable inter-national factors that establish baseline migration propensities across various destinations.

Chapter IV. Results and Discussion

4.1 Total of IMW

Image 1 shows the geographic spread of Indonesian migrant workers in major destination countries in 2023. It shows clear spatial patterns of labor migration flows from Indonesia.

Image 1. Top Destination Country of IMW 2023



Sources: BP2MI (2024), processed

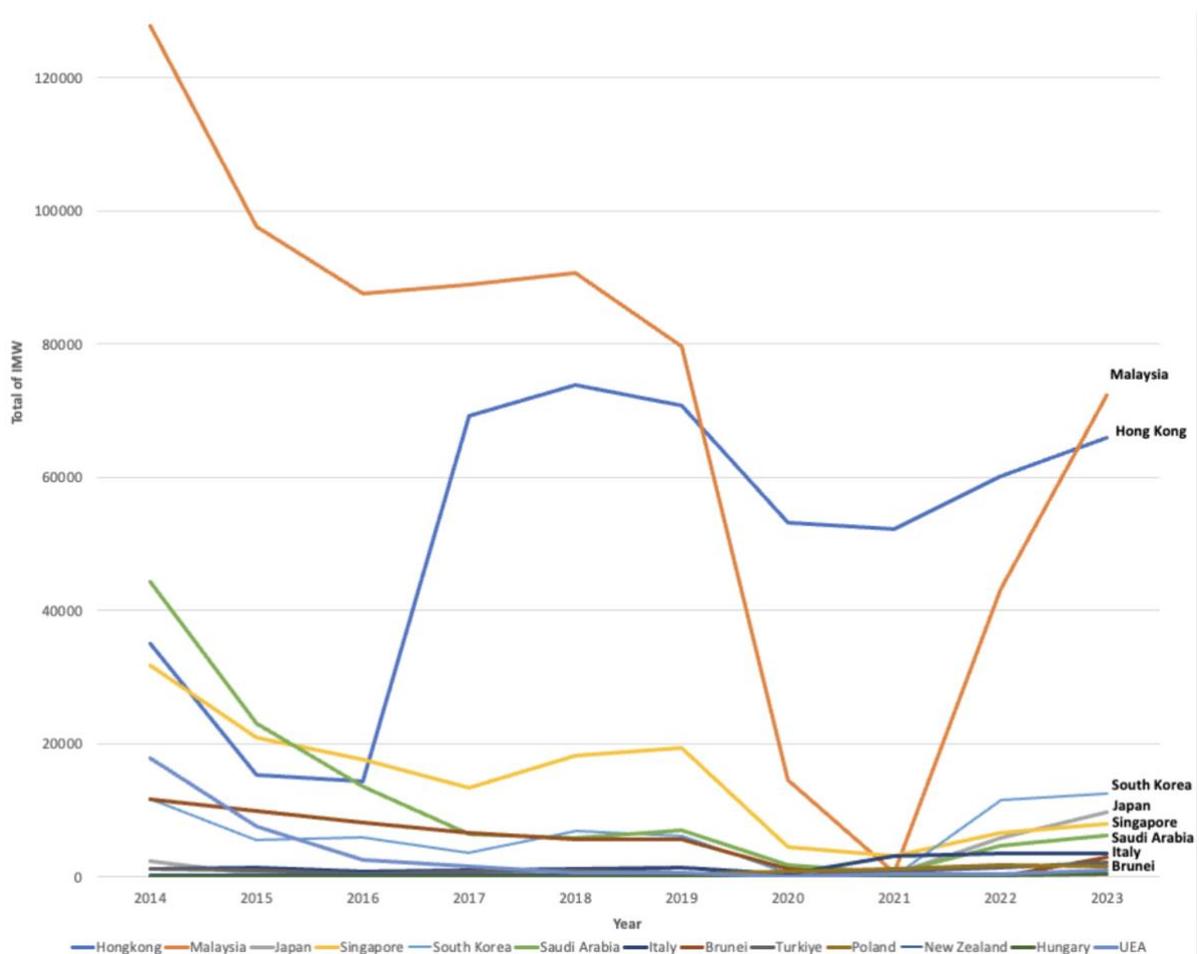
The map shows that Malaysia and other Southeast Asian countries are the main places where Indonesian migrant workers go to work. In 2023, Malaysia will be the largest host country, with 72,260 workers. This concentration is due to Malaysia's close proximity to Indonesia, the fact that the two countries share cultural and linguistic similarities, and migration networks have been in place for decades, and the fact that there is a high demand for workers in areas such as domestic work, construction, and plantation agriculture (Maksum, A., 2022). With 65,916 workers, Hong Kong is the second-most popular destination. Most of them work as domestic helpers for the territory aging population and families with two incomes.

The map shows that migration flows are diverse but hierarchical, with these two main destinations being the most popular. The Employment Permit System (EPS) is one of the arrangements where Indonesian workers are sent to South Korea, specifically for manufacturing and construction jobs (Kartikasari, N., 2013). The number of Indonesian workers in South Korea is 12,580. Japan has 9,673 workers with various visa arrangements,

including the Technical Intern Training Program. Singapore has 7,898 workers for housekeeping, construction, and marine works. The Middle Eastern countries are still major destination areas, with 6,310 workers in Saudi Arabia, although there has been an enormous decrease in this number to date. The smaller but increasingly popular routes to Indonesia involve Italy with 3,519 workers, Poland with 1,524, and Hungary with 447 in Europe. The other major destination areas include Brunei Darussalam with 2,872, Turkey with 2,289, the UAE with 976, and finally, New Zealand with 335 workers in the other parts of the world. The Indonesia workers are distributed across many areas in the different parts of the world, including the Middle East, Europe, and even Oceania. The reason for this is that they can work in many different parts of the world.

Graph 1 illustrates the destination countries where Indonesian migrant workers move, from 2014 to 2023. The graph shows that the trend has been very erratic in terms of the nature of the flows between these destination countries.

Graph 1. Total of IMW by Country 2014-2023



Sources: BP2MI (2024), processed

The orange line representing Malaysia has the largest variation in the series. It begins with about 127,000 in 2014, which is almost twice the number in 2023, and declines to around

87,000 in 2016. The Indonesian Migrant Workers in Malaysia remained stable until 2019. However, because of the COVID-19 crisis, the labor force shrunk to 15,000 in 2020, that practically shut down the mechanisms of international labor migration flows. The post COVID-19 recovery has been robust yet not to the fullest extent. The number in 2023 stands at 72,260, which is still far from the previous level.

The blue line representing Hong Kong has a different trend. Initially, it was low with only 15,000 workers between 2014 and 2016, but it rose to between 68,000 and 73,000 workers between 2017 and 2019. The rise in the number of workers indicates that Hong Kong needs more foreign domestic workers because the country is getting older, and women are increasingly participating in the workforce. The pandemic resulted in reductions to about 53,000 workers in 2020–2021, but they slowly progressed to 65,916 in 2023. The yellow line representing Singapore has between 20,000 and 32,000 workers at different intervals. This shows that Singapore is more stable compared to Hong Kong and Malaysia because the figures of the workers representing Hong Kong and Malaysia were low during the pandemic but rose.

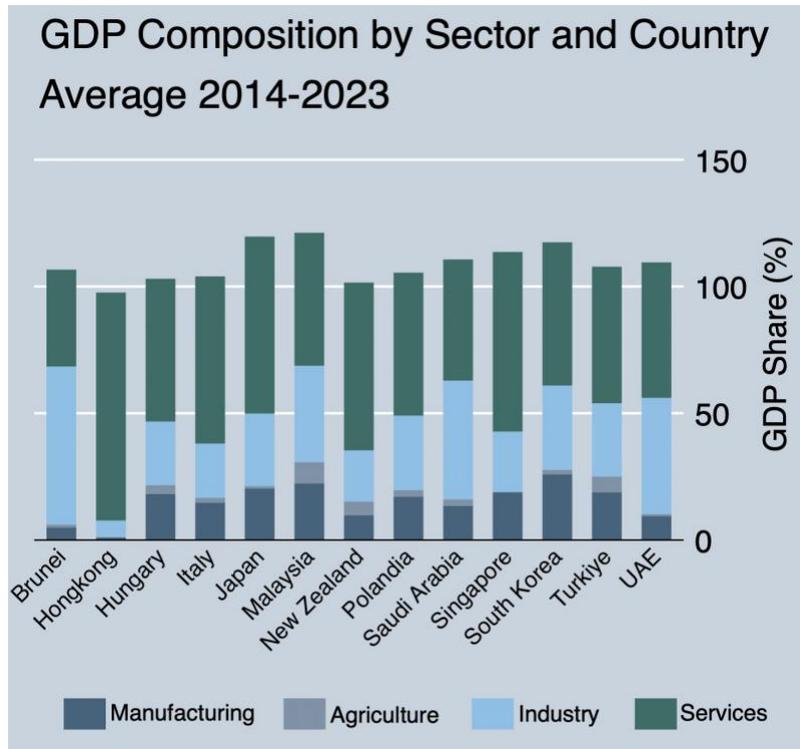
In South Korea, the green line indicates the continuous employment of 12,000 to 20,000 workers. The employment trend in Saudi Arabia, on the other hand, was interrupted by the pandemic and policy shifts that saw the employment level of Indonesian workers reduce from 43,000 in 2014 to very low by 2020. The employment level in Japan, Italy, Brunei, and smaller countries shows relatively constant trends with minute variations occasioned by the pandemic.

The findings from Image 1 and Graph 1 collectively reveal three key aspects that can aid in understanding Indonesian migrant workers' situation. First, the total migration trend revealed by Image 1 and Graph 1 shows that total migrations have been declining gradually from 2014 to 2023 across different destinations. Second, the data revealed that the COVID-19 pandemic presented an extraordinary shock to migration in 2020-2021 across almost all destinations. Third, the post COVID pandemic situation has not experienced normal migration growth yet. These aspects collectively represent the primary thesis to be further explored in this study, the general migration trend conceals prominent variations in different migration scenarios influenced by disparate economic performance in destination countries across different sectors. The different migration patterns indicated in Graph 1 clearly explain that there are migration specific aspects in different destinations associated with economic performance in terms of different growth sectors in different destinations, resulting in migration variations that require different analytical frameworks in study and examination.

4.2 GDP Composition

The data on the contribution of each sector to the GDP of the 13 destination countries of Indonesian migrants is presented in graph 2, with averages calculated between 2014 and 2023. The graph indicates disparities in the economic structure of the countries of hosting, and this has a significant effect on the type and availability of job opportunities for Indonesian nationals in the countries of hosting. The graph highlights the sectors based on the aspect of economic production, including the manufacturing sector (dark blue), agriculture sector (grey), industry sector (light blue), and lastly, the service sector (green).

Graph 2. Total of IMW by Country 2014-2023



Sources: BP2MI (2024), processed

The services sector is the most vital contributor to the economy for the greater percentage of the destination countries at the cost of 50-70% of the GDP. Hong Kong has the highest percentage of services in the economy. The services sector provides 93% of the economy. This happens because Hong Kong has very little industrialization and agricultural production. The reason why the 65,916 Indonesian domestic workers were employed in 2023 lies in the fact that Hong Kong has many high-income families and an aging population. As a result, the territory has a lot of demands for personal service workers like Indonesian nationals (Bai. et.al, 2020). The services sectors in Singapore also perform very well since the country relies on the sectors at the rate of 70% of the GDP. This happens due to the fact that the country has a lot of demands for both the support service staff and the domestic workers.

In fact, the Japanese, South Korean, Italian, and Hungarian economies are more diversified. They have large manufacturing sectors (dark blue) contributing 15-25% of their GDP. This means Indonesian nationals have many opportunities to choose from when looking for job placement in both the manufacturing and service sectors. Both South Korea and Japanese governments have structured programs like the Employment Permit System in Korea and the Technical Intern Training Program in Japan to send the Indonesian nationals to manufacturing sectors (Kartikasari, N., 2013). This is why Indonesian workers can be found in automotive, electronics, and precision manufacturing facilities, as well as in the service sector.

The industry sector (light blue), encompassing construction activities, has a large impact on every destination and typically contributes 20-30% to the GDP. Such industry availability provides Indonesian workers employed in the construction industry and related sectors the opportunity to get employed in countries like Malaysia, which has been growing very rapidly. Indonesian workers in large numbers have moved to countries like Singapore, UAE, and Saudi Arabia, favored tourist destinations, for semi-skilled and skilled labor involving construction activities (Raharto, A., 2007).

Brunei Darussalam can be considered the exception in relation to the services-based pattern of economic development. This country has the largest industrial sector, specifically 60% of GDP contribution. This type of economy based on hydrocarbons demands the creation of human resources in the sectors of oil and gas industries, construction related to the petrol-related sectors, as well as services that assist the foreign labor working in the energy sectors (Darwish & Fattaah 2020). This country depends greatly on the industrial aspect. Yet the service-oriented sectors still require Indonesian domestic helpers to cater to the wealthy families residing in the country due to the country being very wealthy.

Saudi Arabia and the United Arab Emirates are two Middle Eastern countries that rely heavily on oil and have large service sectors (Alabdulhadi, 2014). Their economies are heavily reliant on oil and have large service sectors. These two structural features make it so that Indonesian workers can work in a wide range of jobs, from domestic helpers and hospitality workers in the services sector to construction workers and technical support roles in industrial activities. The professional and semi-professional job opportunities in the UAE and Saudi Arabia's industries have drawn skilled Indonesian workers in engineering support, facilities management, and technical trades. This differentiates these locations from market exemplars such as Hong Kong, whose primary concentration is on services.

The agriculture industry only takes up a very small fraction in the economy of all the destinations, typically less than 5% of GDP. The country with the highest proportional contribution of agriculture is New Zealand, with about 7%. The small number of farms in most of the destination countries illustrates just how modernized they are. It is because of this that Indonesian agricultural workers, though numerous in Indonesia, do not actually have many opportunities to work in the said industry in the destination countries. The trend in sectoral composition in Graph 2 above has very significant implications on migration outcomes in the sense that it gives Indonesian workers, either domestic helpers, construction workers, manufacturing workers, or industry experts, good opportunities in the destinations based on the difference in sectoral economic performance.

4.3 Descriptive Statistic Analysis

The descriptive analysis allows identifying relevant information on the patterns of Indonesian migrant workers, the economic frameworks of host countries, and demographic attributes that play vital roles in explaining the results of regression analysis. The descriptive statistics for the variables used in the study with 130 observations covered in 13 host destination countries over a period of one decade (2014-2023) are presented in table 1.

Table 1. Descriptive Statistics of The Data

| | (1) | (2) | (3) | (4) | (5) |
|--------------|----------|----------|----------|----------|-----|
| | Mean | Std. Dev | Min | Max | Obs |
| imw | 12920.42 | 24807.28 | 0 | 127870 | 130 |
| log_imw | 7.416803 | 2.573138 | 0 | 11.75878 | 130 |
| gdpman | 15.01029 | 6.980428 | .9126655 | 27.04245 | 130 |
| gdpagr | 2.717524 | 2.45814 | .0259773 | 9.566215 | 130 |
| gdpind | 31.55203 | 13.81287 | 5.989491 | 67.92558 | 130 |
| gdpsr | 59.79744 | 12.56565 | 32.52018 | 91.46167 | 130 |
| hdi | .8889385 | .0449525 | .795 | .961 | 130 |
| oadr | 44.31814 | 11.59783 | 22.00266 | 70.257 | 130 |
| distance | 6170.128 | 3433.248 | 897.93 | 10826.39 | 130 |
| log_distance | 8.467964 | .8357423 | 6.800092 | 9.289742 | 130 |
| unemp | 5.237954 | 2.847012 | 1.64 | 13.73 | 130 |
| <i>N</i> | 130 | | | | |

Note: Sample includes 13 destination countries over 10 years (2014-2023)

The dependent variable, Indonesian migrant workers (IMW), has a mean of 12,920 workers, but the range of workers for different country-years is very large, ranging from 0 to 127,870 workers. The large range of values indicates that Indonesian migrant workers are very disparate in number across different countries. For instance, there was a time when Malaysia employed more than 100,000 Indonesian workers per year, while the number of workers in New Zealand and Hungary was in the low hundreds per year. The dependent variable is transformed to its log form, that is, log_imw, to facilitate easy interpretation in terms of elasticities and to reduce the effect of outliers. The logged form has a mean of 7.42 with a standard deviation of 2.57. If you prefer to work with a logged scale, you can see that there are on average 1,650 Indonesian migrant workers in the average destination country, but there is very large variation in the number. The large standard deviation of 2.57 in the logged values shows that there is large variation in the number of Indonesian migrant workers to different destination countries.

Development indicators, demographic information, geographical information, and information on the labor market would be considered control variables. The average of the Human Development Index (HDI) in the sample is 0.889. This indicates that most Indonesian migrants tend to go to very developed countries with good healthcare, education, and living conditions. The HDI score runs from 0.795 to 0.961, which is relatively small in range. This indicates that most Indonesian migrants tend to go to countries that are already very well-developed in terms of human resources, rather than to less-developed countries. This corresponds with the theory on migration, where migrants from middle-income countries such as Indonesia tend to go to countries that are far richer, with the difference in wage rates being enough to pay for the risks associated with migration.

The old age dependency ratio has large variations with an average of 44.3% and a standard deviation of 11.6%. The ratio can range from 22.0% to 70.3% in different countries and year. This wide range is due to basic demographic differences between the countries of destination. For example, Japan and Italy have rapidly aging societies with dependency ratios over 60%, while Saudi Arabia and the UAE have younger populations with ratios under 30%. Such demographic variations carry important theoretical implications given the increasing demands for greater care services, household assistance, and health support requirements among the aging population. This has created labor demands related to personal services that Indonesian workers conventionally offer. The large variation in the level of OADR represents another important factor influencing the differences in the demands for migration across countries.

The distance variable captures the geographic distances in kilometers between Indonesian capital Jakarta and the chief city or capital of each destination country, at an average of 6,170 kilometers. However, the distances range from 898 kilometers (Brunei Darussalam, the closest destination) to 10,826 kilometers (Poland, among the longest destinations in Europe), as shown in the standard deviation of 3,433 kilometers that represents the Indonesian migration routes encompassing the nearby locations of Southeast Asia up to the distant locations of East Asia, the Middle East, and the long-haul European and Oceanian destinations. Geographic distance theoretically influences migration through multiple mechanisms: higher travel costs, increased cultural and informational barriers, greater difficulty maintaining family connections, and reduced effectiveness of migration networks (Schwartz, A., 1973). The log transformation of distance ($\log_distance$) produces a mean of 8.47 and standard deviation of 0.84, ranging from 6.80 to 9.29. This logarithmic specification assumes that distance effects operate proportionally, that is the migration impact of increasing distance from 1,000 to 2,000 kilometers differs from increasing distance from 9,000 to 10,000 kilometers, making the log form theoretically more appropriate for capturing distance-decay relationships in migration flows.

The unemployment rate ($unemp$) variable shows the percentage of people in the destination countries who are not working. It ranges from 1.64% to 13.73% across country-year observations, with an average of 5.24% and a standard deviation of 2.85%. This wide range includes both differences in labor market conditions between countries and changes over time that are related to economic cycles, such as the big spikes in unemployment during the

COVID-19 pandemic from 2020 to 2021. Unemployment rates, in theory, influence migration via labor demand channels, elevated unemployment indicates weakened labor markets with diminished job opportunities for both native and migrant workers, which may inhibit migration flows (DaVanzo, J., 1978). However, the correlation between unemployment and migrant workers is more complex. There is evidence that migrant workers cover specific labor market deficiencies that remain vacant even in periods where unemployment is high. This applies in particular to occupations characterized by bad working conditions, low remuneration, or jobs that would not appeal to native workers, regardless of the labor market situation. The unemployment variable, therefore, takes into account the total labor market tightness in order to examine if sectoral economic performance effects continue to remain significant regardless of the total employment situation (Layard, et.al, 2005).

4.4 Statistical Test Analysis

In order to produce robust and accurate regression results, this study uses more than one statistical test to identify the best possible estimation technique as well as possible econometric problems that must be corrected. The Hausman specification test is used to choose between fixed effects and random effects models. The Breusch-Pagan Lagrangian Multiplier test is used to see if random effects are better than pooled OLS. Heteroskedasticity tests are used to find non-constant error variance that could affect standard errors.

4.4.1 Hausman Test

According to Amini et al. (2012), the Hausman Test determines whether the unique errors or the residuals that belong to each country are significantly related to the regressors. The residuals play a role in determining whether to choose fixed effects or random effects. The null hypothesis states that the residuals are not related to the independent variables. This indicates that the random effects models are consistent and efficient. On the other hand, the fixed effects are considered to remain consistent whether the residuals are related to the independent or not. The aforementioned hypotheses related to the residuals produce the following test statistic results:

$$\mathbf{Chi2 (X^2) = 30.98}$$

$$\mathbf{Prob > X^2 = 0.0001}$$

The chi-squared value obtained is 30.98 on 7 degrees of freedom, yielding a p-value of 0.0001, which is significant at the 1% level. This outcome causes the null hypothesis to be discredited, as it indicates the existence of differences between the fixed effects and the random effects coefficients. Nonetheless, the significance of the test statistic indicates the relationship between country-specific unobservable factors (referring to the country's history of migration ties, the institutions created, cultural proximity, and the existence of recruitment channels) and the sectoral GDP measures as well as the other explanatory variables. In this context, the

random effects estimator tends to generate biased and non-efficient coefficients, whereas the fixed effects estimator tends to remain efficient due to the elimination of the specific country factors through the within-transformation. Consequently, the outcome of the Hausman test strongly favors the fixed effects specification as the appropriate mode for empirically ascertaining the relationship between the economic performance of each sector and the flow of Indonesian migrant workers.

4.4.2 Breusch-Pagan Lagrangian Multiplier Test

The Breusch-Pagan Lagrangian Multiplier test determines the required inclusion of the random effects model or whether the pooled Ordinary Least Squares (OLS) should be used at all (Baltagi et al., 2012). The Breusch-Pagan Lagrangian Test checks the presence of significant variation in the country-specific random effect. The Null and Alternate Hypotheses were: 1) Null, The country-specific effect has a variance of 0. This indicates that the pooled Ordinary Least Squares should be used. 2) Alternate_: Significant variation does exist in the country-specific effect. This indicates the use of the panel data techniques. The test statistic takes:

$$\mathbf{Chibar^2 = 22.46}$$

$$\mathbf{Prob > Chibar^2 = 0.0000}$$

The highly significant test statistic (p -value = 0.0000) strongly rejects the null hypothesis. This indicates the presence of a lot of variation in country-specific effects. This indicates that the baseline willingness of the countries to accept Indonesian migrant workers differs. This has been made clear despite the incorporation of the observed characteristics. Hence, the inter-country variation signifies the existence of hidden factors such as the migration patterns of previous years, the efficiency of the relationship structure between countries, the quality of the diaspora network structure, and the policy structures that cause inequality among countries. The Breusch-Pagan test confirms that panel data techniques (fixed effects model or random effects model) are preferable to pooled OLS because the homogeneity across countries should not be assumed.

4.4.3 Heteroskedasticity Test

Heteroskedasticity refers to the situation whereby the variances of the error term are not equal across observations. This goes against the traditional assumption that specifies equal variances of the error term in the classical model (homoscedasticity). As Baltagi explains: “The reason for heteroskedasticity in panel data is that different countries exhibit different levels of volatility in the flow of migration due to the precision of the measurement of the flow of migration or the relative stability of the country-specific factors influencing the flow of migration as compared to other countries. The Wald test for group heteroskedasticity in fixed-effects regression models tests the null hypothesis that the variances of the errors are equal across all panels (countries) against the alternative that the variances are not equal across panels. The tests produce the following:

$$\text{Chi2 (X}^2\text{)} = 237.05$$

$$\text{Prob} > \text{X}^2 = 0.0000$$

The very large chi-squared statistic (237.05 on 13 degrees of freedom) indicates a p-value of 0.0000, strongly rejecting the null hypothesis of homoskedasticity. This strongly supports the fact that significant heteroskedasticity pervades the sample, as systematically different countries have different error variances. While heteroskedasticity causes incorrect standard errors in fixed effects regression analysis, it does not generate biased results or coefficients. This indicates the standard errors derived under the assumption of homoskedasticity are inconsistent and generate incorrect t-statistics and inference about the significance of the coefficients.

In order to solve this econometric issue, robust standard errors (also referred to as heteroskedasticity robust standard errors / White-Huber standard errors) are employed in fixed effects models. Even when heteroskedasticity is present, robust standard errors stay the same, which makes hypothesis testing valid (Rosopa, et.al., 2013). The results of the regression analysis are presented in table 2, with standard fixed effects models in column 2 and fixed effects with robust standard errors in column 4. This allows one to see the effect of the heteroskedasticity correction on the results. When comparing the values in columns 2 and 4, it becomes clear that robust standard errors tend to be larger than standard errors in general.. Certain values that tend to be only marginally significant in the standard fixed effects models become either insignificantly different or less significantly different in models with robust standard errors. This goes to demonstrate the importance of this correction in coming to an accurate conclusion on sectoral differences

The three diagnostic tests combined validate the methodology used in the study to estimate the values. The Hausman test prefers fixed effects to random effects in the estimation of the performance effect in sectors. This implies that characteristics in countries are tied to independent variables and should be accounted for in the transformation of within rather than being considered random. The Breusch-Pagan test shows that panel data methods are needed because the simpler pooled OLS method doesn't take into account differences between countries. The heteroskedasticity test shows that robust standard errors are necessary for valid inference because the error variances are very different from country to country. Such diagnostic tests suggest that the model specification emphasizing fixed effects and robust standard errors (Column 4 of Table 2) represents the best approach for interpreting the results. Supplementing the above approach are the random effects models (Columns 3 and 5), highlighting the inclusion of the time-independent characteristics mentioned above that fixed effects cannot capture. The comprehensive diagnostic tests ensure that the empirical findings related to detrimental effects on the manufacturing and agricultural sectors, beneficial demographic pressure effects, and the importance of the effects due to distance are based upon robust statistical underpinnings.

4.5 Regression Results Analysis

Table 2 illustrates how the economic performance of the different sectors in the country can be related to the flow of Indonesian migrant workers in five different ways. The comparison between fixed effects and fixed effects robust standard errors shows how the inclusion of unobservable heterogeneity affects the relationship. On the other hand, the random effects estimation enables the estimation of the influence of variables that remain constant across observations. This kind of estimation cannot be performed using fixed effects.

Table 2. Results of Regression OLS, Fixed Effect, Random Effect, Fixed Effect Robust, and Random Effect Robust

| Main Outcomes: Log of Total Indonesian Migrant Workers (IMW) | | | | | |
|---|------------|------------|------------|------------------|------------------|
| | (1) | (2) | (3) | (4) | (5) |
| | OLS | FE | RE | FE Robust | RE Robust |
| gdpman | 0.0604* | -0.346*** | -0.201*** | -0.346* | -0.201 |
| | (1.86) | (-3.76) | (-3.08) | (-1.84) | (-1.46) |
| gdpagr | 0.266** | -0.983** | -0.219 | -0.983** | -0.219 |
| | (2.12) | (-2.28) | (-0.79) | (-3.01) | (-0.60) |
| gdpind | 0.204*** | -0.00415 | -0.0205 | -0.00415 | -0.0205 |
| | (3.87) | (-0.02) | (-0.18) | (-0.02) | (-0.15) |
| gdpser | 0.317*** | 0.0417 | 0.00759 | 0.0417 | 0.00759 |
| | (4.99) | (0.24) | (0.06) | (0.22) | (0.06) |
| hdi | -10.87 | 6.790 | -9.317 | 6.790 | -9.317 |
| | (-1.43) | (0.45) | (-0.77) | (0.31) | (-0.50) |
| oadr | -0.0589*** | 0.257*** | 0.0945** | 0.257** | 0.0945* |
| | (-3.01) | (3.01) | (2.05) | (2.88) | (1.74) |
| log_distance | -0.556* | 0 | -1.865** | 0 | -1.865** |
| | (-1.80) | (.) | (-2.35) | (.) | (-2.13) |
| unemp | 0.0961 | -0.159 | -0.148 | -0.159 | -0.148 |
| | (1.25) | (-1.30) | (-1.32) | (-1.01) | (-0.82) |
| 2014.year | | 0 | 0 | 0 | 0 |
| | | (.) | (.) | (.) | (.) |
| 2015.year | | -0.459 | -0.371 | -0.459* | -0.371** |
| | | (-0.88) | (-0.65) | (-1.96) | (-2.04) |
| 2016.year | | -1.044* | -0.872 | -1.044** | -0.872*** |
| | | (-1.90) | (-1.52) | (-3.34) | (-3.16) |

| | | | | | |
|------------------|---------|-----------|-----------|-----------|-----------|
| 2017.year | | -0.863 | -0.608 | -0.863*** | -0.608** |
| | | (-1.53) | (-1.05) | (-3.32) | (-2.22) |
| 2018.year | | -0.962 | -0.389 | -0.962** | -0.389 |
| | | (-1.62) | (-0.66) | (-2.55) | (-1.10) |
| 2019.year | | -1.290** | -0.521 | -1.290*** | -0.521 |
| | | (-2.01) | (-0.86) | (-3.95) | (-1.36) |
| 2020.year | | -2.058*** | -1.472** | -2.058*** | -1.472*** |
| | | (-3.14) | (-2.45) | (-5.89) | (-2.86) |
| 2021.year | | -2.754*** | -2.193*** | 2.754*** | -2.193** |
| | | (-4.06) | (-3.55) | (-3.20) | (-2.05) |
| 2022.year | | -1.369* | -0.636 | -1.369* | -0.636 |
| | | (-1.92) | (-0.98) | (-2.03) | (-0.73) |
| 2023.year | | -0.902 | 0.124 | -0.902 | 0.124 |
| | | (-1.12) | (0.18) | (-1.03) | (0.19) |
| _cons | -3.138 | -2.527 | 32.58 | -2.527 | 32.58 |
| | (-0.33) | (-0.11) | (1.69) | (-0.08) | (1.30) |
| N | 130 | 130 | 130 | 130 | 130 |

t statistics in * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

4.5.1 Manufacturing Sector Analysis

The manufacturing sector exhibits the most pronounced disparity among estimation methods, with OLS indicating a positive coefficient (0.0604, significant at the 10% level) and fixed effects illustrating a robust negative correlation (-0.346, significant at the 1% level, attaining significance at the 10% level in the robust specification). This sign reversal shows that analyzing data from different countries hides important changes over time that happen in the same country but in different ways. The positive OLS coefficient probably means that countries with bigger manufacturing sectors have historically attracted more Indonesian workers. This might be due to the presence of established hiring networks, bilateral agreements, or regular industry labor demands accumulated over the years. The negative sign on the fixed effects term shows that with the expansion of manufacturing sectors in countries over time, the employment of Indonesian migrants becomes less, not more. This runs counter to the understanding that with the expansion of any economy, employment opportunities should enhance, not reduce, job opportunities for workers from other countries. Instead, it shows that it is the nature of growth that makes the difference in migration outcomes rather than job growth in general.

The negative correlation in the country indicates the various mechanisms in the economy working at the same time in modern manufacturing growth. Firstly, the growth in manufacturing is increasingly associated with new technology, automation, and productivity

gains to reduce the number of employment requirements while increasing production. Modern factories use a lot of computer-controlled machines, industrial robots, and integrated production systems (Singh, T., & Singh, D., 2023). According to the International Federation of Robotics, the installed base of industrial robots in the main Indonesian migrant worker destinations rose dramatically during the study period (World Robotica, 2024). For example, South Korea's robot density (robots per 10,000 manufacturing workers) rose from about 300 in 2014 to over 900 by 2023. Japan's density rose from 200 to 390, and Singapore's density stayed high. These robots do repetitive assembly tasks, precise welding, placing parts, and quality checks faster, more consistently, and more accurately than people can. This means that Indonesian workers who used to do these jobs in electronics manufacturing, automotive parts production, and consumer goods assembly are now out of work.

Second, as manufacturing sectors modernize, they increasingly demand workers with higher formal education, technical certifications, and specialized skills that many Indonesian migrant workers lack, effectively raising entry barriers and transforming remaining manufacturing employment from accessible secondary labor market positions into credential-restricted primary market roles. Modern factories need operators who can program and fix computerized production equipment, quality assurance specialists who know how to use statistical process control methods, maintenance technicians who know about electrical and mechanical engineering, and production supervisors who have management certifications and technical degrees (Tzafestas, 1997). The coefficient of the manufacturing industry (-0.346 in the FE robust specification) indicates that the effect is economically important. For instance, with one percentage point rise in the share of the GDP contributed by the manufacturing industry, the Indonesian migrant worker population will decline by 0.346 percentage point. This displacement effect can be seen in the East Asian countries like South Korea, Japan, and Singapore since the modernization of their manufacturing industries has been moving at the fastest rate. These countries are seeing strong GDP growth in manufacturing and fewer Indonesian workers being hired in manufacturing jobs. Instead, Indonesian workers are moving into non-manufacturing services jobs that are less likely to be replaced by technology.

4.5.2 Agriculture Sector Analysis

The agriculture sector shows a strong negative link with the flow of Indonesian migrant workers, with a fixed effects coefficient of -0.983 (significant at the 5% level in both standard and robust specifications). This is one of the biggest absolute effects among sectoral variables, which means that more agriculture is strongly linked to fewer Indonesian workers. The negative relationship in the agriculture sector is especially surprising because of past patterns of Indonesian agricultural worker migration and what we would expect about the demand for agricultural labor. Traditional agricultural production necessitates considerable manual labor for planting, cultivation, harvesting, and processing tasks, which Indonesian workers have effectively executed in various destination countries, notably in Malaysian plantations and Middle Eastern agricultural development initiatives. During the 1990s and early 2000s, Indonesian workers made up a large part of the agricultural workforces on Malaysian palm oil plantations, in Brunei rice cultivation, and in Saudi Arabian agricultural zones. This made agriculture a traditional channel for people to migrate to other countries. The strong negative

coefficient reflects the fact that the structural pattern diverges greatly from previous patterns. This indicates the usage of very different production patterns in the current expansion in destination countries compared to the previous patterns used by Indonesian agricultural workers.

While the large negative coefficient indicates the opposite: rather than more labor-intensive production methods, the development of modern agriculture is led by technological advancements and productivity increase. The development of modern agriculture encompasses precision agriculture techniques, robotic machines such as GPS-directed tractors and harvesters, biotechnologies, and techniques of integrated agriculture production. This significantly reduces the required labor effort per unit of produce but significantly improves output per area unit (Manida, Ganeshan 2021). Automated irrigation systems with soil moisture sensors and weather data integration improve water delivery without the need for people to watch over it. This means that the irrigation work that used to require a lot of people is no longer needed. Drone technology allows for aerial crop monitoring, pest detection, and targeted pesticide application, which replaces ground-based scouting and manual spraying. Moreover, the concentration of agriculture can also imply that large farms tend to hire less labor but more skilled labor that are able to handle more complex equipment compared to the usual small-scale farms and plantations that were staffed mainly by unskilled worker (Foster & Rosenzweig, 2022).

Agriculture intensity at the coefficient of -0.983 shows that for each percentage point increase in the share of GDP sector in agriculture industry, the Indonesian migrant labor force diminishes at approximately 0.983% for each percentage point increase. The greater the displacement effect, the more Indonesian labor views the modernized agriculture industry as a hindrance in the job search process and finally excludes the migration option because of the improved performance of the agriculture industry in the destination country. This clearly shows how the sectors involved in the agriculture industry focus on replacing human labor systems with machines in the agriculture business that creates little room for low skilled agricultural labor resources in the countries labor markets (Schmitz & Moss, 2015). This represents the distinct difference among sectors when looking at the intensity of displacement due to the physical nature involved in the production of agricultural commodities like planting and harvesting fields of crops.

4.5.3 Industry and Services Sector Analysis

Industry Sector (including construction) shows no significant relationship for the flow of Indonesian labor migrants across all specifications, fixing the effect at -0.00415 (non-significant). This finding shows that industrial development, as a factor that might create job opportunities in the construction and manufacturing sectors, has little effect on the flow of Indonesian labor migrants to the country when country fixed effects and time trends are considered. This lack of significance might have the implication that some equalizing factors are at play simultaneously at the same point in time at the same general level of the industry category. This gives rise to considerable volatility in the data, which can mask any systemic relationships in panel data analysis. Further industry sector classification lumps together

numerous activities such as construction, mining, utilities, and manufacturing, which each demonstrate fundamentally different labor demand and technological paths. Construction relies heavily on manual labor and remains relatively resistant to automation due to the non-standardized, site-specific nature of building projects. While mining increasingly employs automated extraction equipment and utilities require minimal labor inputs, creating heterogeneous labor demand dynamics within the aggregated industry category that may cancel out in statistical estimation (Rogers, et.al., 2019).

The services sector similarly shows non-significant relationship under fixed effects model (0.0417, not significant), contrary to the positive coefficients under the OLS (0.317, significant at 1% level) and random effects model. This pattern suggests that services sector expansion does not translate directly to increased opportunities for Indonesian workers after controlling for country-specific characteristics and temporal trends. This null finding may reflect that services sector growth increasingly concentrates in high-skilled professional services (finance, information technology, business consulting, legal services, accounting) rather than low-skilled personal services where Indonesian workers concentrate, including domestic work, cleaning services, food service, and personal care (Buera & Kaboski, 2012). Alternatively, the null result may indicate that native labor supply adjustments and alternative migrant sources satisfy incremental services sector labor demand in most destinations. The services sector null finding thus suggests that sectoral expansion alone proves insufficient to predict migration flows without examining the skill composition of growth, the regulatory environment governing foreign worker access, and the availability of alternative labor supply sources that compete with or substitute for Indonesian workers.

4.5.4 Control Variable Analysis

Human Development Index (HDI) demonstrates non-significant relationships across fixed effects specifications (6.790 in FE robust, not significant), indicating that HDI variations over time within countries do not substantially affect Indonesian migrant worker flows. This null result may reflect the relatively narrow HDI range across destination countries (0.795-0.961), with all destinations qualifying as high or very high human development, limiting statistical power for detecting HDI effects. Also, the 10 year observation period may not be long enough to see important changes in the HDI, since human development usually changes slowly over decades instead of changing a lot from year to year (Zirogiannis, et.al., 2019) .

Old age dependency ratio (OADR) shows positive and statistically significant relationship across specifications, with fixed effects robust coefficient of 0.257 (significant at 5% level, becoming significant at 10% level in RE robust). This relationship indicates that countries with aging populations consistently host more Indonesian migrant workers, with each percentage point increase in dependency ratio correlating with approximately 0.257% increase in Indonesian worker presence. The positive OADR coefficient aligns strongly with theoretical expectations about demographic transitions creating labor demand for care services, domestic assistance, and health support activities where Indonesian workers find employment. Aging populations require increased personal care, household management, elderly assistance, and

health support services that native workers often avoid due to compensation levels, working conditions, social stigma, and limited career advancement opportunities (Wu, Z., & Li, N., 2003). Indonesian workers, specifically female domestic helpers, plug the gaps in the care economy in countries that are aging very quickly like Hong Kong, Japan, Singapore, and South Korea.

Distance measured as the logarithm of the kilometers between Indonesia and the destination country has a significant negative relationship with the flow of Indonesian migrant workers as shown in the random effects model (-1.865, significant at the 5% level in both standard and robust RE). As explained in the methodology section, distance cannot be estimated in fixed effects models because it stays the same over time and is absorbed by country fixed effects. The random effects coefficient indicates that, for each 1% increase in distance, there is a corresponding 1.865% reduction in Indonesian migrant workers. The large negative correlation is consistent with migration theory: geographic distances apart imply numerous barriers to migration, including higher travel expenses that significantly reduce earnings. Higher cultural and linguistic differences that pose great challenges to integrating with the new environment, higher information asymmetry on working terms, weaker migration networks to provide assistance and information to migrants, and difficulties in maintaining familial bonds via visits and remittances (Schwartz, A., 1973). The size of the effect suggests that geographic proximity is still a key factor in migration flows. For example, Indonesian workers are much more likely to move to nearby Southeast Asian countries like Malaysia, Singapore, and Brunei than to distant European or Middle Eastern countries, all else being equal.

Unemployment rate (unemp) demonstrates negative but non-significant relationships across fixed effects specifications (-0.159 in FE robust, not significant), suggesting that destination country unemployment fluctuations do not systematically affect Indonesian migrant worker flows after controlling for sectoral economic performance and other factors. This null result proves somewhat surprising given theoretical expectations that higher unemployment signals weaker labor markets with reduced migrant job opportunities. However, the non-significance may reflect that Indonesian workers occupy specific labor market segments (domestic work, construction labor, plantation agriculture, low-wage services) characterized by persistent structural demand relatively insulated from cyclical unemployment fluctuations affecting primarily native workers in formal employment sectors (DaVanzo, J. (1978). Additionally, migrant labor demand may prove relatively inelastic to aggregate unemployment because employers in migrant-intensive sectors face persistent recruitment difficulties regardless of overall labor market conditions. As native workers avoid these positions due to compensation, working conditions, and social status considerations rather than job availability.

The year fixed effects' coefficients (though not shown in the table excerpt) exhibit strong variation over time, with very large negative values for 2020 (-2.058, significant at 1% level) and 2021 (-2.754, significant at 1% level), reflecting the shocks to the migration flow due to the COVID-19 pandemic. These temporal controls are necessary to separate the effects of global shocks that affect all destinations at the same time from the effects of sectoral economic

performance. This makes sure that the sectoral relationships that are found are real economic mechanisms and not just effects of the time period.

4.6 Discussion

4.6.1 Theoretical Implication and Framework Development

Empirical results obtained from the previous study pose important challenges to the traditional theories of migration. This calls for a great deal of theoretical development in order to interpret the contradictory relationships between the performance of the macroeconomic sectors and the migration of Indonesian migrant workers. The negative signs of the coefficients derived from the manufacturing sectors (-0.346) and agricultural sectors (-0.983) strongly conflict with the fundamental postulates of the traditional neoclassical migration theory. According to Sjaastad (1962), the traditional neoclassical migration theory states that the increase in economic performance brings about the equal numerical increase in the labor demands at all levels. This clearly shows that the migrants would relocate to geographic areas where their wage rates are higher and where they can obtain gainful employment. The present reality indicates that the increase in economic performance currently provides greater rewards to the demands of higher-skilled labor workers. On the other hand, the shedding of the lowest-skilled labor workers has become prominent due to the advancements in the field of automation and technological development. This assumption acknowledges the fact that the sectors going through the technological revolution can improve their output as well as the share of GDP (Kim, et.al., 2010). Thus, the reduced demands for the lowest-skilled labor workers also decrease.

The Dual Labor Market Theory, originally proposed by Piore (1979), provides the best available structure for understanding the adverse sectoral patterns when adjusted for the influence of technological change. This theory highlights the existence of primary labor markets described as paying high wages, job security, good working conditions, and opportunities for advancement and the secondary labor market described as paying low wages, insecurity of employment, poor working conditions, and little advancement and commonly staffed by foreign labor. As cited in Yang & Zhu (2013), “sectoral development represents the increasing focus of manufacturing and agricultural expansion on the transition from the secondary to the primary labor market. In manufacturing, employers replace large groups of low-skilled assembly workers, which are secondary market jobs that Indonesian migrants can do, with smaller groups of technically trained operators and quality assurance specialists who need credentials that Indonesian workers usually don't have (Allen, 2016). In the same way, the development of agriculture in the destination country has been driven mainly by the implementation of precision agriculture technologies. This results in the elimination of specific employment opportunities and the creation of other employment opportunities that involve individuals with the ability to operate the equipment. This context explains how the GDP

sectors create a loss of employment opportunities to the Indonesian labor force as the main effect of the capital labor substitution and improved human capital.

As explored by the theory of push-pull migration in the context of studies conducted by Morawska (2007) and Wickramasinghe & Wimalaratana (2016), technological trajectories that convert economic growth from pull factors into migration deterrents. The standard application would look at the expected GDP growth in the manufacturing and agricultural sectors as significant pulling factors related to the increase in job opportunities and real wages. What the study illustrates is that growth in the sectors can be characterized by “push away” effects in cases where the growth takes place simultaneously with technological change. The model should allow for distinguishing between labor-augmenting growth, which creates extensive employment opportunities, and growth that preferentially attracts high-skilled workers while “pushing away” low-skilled workers through selective hiring practices in host countries (Van Hear, et.al., 2020). For Indonesian workers, the relevant pull factors are increasingly in the services sector, primarily in housekeeping and elderly care, where technological substitution is less feasible and an aging population (as captured by the positive OADR coefficient of 0.257) creates sustained demand.

The negative distance term with a strong empirical coefficient of -1.865, which is significant at the 5% level, provides strong empirical confirmation for the predictions of the gravity model of international migration, which was derived on the basis of Newton's gravitational force equation applied to migration flows. The gravity model, considerably enhanced by the work of Ramos, R. (2016), maintains that distances between countries reduce migration flows. This rationale encompasses different migration frictions related to direct travel costs, the psychological effects of separation from families, information problems related to decreasing familiarity with far-off areas, and the reduced effectiveness of migration networks, which work better over smaller distances. The strength of the effect shows that the 1% increase in distance translates to around 1.86% less Indonesian migrant workers. This indicates that despite the reduction in the cost of transportation, the effects related to distances are still relevant. Indeed, it explains why there are more than 72,000 workers in Malaysia, which is 898 kilometers from Jakarta, while there are only 1,524 workers in Poland, which is 9,400 kilometers from Indonesia.

The non-significant unemployment coefficient (-0.159) has correlated with theoretical implications for labor market segmentation theory and the special place of Indonesian workers in destination countries labor markets. The result is consistent with the segmented labor market theory argument that there are definitely segments in the labor market that behave independently with little competition between them. Indonesian migrant workers are mainly employed in the secondary market segmented areas including housekeeping, construction jobs, agricultural sector employment, and food service related to jobs. Native workers consistently reject regardless of the level of unemployment rates because there are always structural shortages in these segmented areas because native workers prefer some jobs to others, not because demand fluctuates (Kannappan, S., 1985). Even when the overall unemployment rate goes up a lot during a recession, employers in domestic work and elderly care still have trouble

finding workers because native workers see these jobs as socially undesirable, with low pay and few chances for advancement. The theoretical implication is that the demand for Indonesian migrant workers is driven by structural rather than cyclical dynamics, with aggregate unemployment predominantly impacting native workers in formal employment sectors where Indonesian migrants have a minimal presence.

The New Economics of Labor Migration (NELM) framework, created by Stark and Bloom (1985), says that households, not individuals, are the most important decision-making units. According to Mincer (1978), families strategically diversify their income sources by choosing which members to deploy. The strong negative sectoral coefficients indicate that Indonesian households are encountering progressively limited options as technological advancements systematically eradicate specific migration routes. Families that used to send members to work in factories in Malaysia or on farms in the Middle East must now change their plans to focus on jobs in the service sector in Hong Kong and Singapore. This transition is difficult because it requires new skills, gender-specific labor requirements (domestic workers happen to be female), and new terms of commitment that modify the manner in which household work has been done for the past seventy years. The theories of NELM explain how negative associations represent more than individualized constraints in opportunities because essential shifts in management of risks to the household and sources of diversification of income occur in attempting to cope with global changes in the labor market.

4.6.2 Technological Displacement Mechanisms

The most clear explanation for the negative coefficients in the Manufacturing and Agriculture sectors is offered by technological displacement. The process works by directly replacing labor with capital and indirectly raising skill requirements, which together limit job opportunities for Indonesian workers. Within manufacturing, sectoral growth increasingly depends on automated production systems that eliminate entire occupational categories while creating smaller numbers of high-skill technical positions (Kurt, R., 2019).

Industrial robotics now perform assembly tasks requiring manual dexterity, precision, and repetitive motion that human workers traditionally supplied. According to Singh, T., & Singh, D., (2023), computer numerical control (CNC) machinery executes complex fabrication operations previously requiring skilled craftsmen, while quality control systems employing machine vision and sensors replace human inspectors. According to World Robotic (2024) reports that industrial robot installations in Asian destination countries including South Korea, Japan, and Singapore have accelerated dramatically during the 2014-2023 study period, with robot density (robots per 10,000 workers) increasing from approximately 300 to over 900 in South Korea and from 200 to 390 in Japan. This automation wave directly displaces Indonesian workers who previously occupied factory floor positions in electronics assembly, automotive parts manufacturing, and consumer goods production.

In agriculture, mechanization goes in the same direction. GPS-guided tractors with automated steering do away with tractor drivers; mechanical harvesters that combine cutting,

threshing, and collection operations do away with harvest crews; automated irrigation systems with soil moisture sensors do away with manual irrigation work; and drone-based pesticide application cuts down on the number of ground crew members needed. Farmers can get much higher yields with less work by using precision agriculture technologies that optimize planting density, fertilizer application, and harvest timing. This is how agricultural GDP can grow while employment contracts.

4.6.3 Skills Upgrading and Human Capital Requirements

In this time of economic growth, companies that are growing often raise the standards for education and certification for jobs without really lowering the demand for workers. This gradual tightening of human capital requirements can shut out Indonesian migrants who lack the formal credentials and vocational training now expected by employers in high-tech manufacturing (Andriam, 2021). In areas such as the electronics industry and car manufacturing, there is increasing investment, so automation and precision are increasingly valued. Nonetheless, most of the jobs that remain available require certificates of attainment, mathematical competence, and knowledge of the English language, which most migrant workers lack.

Therefore, the process of up-skilling is not entirely about replacing workers with technology. According to Manning, (2004), jobs are not being eliminated but rather transitioned from tasks that low-skilled workers can perform to tasks that companies would rather trained technicians and certified professionals perform. Therefore, the demand curves for physical presence jobs remain the same, but the human capital requirements require the jobs to transition from the migrant group to a group of better-skilled workers. Therefore, companies continue to utilize many workers in jobs even though they are working in ways that segregate access based on level of education.

Chapter V. Conclusion

The current study investigated the effect of sector-specific economic performance in host countries on the Indonesian migrant worker flow process. The latest panel data analysis techniques were used in the study involving 13 host countries during 2014-2023. For the current study, the fixed effect regression analysis has been conducted to identify the counter-intuitive factors. The important implication derived from the finding clearly shows that the economic growth of the manufacturing and agricultural sectors has the effect of reducing Indonesian migrant workers. This contradicts the expectation that the economic growth of the countries would offer the opportunities for migration. For each percentage increase in the GDP ratio of the manufacturing industry, the corresponding decrease 0.346% for Indonesian migrant workers. On the other hand, the inverse relationship between the agriculture industry and Indonesian migrant workers has been determined as 0.983%. The development of the sectors can systematically reduce the employment prospects of Indonesians because of technological advancement and development processes involving greater emphasis on the hiring of highly skilled individuals rather than the low-skilled Indonesian migrants.

In fixed effects specifications, the industry and services sectors have no significant relationship to Indonesian migration. This indicates that the growth of the industry and services sectors does not significantly alter the likelihood of Indonesian workers being employed when country-specific factors are considered. This outcome is counterintuitive because the expectation was that the growth of the construction industry and the services sectors would create job opportunities for Indonesian workers. The highest positive relationship is between the dependency rates among the elderly and the Indonesian migrants employment. For each percentage point rise in the dependency rate among the elderly, the total Indonesian workers employed rise by 25.7%. This outcome strongly verifies the predictions made in the demographic transition theory about the effects of aging populations due to the expansion required in the care economy related to personal services that Indonesian workers deliver.

Geographical distance is one of the important structural factors influencing the flow of migrants. The empirical findings indicated that for each 1% increase in the distances between Indonesia and the countries of destination, the corresponding decrease in Indonesian migrant workers was approximately 1.86%. The major factor presented in the study supports the gravity model argument that, despite the effects of globalization and reduced transportation costs, geographic proximity remains one of the essential determinants in the process of migrating from one place to another. The study makes it clear that the unemployment level in host countries has not resulted in any significant correlation with Indonesian migrant workers. The study revealed that total labor market conditions, indicated by total unemployment, failed to demonstrate any effect on migration after considering structural performance and demographic aspects of migration counts between countries. The study revealed that Indonesian migrant workers' structural demands in host countries were influenced by structural performance and demographic aspects rather than total employment aspects in host countries even in terms of efficiency in employment market performance across different countries.

These empirical findings have very profound implications for migration policies in Indonesia, as well as the negotiations of bilateral labor arrangements. They signal the onset of a paradigm shift away from the traditional approaches that rely exclusively on macroeconomic performance measures. Firstly, there is a need for policy to recognize that economic performance in certain sectors in host countries does not automatically translate to more opportunities for Indonesian migrants. Secondly, geographic targeting should specifically aim at destinations in Southeast Asia and East Asia because they are near Indonesia. Therefore, it would be less likely for Indonesian migrants to face gravitational pull challenges since migration would be less costly in terms of physical transformation challenges. Thirdly, there would be a need to modify the nature of workforce preparation programs to suit employment areas in the current “care economy” and “hospitality industry” sectors because the current preparedness for employment in manufacturing industries and agriculture is less relevant with technological advancements that render them less useful in any host employment market. Therefore, there would be a need to prepare Indonesian workers in terms of language capability, cultural understanding, elderly handling certificates, and technical skills for any human employment market where Indonesian workers might qualify for employment due to technological innovations in employment areas concerning these sectors. Fourth, bilateral negotiations should take into account the fact that destination countries are getting older and that Indonesian workers can help fill structural care service gaps while also improving working conditions, legal protections, and career advancement opportunities.

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