Youth Migration and Human Capital Development in Indonesia

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Declaration

I declare that all work contained in this thesis is my own original work prepared and submitted for the Degree of Doctor of Philosophy.

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All things come from Him. All things are directed by Him. All things are for His good.
May God be given the glory forever! (Romans 11:36)

Abstract

Migration not only depicts the movement of people but also signifies the relocation of human capital. Migration is influenced by various factors, including age and education. The effect of age is shown through the domination of young adult migrants, while education has consistently shown a positive association with migration behaviour. Since migration can play a prominent role in affecting human capital accumulation and redistribution, examining the education-specific patterns of youth migration is critical to understanding its implications for human capital development, particularly in the education dimension.

Although the relation between education and migration have been extensively studied, thorough studies on the interaction between migration dynamics and educational performance remain rare in many developing countries, including Indonesia. Therefore, by analysing cross-sectional and longitudinal datasets, as well as combining aggregate- and individual-level approaches, this thesis contributes to the literature by exploring education-specific migration dynamics of young adult Indonesians. This country is chosen as a case study country due to its interregional variations in population structure and economic development.

This study has shown that education is one of the most important determinants of youth migration. In terms of spatial structure of migration, rural regions have acted as prominent sources of migration of primary-educated groups. At the same time, these regions have also increased their importance as destination areas for tertiary-educated migrants. Further, the effects of regional connectedness are shown to be stronger for migration flows by groups with higher educational backgrounds. In contrast, social capital has a more pronounced effect on lower-educated groups.

Based on age at first migration, it is evidenced that people with low level of education migrate for the first time at younger ages, possibly after the termination of their schooling careers. This situation illustrates a strong negative selection of education towards migration. Meanwhile, highly educated groups migrate to pursue further education. This study finds that education-related motives is critical in explaining the high migration propensity around the age of 18 to 19 years by tertiary-educated group. The findings indicate that the ways migration is linked to education differ by age at first migration and highest educational attainment.

The shares of repeat migrants also increase considerably for higher-educated groups. Tertiary-educated migrants, particularly, have the highest likelihood of migrating onward.

Life-course transitions after initial migration also significantly influence the patterns of migration trajectories. Repeat migration is highly pronounced among those who continue education, enter the labour force, and change marital status after their first migration.

This study provides several new insights into the relationships between migration and educational performance. First, the distinctive patterns of education-specific migration structure. These findings contribute substantially to the understanding of human capital redistribution through internal migration. Second, a more nuanced understanding of the education-migration nexus through the variations in age at first migration. The results emphasise the critical role of migration as an alternative to human capital acquisition. Lastly, the varied levels and patterns of migration trajectories by educational attainment broaden our knowledge on the importance of migration in human capital redistribution. The results also underline the importance of repeat migration in improving the return on investment in human capital.

This work has demonstrated complementary insights into migration dynamics from macro- and micro-level perspectives in Indonesia. In the context of regional inequality, migration is considered to have a critical role in human capital distribution. However, the selective nature of education on migration has several implications for policies related to human capital investment in Indonesia and other developing countries with similar levels of socio-economic development. The persistent challenges in education and employment opportunities as shown in this study call for effort on the management of human capital flows that puts more consideration into sub-national differences in the population profile and regional development.

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Chapter 1 Introduction

1.1 Research Focus

This research investigates the dynamic interrelationship between youth migration and human capital development in Indonesia. As an archipelagic country with over 279 million inhabitants and wide differences in interregional development, Indonesia provides a critical setting for studying internal migration. Both age and educational selectivity are evidenced in the migration profile in Indonesia. The age pattern is similar to the general migration schedule with a low level of migration in early childhood, then increasing until it reaches its peak at ages 20 to 24 and decreasing again at later ages (Muhidin, 2018). Also, higher education significantly increases Indonesians' likelihood of migrating (Bernard & Bell, 2018; Muhidin, 2018). Moreover, Indonesia currently faces challenges in overcoming human capital gaps between regions. Regional inequalities have consistently been considered major challenges in developing human capital in Indonesia. As shown by UNDP (2019), the human development index (HDI) of Indonesia has reached the high level (HDI value 0.70). When the measurement of the index accounts for the inequality across the country, however, it decreased to 0.59. It is apparent that the human development achievement is not enjoyed equally across regions within the country. Variations in population dynamics and economic development between regions play a critical role in differentiating human capital outcomes at regional level. Disparities in education performance, particularly, are persistently wide between provinces in the country (Statistics Indonesia, 2021a).

At the regional level, human capital can be defined as the accumulation of knowledge and skills of populations that can be used to accelerate regional productivity in economic activities. Education has been the major measure of human capital since it allows individuals to acquire knowledge and skills to improve their capabilities. Moreover, several studies have explained the importance of education in determining the size and composition of migration flows in Indonesia (Adioetomo et al., 2014; Bernard & Bell, 2018; Jones et al., 2016; Muhidin, 2018). Some case studies have also highlighted the narratives of skilled and educated migration in the country (Malamassam, 2017; Malamassam et al., 2017, 2021). Despite growing academic discussions on the relationship between education and migration, thorough studies on the interaction between migration dynamics and educational outcomes remain rare. Therefore, by analysing cross-sectional and longitudinal datasets, as well as combining aggregate- and individual-level approaches, this thesis aims to understand the migration

dynamics of the young population by their educational attainment and their contribution to human capital development in Indonesia, particularly the improvement of human capital outcomes across regions in the country.

The thesis covers various topics in order to meet the study's objective. Not only is a conceptual framework developed for understanding the relation between migration and human capital development, but this study also provides a thorough review on the contextual setting of population dynamics and regional development in Indonesia. Moreover, by focusing on education as the foremost proxy of human capital, the thesis examines various aspects of the youth migration dynamics in Indonesia. Based on the results, this study provides policy recommendations on the issues of youth migration and human capital development in Indonesia.

This study aims to address following main questions:

1. To what extent can the spatial structures of youth migration be explained by variations in migrants' educational background?
2. In what ways does the first adult migration linked to the educational attainment of young migrants?
3. How do educational attainment and life-course transitions influence level and patterns of migration during young adulthood?

Using data from Census 2000 and 2010, the first research question explores a critical aspect of the migration flow, i.e., spatial structure. Spatial structure of migration can be defined as a disaggregation of migration flows that explains the relative push and pull factors of each region and identifies levels of spatial interactions between places (Rogers et al., 2002). Answering this question allows for better comprehension of interregional human capital accumulation through youth migration by taking into consideration education background of the migrants. The analysis also establishes regional-level factors affecting the distinctive spatial patterns of migration flows by educational level.

The second and third research questions apply a life-course approach in examining the migration dynamics of youth migration at an individual level. The life-course approach focuses on how migration decisions are shaped and influenced by ongoing events in people's lives and various contextual processes (Coulter et al., 2013; King, 2012). This framework allows for a more nuanced understanding of the motives and implications of migration through exploring the timing and frequency of migration as well as variations in life-course trajectories (Findlay

et al., 2015). Panel datasets from five waves of the Indonesian Family Life Survey (IFLS) are utilised to capture migration events and life-course trajectories of young Indonesians.

The second research question examines the occurrence of first migration during the young adult period. By exploring the patterns of age at first migration, the analysis is essential to get an insight into the process of human capital acquisition and investments among the youth population (Sjaastad, 1962). Moreover, age at first migration can give insight into contextual factors embedded in life-course transitions (Collinson, 2009).

The third research question investigates the level and pattern of migration during the young adult period. Level of migration depicts the intensity of spatial movement during a certain period, while pattern of migration illustrates the continuity of migration trajectory. The variations of level and pattern of migration by educational background can affect the returns to migrants' prior human capital acquisition and investment. Human capital acquisition through initial move has enabled migrants to improve their skills and knowledge, resulting in a greater ability to access opportunities in various locations, and might lead to subsequent migration (Faggian et al., 2007a). Subsequent migration to previously lived locations or return migration is associated with a penalty in returns to human capital, whereas moves to new regions or onward migration can improve returns to education and migration (Knapp et al., 2013). In addition, the examination of the effect of various life-course transitions on the level and pattern of migration by educational attainment provides a more nuanced understanding on the potential opportunities and challenges in human capital redistribution across regions.

1.2 Research Rationale

Migration acts to change population structure over time, together with fertility and mortality. Its role in population dynamics has becomes more prominent as countries reach the later stages of the demographic transition, characterised by low to moderate fertility and mortality (White, 2016). At the regional level, migration is viewed as a critical instrument for human capital redistribution (Suzuki & Suzuki, 2016). At an individual level, migration is considered a strategy to improve quality of life through greater access to opportunities located elsewhere (Greenwood, 2016).

Migration is influenced by several factors, including those associated with origin and destination areas (Lee, 1966). Factors related to areas of origin or push factors result from an assessment of positive and negative aspects. In contrast, factors associated with areas of

destination or pull factors are perceived based on information from various sources. However, migration decisions are not simply outcomes of assessing positive and negative aspects of the origin and destination locations. Personal characteristics are also important in shaping one's decision to migrate. Age, sex, cultural and educational background as well as previous life-course trajectories and contextual settings of individuals, are empirically found to be critical determinants in explaining the selectivity of individuals' migration propensities (Bailey, 1993; Bernard & Bell, 2018; Cattaneo & Robinson, 2020; Lundholm et al., 2004; Mulder, 1993; Plane & Rogerson, 1991; Vidal & Lutz, 2018). Therefore, interactions between contextual and individual factors are critical in explaining migration dynamics.

The age selectivity of migration has been shown to have strong regularity over time and across regions (Bell & Muhidin, 2009; Lundholm et al., 2004; Rogers & Castro, 1981). Variations across regions can be observed from the peak age at migration of around 21 to 22 years in Southeast Asian countries, e.g., Indonesia, Malaysia and Vietnam, while migration intensities peaked in the late 20s in more developed countries, such as Australia, Canada, and Portugal (Bell & Muhidin, 2009). Unsurprisingly, young adults are the group that dominates migration flows in the world, both internal and international. The selective nature of age at migration is attributed to major life-course events generally occurring in persons aged 15 to 34 years. During this period, they confront various demographic choices related to their education, family formation, and employment. These choices can include decisions to leave their hometowns and live elsewhere (Bernard et al., 2016; Coulter & Ham, 2013; Mulder, 1993; Plane et al., 2005). As individuals age, various life-course events can increase or diminish their propensity to experience migration, and the events are not necessarily isolated from each other (Schittenhelm, 2011).

Migration also works in a selective manner by levels of education. Those with a high level of educational background are shown to have a higher likelihood of migrating, and this situation can be attributed to their higher level of human capital, which allows them to access a broader range of working opportunities and higher financial returns (Gamlen et al., 2017; Gould, 1982). Muhidin (2018) added that education influences people's perceptions and attitudes toward migration. In addition, education positively affects investment in human capital. However, individuals with low levels of education also migrate internally (Bernard & Bell, 2018). The constraint of finding preferable opportunities for low-educated individuals in rural regions and the extensive choices of non-agricultural employment in urban areas might work as a strong catalyst for low-educated migration. This situation contributes to the

participation of low-educated individuals, particularly within the rural–urban migration system (Ginsburg et al., 2016; Semela & Cochrane, 2019).

The educational selectivity of migration has critical implications for educational profile of regional populations. Kanbur and Rapoport (2005) argued that the migration of highly educated persons leads to widening gaps in human capital development within a country. In contrast, Suzuki and Suzuki (2016) pointed out that human capital redistribution through the migration of highly skilled individuals can accelerate human capital accumulation in both areas of origin and destination. In addition, Bailey (1993) emphasised that the higher intensity of migration flows and repeat migration by highly educated individuals could lessen the positive impact of migration on regional development. Moreover, regions that receive a higher number of in-migrants can fail in accumulating human capital if the out-migrants are more educated than the in-migrants. Similarly, regions that cannot retain a considerable number of their native population might still gain human capital stock if they can attract groups of highly educated individuals (Krieg, 1991; Sjaastad, 1962). The distinctive migration dynamics among migrants with different educational background would have a crucial role in human capital accumulation and redistribution across regions in a country. Therefore, the examination of various aspects of migration dynamics by educational level is critical in order to understand the interrelationship between migration and human capital development.

1.3 Significance of Research

Previous studies have explored the multifaceted aspects of migration. However, most studies approach migration as a one-off event rather than a lifelong trajectory. The examination of migration dynamics should not consider this population phenomenon as a standalone event within the individual's life (Findlay et al., 2015). Migration must be viewed as an integral part of individuals' biography and it is influenced by various contextual changes and processes (Coulter et al., 2013; King, 2012). Further, the exploration of individuals' residential mobility histories or migration trajectories is commonly limited by the data availability, particularly in the developing countries context, despite growing calls to study migration as a life-course trajectory (Bernard, 2022b). By analysing migration-related information from both cross-sectional and longitudinal datasets, this study offers new insights on evolving approaches and methodologies on migration studies.

Discussions of the linkage between migration and education have been one of the prominent highlights of the existing literature on migration and human capital development

(Bernard & Bell, 2018; Harttgen & Klasen, 2009; Schultz, 1961; Sjaastad, 1962; UNESCO, 2018). People with diverse backgrounds may be exposed to different patterns of life-course transitions, and this situation results in variations in migration trajectories. The various patterns of migration trajectories by education level can particularly impact human capital redistribution across regions (Constant & Zimmermann, 2011). Further, exploration of the migration dynamics can explain contextual settings of human capital accumulation and return to human capital (Bailey, 1993; Knapp et al., 2013). Therefore, this study makes a significant contribution to enriching existing knowledge in discussions of the education-migration nexus and its relation to human capital development.

The human capital redistribution through migration marks simultaneous human capital loss and gain for the sending and receiving areas. Thus, the educational selectivity on the migration process has several implications for interregional population dynamics and human capital development. On the one side, migration can lead to a convergence of regional development (Faggian et al., 2017). On the other side, it also potentially results in more substantial interregional inequalities (Faggian et al., 2017; Fu & Gabriel, 2012). For these reasons, the findings of this study are significant to serve as a basis for social policy formulation in addressing gaps in human capital development across regions.

1.4 Thesis Structure

This thesis consists of eight chapters discussing migration of young adult Indonesians by analysing variations in the migration dynamics by educational background and examining their implications for human capital development across the country.

After this introduction, Chapter 2 presents a review of migration-related concepts and theories. Further, previous works on the topic of internal migration, education, and human capital development are also reviewed. Based on the reviews, the conceptual framework developed for the thesis is also elaborated in this chapter.

The contextual setting of this thesis is provided in Chapter 3. The setting covers discussions on population dynamics, human capital development, as well as education and migration profiles of Indonesia. Using statistical reports, policy papers, and empirical studies, this chapter presents trends in population and regional development in the country. The last part of the chapter highlights the gap in the knowledge on the issue of migration and human capital development in the Indonesian context.

Various data sources for migration-related information in the Indonesian context are introduced in Chapter 4. This chapter further explains the rationale for selecting censuses and IFLS as data sources used for the analysis. Also, this chapter describes the methodological approach employed in answering this study's research questions.

The following three chapters presents the analytical parts of this thesis. The format of the chapters allows them to be perused as stand-alone pieces of research. The first analysis of the study is examined in Chapter 5. Using 2000 and 2010 census data, the chapter discusses the spatial structure of education-specific migration flows among young Indonesians. It also investigates the underlying regional-level factors that differentiate origin–destination interactions by education level within the youth migration system.

The second analytical chapter (Chapter 6) investigates the onset of the migration trajectory by examining the age at first adult migration. Through the exploration of migration-related information from five waves of IFLS datasets, this chapter establishes variations in the education-migration nexus by the onset of migration trajectories. It also discusses the contextual factors that influence patterns of age at migration over time and implications for human capital development.

The examination of the level and pattern of migration trajectories of young Indonesians is conducted in Chapter 7. By utilising information on individuals' migration histories from IFLS datasets, this chapter also explores factors affecting repeat migration within the young adult period. Further, it discusses the effect of life-course transitions on the patterns of migration trajectories during young adulthood.

Findings from previous analytical chapters are summarised in Chapter 8. The chapter also discusses the study's contributions to the existing knowledge. It suggests specific policy recommendations based on the key findings in the thesis. Future research directions related to this topic are addressed as well.

Chapter 2 Migration and Human Capital Development

2.1 Introduction

About one in eight adults live outside their birth region (UNESCO, 2018). Bernard et al. (2018) also found that, on average, one in five people in the world had changed residential regions within a five-year interval. In 2015, more than 1 billion people living in developed countries moved between and within rural and urban regions (FAO, 2018). Growth in the young population accompanied by increasing employment opportunities, cheaper communications, and transport costs have been critical factors encouraging the increasing intensity of internal migration (UNDP, 2009). In low- and middle-income countries, particularly, declining agriculture and rising manufacturing and service sectors have resulted in the migration of labour from rural areas to cities (World Bank, 2009).

Migration is an essential part of human capital development. Not only does migration redistribute human capital, but it also affects human capital accumulation across regions. Education is another critical aspect of human capital development. The interaction between education and migration has been studied thoroughly, and several studies suggest education as a strong predictor of migration behaviour (Bernard & Bell, 2018; Gould, 1982; Long, 1973). The selectivity of migrants is shown through the higher propensities of more educated individuals to migrate (Bernard & Bell, 2018). However, the relationships between education and migration are diverse in different socio-economic contexts. For example, the dominance of informal economy in a region works as a strong incentive for low-educated in-migration, while positive selection on migration and education can be mainly found in regions with wider range of formal employment (Ginsburg et al., 2016). Additionally, due to the limited education and employment opportunities, less developed districts and small cities have a higher probability of losing educated inhabitants (Eacott & Sonn, 2006). Alternatively, large cities have become the primary destination for highly educated migration (Fafchamps & Shilpi, 2013). Differentiated opportunities within countries can shape the variations in education-specific migration dynamics at the sub-national level (Bernard & Bell, 2018).

Migration is a critical population phenomenon because it can shape and re-shape societies as well as create divisions between regions and population groups (King, 2012). Therefore, examining its dynamics is important to understand its potential implications. Explorations of migration dynamics through a macro-level approach can explain the

characterisations of socio-economic contexts over regions as well as identify patterns of migration flows. Therefore, this approach is useful in providing insight into migration dynamics at the population and regional levels (Bernard et al., 2020). Meanwhile, a micro-level approach focuses on individual level factors attributed to the dynamics of migration. In order to be able to fully capture variations in migration dynamics, migration should also be explored at the individual level and be viewed as an integral part of one's life-course trajectory. Recent studies on migration have called attention to applying a life-course perspective in understanding the migration dynamics at the individual level (Coulter et al., 2013; King, 2012). The life-course approach offers a different perspective to examining migration by focusing on events, rather than simply comparing residential locations between two time points, which is the typical practice of identifying migration information from censuses or other national-level surveys. The increasing importance of the sequential pattern in the internal migration profile in many countries (Bernard, 2017a; Cattaneo & Robinson, 2020) also implies the significance of understanding the migration dynamics from a life-course perspective.

Existing studies on migration have explored an extensive range of underlying dimensions of migration dynamics, including characteristics, determining factors, spatial patterns, and implications. Moreover, education-related migration has been gaining increasing attention in recent years. Tertiary student and graduate migration have been studied extensively – mainly in developed countries – for the purpose of understanding their consequences on human capital production and regional development (e.g., Crescenzi et al., 2017; Eacott & Sonn, 2006; Fafchamps & Shilpi, 2013; Liu et al., 2017; Venhorst, 2013; Wilson, 2015; Winters, 2011a, 2011b). Again, regional dynamics and socio-economic contexts play important roles in differentiating the outcomes of this highly-skilled migration.

This chapter synthesises key theories and empirical findings on migration dynamics in order to understand the existing studies relevant to the issues of migration, education, and human capital development. Although some theories on migration discussed in this chapter were developed for international migration context, the discussions attempt to review the concepts that fit the context of internal migration, particularly long-distance residential mobility. The review also incorporates a thorough discussion on the impact of migration on human capital development at the regional level. Migration can have a considerable effect on the redistribution and reproduction of human capital and, in turn, affect regional and national development. The following section discusses the major theories on migration that focus on its spatial pattern, as well as initiation and continuation of the migration trajectory. Further, this

chapter explores the critical role of the life-course approach in migration studies and the application of this perspective in previous research. The following discussion outlines the diverse relationships between human capital, education, and migration in different contexts. The last section presents the research framework that is developed for this study.

2.2 Major Theories on Migration

Due to its complex and diverse nature, migration scholars have agreed that it is impossible to formulate migration dynamics into a single theory (Brettell & Hollifield, 2015; King, 2012). Migration has been discussed from various approaches, and previous studies have analysed diverse dimensions of the migration dynamics, including its spatial patterns, and initiation and continuation of migration trajectories.

One of the earliest studies on migration patterns is the laws of migration by Ravenstein (1885, 1889). His hypotheses on migration indicates the importance of economic development as the primary determinant of interregional migration. His research came up with several general patterns of migration flows, including:

1. Most migrants move over a short distance, mainly to centres of commerce and industry.
2. Regions experienced migration differently in terms of their extent and direction. Some areas manage to retain most of their natives as well as absorbing population from other regions, while other areas encounter shortfalls due to their population's dispersion.
3. Migrants from rural areas are progressively flocking into regions with more rapid development.
4. Each migration flow generates a counter-flow, but the intensity of the latter might be varied, and it is not necessary to counterbalance the former flow.
5. Females predominate migration flows, particularly short-distance mobility.
6. While other factors are also found as migration motives, economic factors are the main driving force of population mobility.

Ravenstein's laws have been a critical foundation for future migration research and theorisation since they illustrate the major forms of population movement until today. The theory prefigured the importance of population size and distance in examining the spatial pattern of migration and highlighted the main form of spatial movement within a country, i.e., rural–urban migration. Additionally, the theory has foretold the close association between migration and development, migration trajectories through return moves, the gender aspect of migration, and the major migration motive.

Lee's (1966) theory of migration expanded Ravenstein's hypotheses on the migration dynamics by combining the factors of rural–urban structures and regional development inequality with rational choice theory in learning about migration behaviour. It is suggested that migration is influenced by several main factors, including factors associated with origin and destination areas. While factors related to areas of origin generally result from an unhurried and thorough assessment of positive or negative factors due to the long period of settlement in home regions, factors associated with areas of destination are related to perceived situations in particular regions based on information obtained through the prospective migrants' social networks. However, migration decisions do not simply result from calculating positive and negative factors in the areas of origin and destination by the prospective migrants. The fact that only a portion of the population migrates, while factors in the area of origin and destination should apply equally to all people in an area, shows the critical role of other factors in the migration decision, namely intervening obstacles and personal factors. Intervening obstacles, also known as natural barriers, will always be present in migration decisions and vary from distance, physical barriers, rules and regulations to the cost of migration. Also, personal factors, such as individual personality and attitudes and life-course stages, have essential roles in the migration decision. Some people may be resistant to changes in their living environments, while others actively look for opportunities to live in new places. Regarding the life-course phase, families with school-age children are more likely to consider the provision of education facilities an important factor when making migration decisions. At the same time, for unmarried individuals, the availability of employment opportunities could be the most crucial consideration.

Another major theory on migration patterns is the mobility transition hypothesis by Zelinsky (1971). Based on historical migration patterns in European countries, this theory highlighted the regularity of mobility patterns as an integral component of modernisation process. The transitions are categorised into five stages, namely:

1. Pre-modern traditional society: limited residential migration and circulatory moves attributed to social visits, trading activities, or religious practices.
2. Early transitional society: mass rural–urban migration, significant growth of emigration to a foreign destination and local circulatory moves.
3. Late transitional society: less flows of rural–urban migration and emigration, circular moves are prominent.

4. Advanced society: significant decrease of rural-urban migration, growth of inter-urban migration, increasing flow of migration of low-skilled workers from less developed areas and international migration of highly skilled individuals.
5. Future super-advanced society: declining level of migration due to better communication and delivery systems, inter-urban and intra-urban moves represent major residential migration patterns.

Zelinsky's theory integrated various forms of population mobility into a single framework and highlighted how regional development influences migration. The hypothesis also prefigured the critical role of advanced technology and means of communication in migration systems. In his later study, Zelinsky (1983) suggested that integrating modernisation concepts into this hypothesis might be irrelevant to the situation in less developed countries. This is because government interventions and labour markets heavily regulate migration patterns in such countries. Although Zelinsky's theory had attempted to bring migration into a similar framework as other demographic variables (fertility and mortality), this approach missed the crucial role of governmental policies in managing the volume and direction of migration that could result in the reversal or stagnation of transitional processes (Skeldon, 2019). Similarly, this framework had predicted some critical aspects of population mobility nowadays, but did not foresee contemporary urban development that highly influenced by spatial movements of low-income and less skilled workers (Cooke et al., 2018).

Exploration of migration drivers has also been the prominent topic in migration-related studies. The neo-classical model described in Massey et al. (1993) is one of the primary references which highlights the inequality of the spatial distribution of the labour market as a trigger for migration. Regions with low capital and a large labour supply would have low wages, while areas with highly intensive capital and labour shortages would offer high wages. Migration is understood to result from the unequal spatial distribution of labour and wage discrepancies between these regions. Alongside this assumption, at the individual level, migrants are assumed to be rational individuals who make decisions to move after deliberating about the potential costs and benefits of migrating, especially additional costs they have to incur to increase their resource capacity (Todaro, 1976). Potential migrants are presumed to estimate the financial and non-financial costs and benefits of moving to various locations. They eventually migrate to a region where the expected net returns to their migration is the highest. Further, Piore (1979) proposed a dual labour market theory that explains how migration dynamics attributed to the characteristics of advanced industrial economies. Rather than being

influenced by low wages and high levels of unemployment in areas of origin, the cause of migration is more likely related to high demand for migrant workers in destination areas. The need for migrant workers, particularly in labour-intensive sectors and low-skilled jobs, emerges due to the dualism of labour market mechanisms. Local workers mainly occupy skilled formal job opportunities and leave low-status unskilled jobs vacant. This situation creates demand for migrants to fill the shortfall within unfavourable, less stable, and low wage working opportunities. However, these theories fail to explain why only a small proportion of the population decides to migrate due to economic inequality between regions (Arango, 2004). Also, it cannot clarify why some regions have high out-migration rates while other regions with similar economic structures do not experience a similar situation.

The theory of new economics of migration has emerged to challenge the assumptions in the neo-classical model (Stark, 1991; Stark & Bloom, 1985). Instead of being an individual decision, migration is assumed to be a joint decision made within a larger unit of people, such as households and communities. Additionally, the rationality of the migration decision is not solely related to wage problems and income maximisation but also attributed to the diversification of income, improvement of the social status of migrants and their family members, as well as efforts to reduce the risk of household economic activity (Massey, 2015; Massey et al., 1993; Stark & Bloom, 1985). Individuals' social networks, such as non-resident family members, have also been the primary consideration for migration decision. The presence of family members in other areas can increase one's propensity to conduct family-related migration (Gillespie & Mulder, 2020).

Migration often leads to more migration. Thus, several critical studies on migration have also discussed the topic of migration continuation. Massey et al. (1993) pointed out the importance of migrant networks in facilitating subsequent migration. Migrant networks cover personal ties through kinship, friendship, or cultural bonds that connect migrants, former migrants, and stayers in origin and destination areas. These networks can work as social capital that can help migrants have easier access to resources and opportunities as well as decrease the economic and social costs of migration. Thus, the formation of migrants' social networks in a region plays an essential role in encouraging follow-up migration. The networks can offer support for prospective migrants to ease their adaptation in destination areas, such as arranging lodging and financial assistance and providing direct access to labour markets. Also, since migration induces changes in migrants' personal circumstances as well as their socio-economic status, this situation can cumulatively cause further impact on socio-economic processes at

meso- and macro-levels and facilitate subsequent migration. The continuality of migration, then, is highly influenced by changes in the expansion of migration networks, the distribution of income, land, and human capital, the organisational structure of economic activities, and the emergence of culture of migration (Massey et al., 1993).

Within the framework of neoclassical theory, however, subsequent migration to areas of origin or return migration is never considered. This is because migration decision is understood as a result of deliberate calculation of its costs and benefits. Therefore, migrants are expected to gain maximum benefits of their earnings and living experiences in their areas of destination and stay there permanently. When return migration occurs, it would only be conducted by migrants who have failed and miscalculated their migration expectations and expected earnings. This assumption is in line with DaVanzo (1983) who suggested that return migration is generally considered as a corrective move following failed initial migration. Additionally, prior migration due to unemployment in origin areas is more likely to be followed by return migration. The choice to return to previous regions of residence can be influenced by location-specific capital such as home ownership and social networks (DaVanzo, 1981), or the need for support from non-resident family members (Mulder, 2018). However, return migration can also be viewed as a calculated strategy within the framework of the new economics of labour migration theory (Cassarino, 2004). In this approach, return migrants are recognised as individuals who chose to return home after successfully achieving their migration goals. Their return migration can be a planned strategy after study completion or capital accumulation (Constant, 2019; Mulder et al., 2020; Sage et al., 2013).

Examining migration continuation should take notice that migration process could be reconfigured several times over the individual's life course (King, 2012). Also, the dynamics of migration processes are not linear or unidirectional. As suggested by Mabogunje (1970), the dynamics of the processes are influenced by five main aspects, namely:

1. The migrants: the actors who conducted spatial movement(s) within the system.
2. Environmental setting: stimulants for migration, ranging from economic conditions, social welfare development, and government policies, to technological advancements.
3. Control subsystems: various institutions that determine when and how migration flows occur, such as family, community, residential settings, employment agencies.
4. Adjustment mechanisms: a series of social, economic, and other relationships that sets migration dynamics.

5. Feedback channels: further response behaviour to the stimuli from the environmental setting and other components in migration.

The exploration of various components within migration process should offer a better comprehension of the dynamics of migration processes. However, the conventional theories of migration typically assume the uniformity of sets of macro and micro causal factors and similarity across societies (de Haas, 2021). Thus, the existing studies may ignore the dynamics of migration processes and the complexity of migration trajectories.

2.3 Life-Course Transitions and Migration

Although the conventional theories of migration have explored various aspects of this population phenomenon, many studies view migration as a one-off event that ends in settlement in destination areas. However, Ravenstein (1885, 1889) had indicated that the migration trajectories might incorporate several stages in individuals' lifetime. Rather than move directly from a rural village to a metropolitan area, an individual's history of migration generally starts with a move from a village to a nearby small town, followed by another move to a larger town, and ending up living permanently in big cities. Further, Flöthmann (1993) and Halfacree and Boyle (1993) have drawn attention to the importance of the conceptualisation of migration situated within individuals' biographies. The examination of migration should focus on how it is shaped and influenced by ongoing events in people's lives, as well as on various contextual changes and processes that influence its decisions (Coulter et al., 2013; King, 2012).

Various life events can change individuals' evaluations regarding their life aspirations and living environment. The evaluations are used to inform decisions regarding migration (Findlay et al., 2015; Kley & Mulder, 2010). Additionally, decisions to migrate are generally taken with consideration of social aspects, social networks, and individual preferences, as well as situations of work, family welfare, and housing availability. Moreover, examination of the interrelation between migration and life-course transitions shows the sequencing of moves alongside other life events (Aybek, 2011). Thus, Findlay et al. (2015) argued that a life-course approach has been able to consider the complex nature of individuals' migration in their lives, such as repeat relocations between parental home, place of study, and regions of employment (Findlay et al., 2015).

Elder (1994) identified four main themes within the life-course framework, i.e., the interplay between historical times, timing of lives, linked lives, and human agency. Historical

times refer to variations in individuals' exposure to historical changes as well as social constraints and options attributed to differences in their birth cohorts. Further, timing of lives refers to sequences of roles as well as social norms and beliefs toward particular life stages based on the ages of individuals. Linked lives can be understood as the interdependent lives of individuals due to their embeddedness in social relationships with their surroundings, whereas human agency refers to the selectivity of individual characteristics within the broader social context. The concept of linked lives has been the central notion of the life-course approach. The principle of linked lives enables variations in individual trajectories to be explained by pointing out that life-course transitions are shaped by particular institutional and social settings (Windzio, 2011). For investigating migration dynamics, Findlay et al. (2015) emphasised the importance of changing perspectives from cross-sectional analysis at an individual level to longitudinal analysis of linked lives. Within the context of migration, linked lives refer to how population mobility covers various relations over time and space between groups of people in a union, between movers and stayers, and between movers and the institutions to which they are linked.

Findlay et al. (2015) suggested that application of the life-course framework in migration studies allows the exploration of several critical research questions, such as (i) to what extent do variations in life-course influence the timing and frequency of population mobility; (ii) to what extent do explorations of linked lives bring about a more nuanced understanding of the motives and implications of migration; (iii) to what extent do the roles of structural processes in distinctive periods shape the migration behaviour of individuals during their lifetime; and (iv) to what extent do the changing natures of time and space attributed to migration flows result in the emergence of new mobility patterns? Moreover, Coulter et al. (2013) pointed out three critical aspects of applying the life-course approach to migration studies. First, this approach recognises the diversity of life trajectories within structural contexts over space and time. Population mobility has been an integral part of individuals' life pathways, e.g., education, employment, and family trajectories. Hence, the life-course approach is helpful in understanding the diversity in the occurrence, timing, and sequencing of life events, including migration. Second, the life-course perspective points out that migration behaviours are fundamentally relational. People are linked together across time and space, and their choices in life-course pathways are entangled with those of other people in their surroundings. Lastly, the life-course approach views migration as part of individuals' biographies. By positioning migration within individuals' biographies, their migration events

and spatial transitions during a lifetime can be explored within the long-term trajectory, including past experiences and future aspirations.

Individuals' life careers – which are accompanied by changes in their preferences, resources and constraints – can influence the migration dynamics. The life-course approach can explain the contextual background of the life events that prompted individuals' decision to migrate, alongside other domains of their life careers, i.e., family, housing, education, and occupation (Mulder, 1993). Horowitz and Entwisle (2021) found that school graduation, employment events, marriage, and separation significantly increased the probability of migration. Therefore, migration analysis within a life-course framework provides a basis for thorough examinations of the interactions and relationships embodied and generated during migration, as well as contexts of migration strategies and decisions (Jasso, 2003).

Various factors throughout life-course transitions potentially increase or diminish individuals' propensity to experience migration, and these factors are not necessarily isolated from each other (Schittenhelm, 2011). Life-course transitions could imply changing influence of macro-level constraints and opportunities, and individuals' preferences and characteristics over time, and such a situation influences the dynamics of specific migration types (Mulder, 1993). For example, variations in educational attainment result in working opportunities at different stages of individuals' life courses. Also, females move more often than males in their earlier years of young adulthood. The differences on their migration behaviour are mainly attributed higher prevalent for migration due to family formation for young females (Mulder, 1993). For the workforce, their occupational trajectories implicate their entry to the labour market and incorporate their efforts to gain adequate employment and pursue a successful working career (Kogan et al., 2011).

The influence of life-course transitions on migration dynamics can be observed in diverse settings. For example, various critical life-course events occur within aged 15 to 29 years, such as leaving the parental home, family formation and childbearing, and entering the labour market, were attributed to a high level of age-specific migration rates of this age group toward large urban area in the U.S (Plane et al., 2005). Some young people who migrated to attend universities initially move to small cities where many tertiary institutions are found, but they tend to have subsequent migration to larger cities. Moreover, those aged 30 to 39 years demonstrated a strong likelihood of moving out of metropolitan cities. They prefer to reside in less populated areas during their mid-career and childrearing years (Plane et al., 2005). Another

study in the Netherlands (de Valk, 2011) pointed out how young adults' life-course transition of leaving the parental home may shape various migration patterns, namely:

1. Delayed independence: those who have no youth migration experience since they do not leave their parental home, do not cohabitate, or enter a marriage by the age of 25 years.
2. Prolonged individuals: those who have earlier migration and live by themselves for a considerable period before having family-related life transitions.
3. Condensed transitions: those who experience transitions between two life-course events, i.e., migration and family formation in a quite short period (less than two years)
4. Coinciding transitions: those who directly enter a marriage union after migrating,
5. Early family life: those who migrate before 18 years old and start to form family before the age of 21 years.

It can be said that in developed Western world, leaving parental home has been a critical marker of life-course transitions, particularly first adult migration. However, Bernard et al. (2016) argued that countries with similar socio-economic structures might also encounter different effects of life-course transitions on migration among young adults. In Great Britain and Australia which have similar level of socio-economic development, different age patterns of entering higher education and the labour market result in distinctive internal migration patterns between the countries. In Great Britain, transitions to higher education, the labour market, and household union strongly increased the propensity of young adult migration. Strong links between migration and other life-course transitions are shown in the age profile of migration in the country, where they peaked in the early twenties, the age span when the transitions are also concentrated. On the other side, the age profile of migration in Australia shows a widely dispersed pattern that reflect the limited effect of life-course transitions on internal migration in this country.

Several studies have found that migration driven by marriage or cohabitation had been the main feature of interregional flows at earlier ages of young adulthood (Bernard et al., 2016; de Valk, 2011; Mulder, 1993). However, the level of this type of migration at younger age decreased significantly in later years (Mulder, 1993). The effect of individualisation tendencies over the years, which affected postponement of the family union until later ages, is argued to be the main explanation for this phenomenon. Also, the rising of emancipation values that accompanied with the increasing phenomenon of two-earner couples has also led to reduced migration propensity of young females, particularly for long-distance moves. On the other side, changes in educational participation have significantly affected the rising level of education-

driven migration at 18 to 22 years. Additionally, migration triggered by working careers in the early 20s decreased around the mid-1980s. The high level of youth employment and low job mobility during that time is suggested to be the contextual background for this trend. Alternatively, Vidal and Lutz (2018) suggested that migrants and stayers experienced distinctive labour market trajectories. Stayers were more likely to have earlier entry to the workforce, while migrants exhibited longer time spent in education careers, hence delayed entry into the labour market. The influence of life-course transitions on migration might also result in unplanned or untended mobility (Clark, 2016). Individuals might experience destabilising life events, such as job loss, family dissolution, or housing loss, and this situation puts them in a disadvantaged situation and drives migration decisions. Those with low income and less-educated individuals, particularly, are suggested to have the highest likelihood of conducting unexpected moves to other regions due to their vulnerable condition.

In rural context, various life courses are also recognised as triggers for migration dynamics from and to these regions (Ní Laoire & Stockdale, 2016; Stockdale & Catney, 2014). Not only can they reinforce interregional inequalities, but rural in- and out-migration patterns at different life-course stages can also prompt challenges in rural development, particularly regarding ageing problems, local service provision, gender and age structure imbalance, as well as social cohesion in the community (Ní Laoire & Stockdale, 2016). However, Stockdale and Catney (2014) found a higher likelihood of urban-rural migration by young adults in their 20s and 30s at their household formation life stage compared to older age groups. The settlement of young migrant families in rural regions is attributed to the culture of migration and rural planning policy. While Kley (2011) explained that migration is mainly driven by perceived opportunity differentials between areas of origin and other regions, variations in life-course stages influence individuals' decisions to migrate. For young adults, better opportunities for pursuing personal interests may significantly shape their migration intentions. In contrast, those with spouses and children put more consideration into opportunities for family life while considering and planning migration. Further, perceived better opportunities for career advancement elsewhere trigger migration in all life-course stages. Additionally, the migration plans of those aged 30 years and above generally consider the stability of both job and family careers.

At individual level, socio-demographic characteristics play critical roles on individuals' migration trajectories. For example, sequential migration by highly educated people is attributed to their earlier decision to pursue further study (Faggian et al., 2007a; Plane et al.,

2005). Also, Kõu et al. (2015) found that parallel advancements in life-course trajectories, i.e., migration, education, employment, and family careers, are more apparent among male migrants. In contrast, these life-course transitions are more likely to be separate events for female migrants. Moreover, Coulter and Ham (2013) found a considerable share of migrants who expressed the failure of their initial migration decisions in meeting their earlier expectations. Some of them desired to conduct subsequent move immediately after their initial migration, while others showed an intention to stay. The propensity of migrating again was higher for females, single people, and those with volatile income. At the same time, the probability of staying was higher for those who entered a family union and exited homeownership. Further, patterns of circular moves can also be observed among older migrants, those without children, and low-income individuals. Meanwhile, older people and those with more stable life-course transitions have less propensity to be highly mobile migrants who move across regions at least four times within a certain period. Findings from various studies have implied that diverse structural settings influenced migration decisions over time. The structural contexts underlying migration dynamics can be varied, including education systems, labour market opportunities, and human capital investment.

2.4 Human Capital, Education, and Migration

Migration implies the interregional transfer of human capital embedded within migrants. Human capital can be defined as the knowledge, skills, and characteristics of individuals accumulated throughout their lives to enhance their productivity (OECD, 2001). Human capital manifests in various forms, including educational attainment, on-the-job training, working experience, natural talent, attitudes, and work ethics. From the macro-level perspective, human capital is considered a crucial factor in regional development. Since migration is mainly driven by inequality of opportunity distribution across regions, the presence of migrants increases the potential to improve human capital accumulation and economic development across regions (UNDP, 2009). However, the nature and extent of the effects of migration on human capital development are heavily subject to the characteristics of the migrants, their productivity in areas of destination, and their interactions with native communities. Thus, the ability of a region to attract and retain population with high human capital or highly educated population is critical.

Human capital aspects of migration are rarely discussed within the internal migration context, due to the assumption that this type of population movement only relocates human

capital within countries and would not affect human capital accumulation at the national level. Suzuki and Suzuki (2016) argued that internal migration also plays a critical role in the reproduction of human capital in both origin and destination areas. For example, migration within countries can work either as incentive or disincentive to educational attainment, not only for migrants but also for stayers. In addition, Kooiman et al. (2018) have shown that internal migration plays a critical role in redistributing human capital within a country. Moreover, Harttgen and Klasen (2009) found substantial variations of human capital between migrants and stayers within countries in 16 low- and middle-income countries. In general, migrants have a significantly higher human development index than non-migrant populations. Large differences in human development are mainly shown by the substantial gap in GDP and education indexes between these two population sub-groups. However, it is also emphasised that the improvement in return to migration could not be made without the accompaniment of other monetary (e.g., expenses for lodging and transportation) and non-monetary investments (e.g., education and working experiences).

The outcomes of human capital development through migration are greatly influenced by the contextual settings of the spatial movements (UNDP, 2009). From the perspective of destination areas, human capital accumulation acquired from in-migration improves regional competitiveness in knowledge-based economic activities (Florida et al., 2008; Whisler et al., 2008). The presence of educated migrants, in particular, increases regions' share of persons with high educational degrees. This situation simultaneously accelerates growth through the development of social services and public amenities, the upsurge in sources of tax, and protection against economic vulnerability (Corcoran et al., 2010; Goujon & Samir, 2008; Ishitani, 2011; World Bank, 2008a). Ciriaci (2009) and McKenzie (2009) also highlighted the intangible gains of highly educated migration, such as enhancing social capital and knowledge creation for local communities. However, highly educated in-migration can also have negative consequences. The accumulation of highly skilled in-migrants might result in abundant labour stocks. This situation can trigger inflation due to the limited supply of goods and wage deflation (Faggian et al., 2017). Also, the presence of migrants from diverse backgrounds might bring about social segregation in destination areas due to their cultural and social differences from the native population (Faggian et al., 2017; Malamassam et al., 2021).

Areas of origin gain from highly skilled out-migration by indirectly encouraging local communities to invest in higher education (Faggian et al., 2017). Highly educated migration also created more extensive social networks of local communities that allow greater scope of

trade, capital flows and knowledge diffusion. However, the loss of human capital with high educational qualifications can delay development in origin areas (Docquier et al., 2007). As a result of losing highly educated young natives, origin areas may experience endangerment in the local development of health, education, welfare services, and public amenities as well as hindered advancement of the wellbeing and quality of life (Drozdzewski, 2008; Faggian et al., 2017; Winters, 2011b).

For the overall national economic system, Faggian et al. (2017) pointed out that skilled migration leads to wider gaps between interregional unemployment and wages. The concentration of workers with a high level of human capital in big cities and metropolitan areas results in the clustering of skilled labour. This situation is argued to be a strong attractor for the in-migration of other highly skilled individuals in such areas (World Bank, 2009). Similarly, in their study on labour migration and human capital agglomeration in China, Fu and Gabriel (2012) emphasised that human capital concentration has been an important factor in explaining the choice of migration destination by skilled migrants. This situation results in greater interregional inequality of human capital distribution within a country. However, skilled migration can also lead to convergence of regional development if the spatial movement of highly educated individuals works as an incentive for the young stayers to pursuing further education in areas of origin (Faggian et al., 2017).

The dynamics of migration trajectories have also been a critical aspect in human capital development. The level and patterns of migration trajectories can impact human capital circulation across regions (Constant & Zimmermann, 2011). For migrants, the direction of their subsequent migration can affect the returns to their prior human capital investment (Knapp et al., 2013). Moving back to previous regions could be associated with a penalty in returns to human capital. In contrast, those who move to new regions benefit from improved returns to their education and migration. Moreover, Faggian et al. (2007a) also argued that human capital acquisition through migration might lead to sequential migration. The initial move has enabled migrants to improve their skills and knowledge, resulting in a greater ability to access opportunities in various locations. Hence, the redistribution of human capital through repeat migration can also shape labour market sorting and economic performance across regions.

Migrants can obtain better human capital outcomes when they are able to access opportunities in destination areas in the form of higher incomes, better access to public facilities, and secure prospects for their future living. Nonetheless, their access to opportunities is greatly affected by their embedded capital, such as education background. Therefore,

education has been a prominent feature in several major theories of migration. Pre- and post-migration education has also been discussed as an essential part of human capital development. Benneworth and Herbst (2015) pointed out that human capital development is not only reflected in existing regional economic structures and hierarchies but also in regions' ability to provide means for human capital accumulation, such as education opportunities. Thus, the presence of educational institutions is critical in shaping local development prospects and raising concerns about interregional brain drain.

In one of the earliest studies on migration, Shryock and Nam (1965) observed the relationship between education and internal migration flows. Regions that were highly selective toward tertiary-educated in-migrants had a higher tendency to also send highly educated out-migrants. Likewise, regions that show low levels of educational selectivity in their in-migration flows also tend to exhibit low levels of educational outcomes among their native populations. Long (1973) further explained that, compared to other socio-demographic characteristics such as age and occupational characteristics, education is a stronger predictor of migration behaviour. The significance of education selectivity toward migration is mainly observed in long-distance moves. The likelihood of those who attended graduate school living in more than two states during their lifetime was three times higher compared to their lower-educated peers. Moreover, Gould (1982) found that education- and migration-related decisions can influence each other and strengthen their impact on each other. Since there are various mechanisms for how education and migration affect each other, it is critical to understand the complex relationships between these two domains at various spatial scales (Bernard & Bell, 2018).

Both migration and education can be considered channels for upward socio-economic mobility (Rao, 2010). Migration brings out opportunities to experience new life and culture, gain skills, and earn money, while educational attainment enables individuals to have more opportunities to access secure and better-paid jobs. Gould (1982) highlighted some important features within the context of the interaction between education and migration, i.e., (i) the effect of education on migration remains highly significant alongside the standardisation of other individual characteristics; (ii) the relationship between education and migration is generally positive, but the relation might also show a J-shaped curve in particular contexts that indicated higher migration propensities for school leavers; (iii) the education backgrounds of rural–urban and rural–rural migrants would not be similar; and (iv) the educational selectivity of migration can vary considerably across regions and over time. Despite the existing studies on the

relationship between migration and education, it relatively less remains known about the extent to which variations in education background drive and are driven by different types of migration (Gamlen et al., 2017). Variations in the degree of educational selectivity on migration imply the importance of national and local contexts in understanding the effect of education and migration on each other (Bernard & Bell, 2018). Also, the distinctive effects of factors related to migration decisions, such as economic returns to migration, income differentials, and the structure of labour markets, play a critical role in how education background drives internal migration (Bernard & Bell, 2018).

A study by Ginsburg et al. (2016) revealed substantial variations in the linkage between education and migration across African countries. In countries in which the labour markets are mainly driven by informal sectors, negative educational selectivity on migration is significantly evident. In this case, less-educated individuals are more prone to move due to unskilled employment opportunities elsewhere. On the other hand, highly educated migrants choose to remain in their origin areas because of a lack of preferable incentives to move to other regions. The implication of migration by low-educated individuals is adverse outcomes in human capital accumulation. These migrants mainly come from semi-urban and rural areas and are employed in secondary jobs, often as a part of businesses of their origin communities (Semela & Cochrane, 2019). In contrast, positive educational selectivity is shown in migration flows across regions primarily driven by the development of the formal working sector (Ginsburg et al., 2016). Here, human capital is accumulated in urban areas that provide a wide range of working opportunities for skilled labour. Moreover, the development of rural education systems accompanied by labour opportunities that combine both skilled and unskilled employment might draw out the education selection effects on migration (Ginsburg et al., 2016). This situation can be seen in the decreasing likelihood of migration for females along with their increasing educational attainment (Williams, 2009).

The self-selective nature of migration leads to a tendency for more migration by those with a higher-educated background (UNDP, 2009). A study by Bernard and Bell (2018) in 56 countries exhibited the universal regularity of education as a trigger for internal migration. In most countries observed, secondary and tertiary education significantly raises the propensity to migrate. Gamlen et al. (2017) argued that those with a higher level of educational attainment are entitled to a greater range of opportunities and incentives to move. Migration propensity increases along with the rise of educational attainment, but the addition of schooling years, per se, does not directly affect the decision to migrate (Gould, 1982). The knowledge and skills

acquired during schooling years enable highly educated individuals to access better opportunities elsewhere and have more capability to overcome migration obstacles (Gamlen et al., 2017; Gould, 1982). Additionally, education provides capabilities and access to information for potential migrants to make a cost-benefit analysis of moving decisions and to gain a higher return on their migration (Gamlen et al., 2017). The strong positive selectivity between migration and education results in the disproportionate distribution of migrants' characteristics that are more likely to have better access to education. However, McHenry (2013) argued that longer years spent in the schooling system in areas of origin lead to less effect of education on migration. The completion of education trajectories in hometowns provides location-specific capital and stability while transitioning to employment trajectories. This situation also results in a higher opportunity cost of migrating and living elsewhere.

Educational attainment may also be facilitated by migration. This mechanism is manifested in the spatial movement of the young population to pursue higher education. Limited education facilities in many rural areas in less developed countries works to motivate out-migration to pursue further education for many young adults (UNDP, 2009). Thus, migration can facilitate education since it gives access to diverse educational opportunities, not only to a greater number of accessible schooling institutions but also to new cultures and values (Gamlen et al., 2017). Migration can also increase demand for further education when this spatial movement is able to bring higher returns (Gould, 1982).

Student migration has been a common practice by some youths as a typical response to the lack of accessibility to high-quality local schools at the higher education level (Crivello, 2011; Eacott & Sonn, 2006). This type of migration is also considered as an effort to fulfil their personal aspirations to have broader knowledge and better life opportunities (Gabriel, 2006; Raghuram, 2013). While pursuing further education might not be the major driver of internal migration across all ages, education-driven migration has a notable impact on migration systems due to its high concentration in particular age range and regional interactions (Wilson, 2015). Spatial flows of tertiary students have been a critical part of the high intensity of internal migration at ages 18 and 19 years. This age pattern indicates that student migration is a major feature of in-migration flows in capital cities where higher education institutions are concentrated. However, student out-migration is prominent in both big and small cities. This situation implies that student migration is not only triggered by the limited provision of education institutions but also influenced by choice of study field and academic ability.

Student migration is a complex process that incorporates not only individual consideration but also family and community influence as well as regional situations (Drozdzewski, 2008). Within the framework of new economics of migration theory, the exploration of this type of migration should be placed in a wider societal context and should be understood as a family and household decision to improve livelihoods (de Haas, 2010). In terms of life-course transitions, migrating to pursue tertiary education is a crucial life-course phase that can have a significant role in students' prospective migration behaviour. However, not every young person decides to migrate to study elsewhere. Migration for educational purposes would be more likely done by those with remarkable achievement in previous educational studies, better economic backgrounds to support their study costs, and extended social networks (Eacott & Sonn, 2006; Elder et al., 1996). Moreover, Eacott and Sonn (2006) suggested that the countryside, less developed districts, and small cities would suffer from education-driven migration due to their failure to meet the education aspirations of some young people. Also, large cities have become the primary destination of migration for education since they offer various educational facilities and employment opportunities (Fafchamps & Shilpi, 2013). Young migrants would consider their future career prospects while choosing regions for their further study. Thus, the choice of areas of destination by student migrants not only indicates their appraisal of regions with better education facilities but may also disclose their residence preferences after they finish their studies (Ciriaci, 2009).

The influence of the local community also plays essential part in student migration. Eacott and Sonn (2006) and Drozdzewski (2008) found that stereotypes built by the youths' surrounding remarkably influence their decision to move out of their hometown. In addition, Easthope and Gabriel (2008) argued that some communities with strong migration culture view migration as a 'rite of passage' and a means to gain upward social mobility. Some of student migrants believe that migration is the primary tool for fulfilling their needs for independence (Eacott & Sonn, 2006). Further, Elder et al. (1996) and Gabriel (2006) argued that the more attached young individuals are to their communities of origin, the less propensity they have to migrate. If they aim to pursue higher education opportunities amidst the limited education facilities in their hometowns, moving to nearby regions can be a strategy to maintain social ties to their communities of origin. Similarly, Fafchamps and Shilpi (2013) suggested that most youth migrants prefer to move to nearby, more developed regions. These migration arrangements enable them to go home periodically and easily keep in touch with their original surroundings. Also, moving to nearby regions has been preferred by student migrants due to

the similarity of the living environment with their hometowns (Magnan et al., 2007; Venhorst, 2013).

After completing their degree, tertiary-educated individuals are highly likely to experience various stages of life-course transitions, including school-to-work transitions. These changes might intertwine with migration decisions. Migration by highly educated individuals can be seen as a manifestation of how education background works as a driver for migration. Crescenzi et al. (2017) suggested that the decision to migrate by tertiary degree holders is the meeting point of individual preferences and structural factors mediated by the existence of social networks. In the context of school-to-work transitions, highly educated migrants generally have a more extensive choice in the labour market and have a higher chance of repetitive inter-regional mobility. Thus, their transition to the labour market may only involve a one-stage transition of career entry or multi-stage transitions of trying out various career opportunities (Schittenhelm, 2011).

Migration of graduates is more likely to be geographically unbalanced because most of the migrants move toward regions with more highly skilled job opportunities, high wages, and promising upward social mobility (Liu et al., 2017; Venhorst, 2013). Higher wages, particularly, have been an important attractor for the graduates' choice of destination. However, Whisler et al. (2008) argued that there are distinctions in the spatial patterns of tertiary graduate migration by their demographic characteristics. Young graduates prefer to move to metropolitan areas, while married graduates choose to live in less dense regions. In addition, unmarried graduates tend to move away from regions with limited living amenities, whereas recent graduates are likely to avoid migrating to regions with high living costs. Also, female university graduates are found to have higher migration propensities than their male counterparts. For the highly educated females, migration is seen as an alternative to overcome gender differences in labour market access in their areas of origin (Faggian et al., 2007b).

Similar to student migration, some college graduates may consider regional familiarity when making migration decisions (Faggian et al., 2007a; Sage et al., 2013). Thus, former student migrants might choose to return to their previous residential areas. For them, family and sentimental ties have become the important drivers to move back (Crescenzi et al., 2017). However, areas of origin are less likely to gain back a large share of returning student migrants. Most migrants prefer to remain living in their regions of education or move to a new city (Winters, 2011a). In his study on subsequent migration preferences of university graduates from rural Switzerland, Rérat (2014) found that only a fourth of them returned to their

hometown, and the rest chose to remain living elsewhere. The observed migrants show homogeneity in their age range, level of education, and hometowns. Still, the distinctive patterns of subsequent moves indicate the importance of other determinants in their migration decisions. Young graduates' subsequent migration is not merely a result of education-job market mismatch, but it is an embedded part of their life-course stages. Their choice to return home heavily relies on their family backgrounds. Those who are starting a family have a higher likelihood of returning home. However, if the partner originated from other regions, the propensity decreases. Also, returning home is more likely conducted by those whose parents are natives in their hometown.

For educated individuals, the prospect of social mobility is also an important consideration when deciding on their subsequent residential regions. Fielding (1992) introduced the term 'escalator region' to describe regions that (i) have high attraction to pull educated young workers from various regions to enter the area; (ii) offer an accelerated increase in social mobility by providing particular working opportunities; and (iii) subsequently lose educated migrants who had succeeded in increasing social mobility due to their choice to migrate out of the region. While Fielding (1992) and Findlay et al. (2009) refer to large cities with high economic development conditions as generally acting as escalator regions, Martel et al. (2013) suggested that regions in borderlands or remote areas could also become escalator regions for educated migrants. The opportunity to work in these regions can also be seen as an escalator in their career development because they generally enjoy accelerated job promotion and better income when migrating to small areas, borderlands, or remote areas. The choice to move away from core economic regions to peripheral areas can also be triggered by more challenging and attractive job opportunities compared to big cities (Hansen & Aner, 2017). Those who chose to 'move backwards' have also emphasised other motivations for their residential preferences, such as better housing opportunities and desires for lifestyle changes.

The fluidity of these highly educated migrants was discussed later by Engbersen (2012) and Engbersen and Snel (2013). Highly educated migrants are suggested to have particular characteristics of unpredictable spatial patterns, flexible migration intentions, and temporary and repeat moves. Labelled as 'liquid migrants', the primary strategy of this type of spatial mobility is open for every opportunity in various regions. Since their moves are primarily temporary in nature, they are generally not officially registered in the population system at the destination of migration and might be not seen in population profiles (Engbersen & Snel, 2013). These educated migrants make temporary moves to accumulate capital, such as academic

ability or skills and variations in work experience, to enhance their capabilities. The high human capital will enable them to freely move to other areas that offer better economic opportunities. Further, the flow of liquid migrants also includes new geographical patterns of origin and destination areas. Spring et al. (2016) suggested that those in higher education categories are more likely to make long-distance moves. Similarly, Rosenbloom and Sundstrom (2004) argued that the role of rising educational attainment could explain an upward trend in long-distance migration.

The role of migration in human capital distribution can also be examined through the spatial pattern of education-specific flow across life-course transitions (Kooiman et al., 2018). Young individuals who are just starting their independent housing trajectories and continuing their education careers are highly likely to be concentrated in large cities and university regions (Ciriaci, 2009). Education-bound migrants with remarkable academic achievements paid more attention to the type of tertiary institutions, rather than the location of the universities, for their migration decisions (Faggian & Franklin, 2014). Thus, investment in enhancing the quality of local universities is considered a critical effort to mitigate interregional brain drain and reproduce human capital at a regional level. Further, initial entry into the workforce in the early and mid-twenties might shift the human capital concentration since some choose to move to core economic centres in the country. However, the higher the quality of a university in an area, the lower the likelihood of its graduates moving away from the study region. Other determinants such as income differentials, opportunities for young workers, quality of life, and socio-economic amenities are also considered critical factors in retaining these migrants. Moreover, once people reach their mid-thirties, patterns of suburbanisation of human capital can be observed. Peripheral regions might attract highly skilled individuals in the mid- or late stages of their working trajectories as they start to look for more affordable areas to live. Kooiman et al. (2018) also highlighted that career advancement has a more pronounced effect on migration trajectories by highly educated migrants, rather than simply pursuing higher wages than previous jobs.

2.5 Conceptual Framework

Major theories on migration have highlighted that migration is mainly driven by differentials in opportunities between origin and destination areas (Lee, 1966; Massey et al., 1993; Stark & Bloom, 1985; Todaro, 1976). Moreover, age and education selectivity are highlighted as the prominent determinants in migration dynamics (Bernard & Bell, 2018; Mulder, 1993; Plane et al., 2005). As migration signifies human capital transfer between regions, the selection of migration has a critical role in human capital redistribution within a country (Faggian et al., 2007a; Kooiman et al., 2018; Suzuki & Suzuki, 2016). Further, variations across population groups highlight the importance of examining this population phenomenon through macro- and micro approaches to provide comprehensive insights into the migration dynamics (Bernard et al., 2020; Billari, 2015; Coulter et al., 2013; Findlay et al., 2015).

Based on the theoretical works and existing empirical studies that have been elaborated in this chapter, Figure 2.1 presents the conceptual framework for this thesis. The contextual setting is noted as an important consideration while examining migration dynamics (Bernard et al., 2016; Bernard & Bell, 2018; Findlay et al., 2015; Kõu et al., 2015). Variations in demographic situations, socio-economic and cultural backgrounds, and levels of economic development shape relative opportunities across regions and work as push and pull factors within the migration system. Thus, an understanding of population and regional dynamics within the Indonesian context serves as a critical foundation in analysing the implications of migration on human capital development.

The analytical focus in this study is youth population – the group that dominates migration flows in Indonesia. Also, this study specifically examines long-distance migration within a country, namely interregional and inter-district mobility. Within the context of human capital development, long-distance migration of this population group holds a key role in human capital accumulation and redistribution across regions. Due to the selectivity of migration, exploration of variations in the youth migration dynamics attributed to educational attainment is critical to get better insight into the interrelationship between migration and human capital development (Bailey, 1993; Kanbur & Rapoport, 2005; Suzuki & Suzuki, 2016). Therefore, the analytical stage in this study emphasises the effects of educational differences in the migration dynamics.

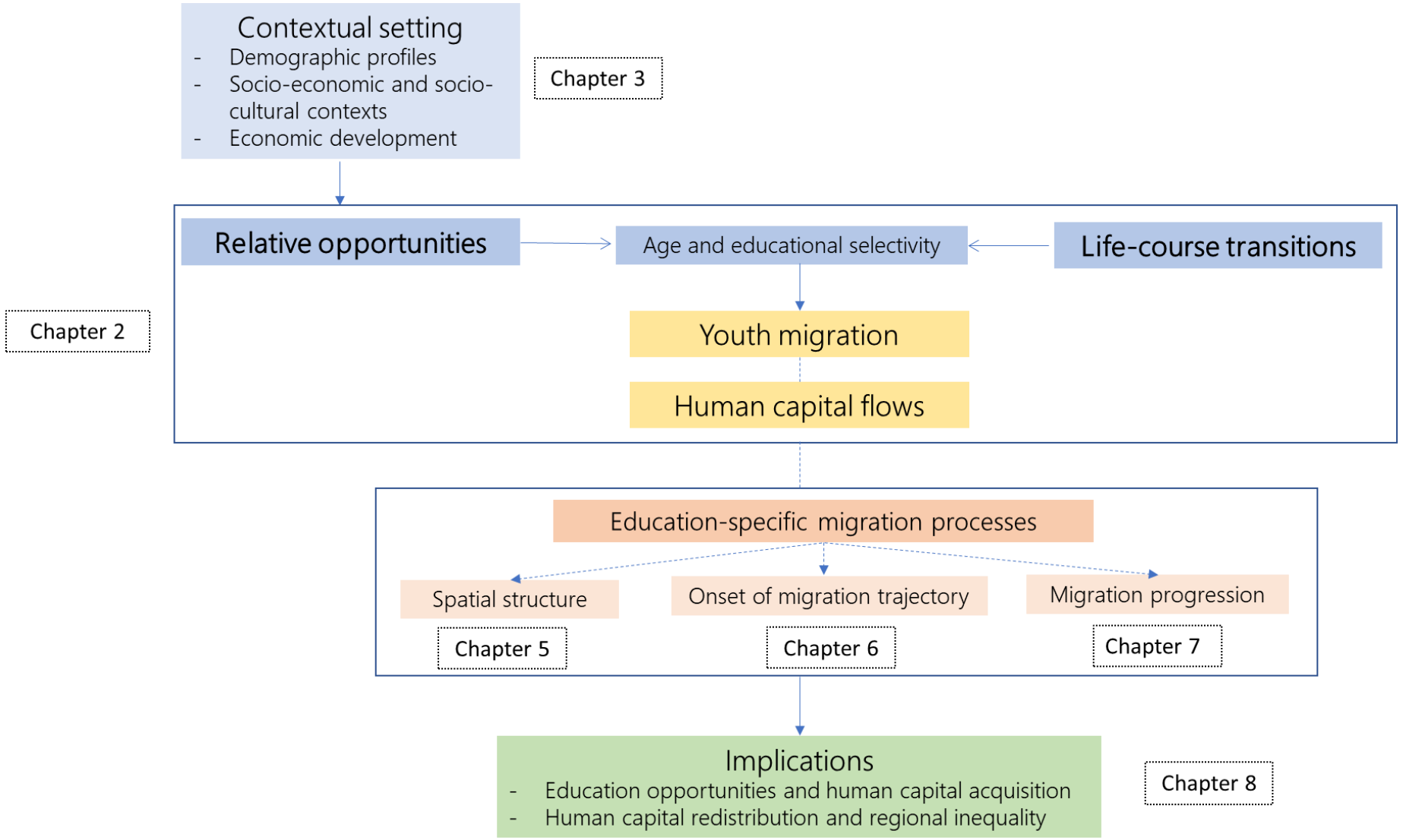

Figure 2.1 Research framework

While the migration dynamics entails various aspects, this study highlights its three main components, i.e., pattern, initiation, and continuation of migration. Patterns of youth migration are observed by examining its education-specific spatial structure. Understanding variations in origin–destination interactions within the youth migration system offers a comprehensive view of the spatial context of human capital flows within Indonesia. Also, the macro-level approach to exploring patterns of migration flow provides explanations of sub-national variations of relative opportunities related to human capital development.

This study also applies a micro-level approach in the examination of youth migration dynamics by exploring the initiation and continuation of the migration trajectory. This approach draws attention to the diversity of the occurrence, timing, and sequencing of migration events at the individual level (Coulter et al., 2013). This research argues that people with different education background are exposed to different patterns of life-course transitions, and this situation results in variation in their migration trajectories. The exploration of migration trajectories allows for a more nuanced understanding of the underlying contextual settings that have influenced the youth migration dynamics over time.

The onset of migration is studied by exploring the age at first migration during young adulthood. Understanding the age at first migration is important for insight into critical contextual factors that shape individuals' migration trajectory (Collinson, 2009). Variations in age at migration can also portray individuals' exposure to economic opportunities. Within the context of human capital development, the discussions of age at first migration can explain education needs, opportunities, and outcomes within a country (UNESCO, 2018).

The continuation of migration is examined by analysing migration trajectories during young adulthood. This study emphasises that the migration trajectories can vary from a one-time event to repeat moves over the life course. Various life-course events might trigger or inhibit repeat migration. Education trajectories, in particular, have been evidenced as an important determinant in various patterns of migration trajectories (Faggian et al., 2015; Kooiman et al., 2018). The exploration of education-specific migration trajectories highlights the crucial role of migration in the redistribution of human capital across regions and over time (Constant & Zimmermann, 2011). Knowledge of sequences of migration events can also explain different narratives of human capital investment and return to human capital across population groups.

As a multi-faceted process, each aspect of migration can provide different insights into the issue of human capital development. At the regional level, migration plays an important role in affecting human capital stock. Moreover, at the individual level, migration is seen as a strategy to accumulate human capital, as well as an investment that increases returns to human capital. Therefore, an understanding of variations in the migration dynamics by educational attainment is critical as a basis for designing appropriate social policies at national and regional levels. Drawing on the education-specific migration dynamics, this study recognises the potential implications of youth migration for economic development and regional growth in the Indonesian context.

Chapter 3 Population and Human Capital Dynamics in Indonesia

3.1 Introduction

With around 279.1 million persons in 2022, Indonesia has the fourth largest population in the world after China, India, and the USA (UNFPA, n.d.). Also known as the largest archipelagic country, the Indonesian population is spread across 17,504 islands, including five main islands, i.e., Sumatera, Java, Kalimantan, Sulawesi, and Papua (Statistics Indonesia, 2017b). Administratively, Indonesia consists of 34 provinces and 507 districts (comprising 414 regencies and 93 autonomous cities).[1] The classification of major regions in Indonesia refers to the five main islands and their surrounding areas. Figure 3.1 presents a map of major regions in Indonesia, along with their corresponding area and population size, provinces, and districts.

The western part of Indonesia is generally associated with a higher level of regional development, covering the two main islands of Java and Bali, and Sumatera. On the other side, Eastern Indonesia is generally linked to less developed areas spread across Kalimantan, Sulawesi and the rest of the country.[2] The latter comprises about two thirds of Indonesia's area but is only inhabited by a fifth of the country's population (Statistics Indonesia, n.d.). The advanced level of regional development in Western Indonesia is supported by higher connectivity to the country's capital, Jakarta. Inequalities in public infrastructure investment have contributed towards the regional development gap between the western and eastern parts of the country (Nugraha & Prayitno, 2020). Inequality can also be found within provinces, particularly between autonomous cities and regencies. Autonomous cities are usually the provinces' capitals as well as the most developed and densest districts in the provinces. Cities represent the centre of economic activities and public amenities development. In contrast, outer and remote regencies are generally less developed.

[1] The division of province and districts in Indonesia has changed several times over the years. During the Reform Era (1999 and afterwards), major changes in sub-national divisions occurred with the addition of 8 provinces, 183 regencies, and 30 autonomous cities (Kementerian Dalam Negeri Republik Indonesia, 2014). After the establishment of Law Number 23/2014, the Indonesian government issued a moratorium on the establishment of new administrative regions. Recently, the parliament announced the creation of three new provinces, in late June 2022. However, this study still refers to the administrative region division in 2014.

[2] The categorisation refers to Presidential Decree No. 44/2002 on The Eastern Indonesia Region Development.

Major Regions	Area size	Population size (in millions)	Provinces	Districts (regencies & autonomous cities)
Java & Bali	135,218 km^2	155.91	7 (Jakarta, West Java, Central Java, Yogyakarta, East Java, Banten, Bali)	121
Sumatera	480,793 km^2	58.66	10 (Aceh, North Sumatera, West Sumatera, Riau, Jambi, South Sumatera, Bengkulu, Lampung, Bangka Belitung, Riau Islands)	154
Kalimantan	544,150 km^2	16.63	5 (West Kalimantan, Central Kalimantan, South Kalimantan, East Kalimantan, North Kalimantan)	56
Sulawesi	188,622 km^2	19.90	6 (North Sulawesi, Central Sulawesi, South Sulawesi, South East Sulawesi, Gorontalo, West Sulawesi)	81
Rest of Indonesia	562,247 km^2	19.22	6 (West Nusa Tenggara, East Nusa Tenggara, Maluku, North Maluku, West Papua, Papua)	95

Figure 3.1 Major regions in Indonesia and their corresponding area and population size, provinces and districts

Source: Kementerian Dalam Negeri Republik Indonesia (2014); Statistics Indonesia (n.d., 2017b)

The wide variation in regional development in Indonesia is accompanied by a high diversity of cultural backgrounds. Among 1,331 ethnic categories that exist in the country, the largest ethnic groups are Javanese (40.2%), Sundanese (15.5%), and Batak (3.6%) (Ananta et al., 2015; Statistics Indonesia, 2011a). Further, both ethnically homogenous and heterogeneous districts can be found in each major region (Arifin et al., 2015). Javanese represents the largest ethnic group in 132 districts in Indonesia, some of them situated beyond Java Island, whereas provinces in eastern Indonesia are mainly ethnically heterogeneous. Ethnic diversity and its composition and distribution are critical in understanding differences in societal behaviours and preferences (Ananta et al., 2015).

Indonesia is a large, populous country with diversity in social and cultural backgrounds, geographical settings, and regional development. Over the past few decades, Indonesia has undertaken significant transformations in population dynamics and human capital development. In general, Indonesia has experienced a remarkable decrease in birth and death rates during the past few decades (Hayes & Setyonaluri, 2017). Also, Indonesia has entered the late stage of mobility transition marked by a rising level of urbanisation (Ananta & Arifin, 2008). Internal migration in Indonesia has also shown greater variation in patterns and levels in recent years (Sukamdi & Mujahid, 2015). Further, the level of human capital development in this country has experienced major improvement over the years (UNDP, n.d.-a)

This chapter provides a systematic review of Indonesia's population dynamics and human capital development over time. Previous statistical reports, policy papers, and empirical studies are explored in order to provide the contextual settings of population and human capital dynamics in Indonesia. The review of population dynamics addresses trends in the spatial distribution of the population, its age structure, and migration patterns. Meanwhile, the discussion of human capital dynamics examines the level of human capital development in the country as well as highlights the educational and employment profiles – the two prominent dimensions of human capital – in the country. The chapter concludes by highlighting gaps in the knowledge on population mobility and human capital dynamics across regions in Indonesia.

3.2 Population Dynamics

Indonesia's population has grown remarkably over decades. As indicated in Figure 3.2, the country's population has increased significantly during the past five decades. It is also noticeable that Indonesia's population has doubled within just 40 years. Moreover, the average growth rate per year has shown a decreasing pattern over time. However, with a 1.25% yearly growth rate from 2010 to 2020, Indonesia's population has grown by nearly 3 million people annually over the past 10 years. The continuing significant population growth points to potential challenges in national and regional development in this country.

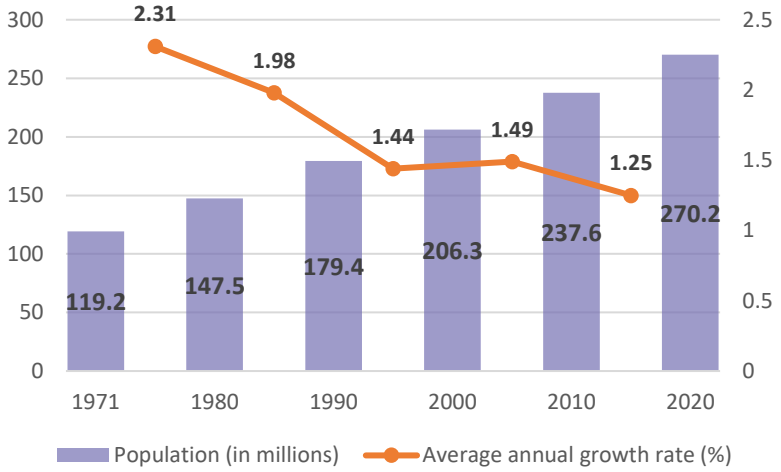

Figure 3.2 Total population and average annual growth rate, 1971–2020

Source: Statistics Indonesia (n.d., 2021e)

3.2.1 Spatial Distribution

One of the challenges in Indonesia's development is attributed to the uneven distribution of population across regions. As indicated in Figure 3.3, the most populous region, Java and Bali, is inhabited by more than half of the country's population. The concentration of population in this region – which only comprises about 7% of the total area of Indonesia – has persisted in recent decades, though the population share has been decreasing over time. This situation can be attributed to its lower fertility rates. Among all provinces, only provinces in Java and Bali, such as Jakarta, Yogyakarta, and Bali, have fertility rates below replacement level (Arifin et al., 2015).

Figure 3.3 emphasises the very low proportion of the total population residing in major regions in the eastern part of Indonesia. The Sulawesi region has exhibited a relatively stagnant share of the population over time, whereas Kalimantan and Rest of Indonesia regions display a considerable rise in their population share since 2000. The main reason for the increasing

share of population can be attributed to the higher birth rates in eastern Indonesia. For instance, the total fertility rates (TFRs) of provinces in the Rest of Indonesia region are the highest in the country. In 2017, the TFR of East Nusa Tenggara was 3.4, while the TFRs in Papua and Maluku were 3.3 (BKKBN et al., 2018). Additionally, a significant shift in out-migration patterns in recent years has contributed to the rise in the population share in eastern Indonesia. While regions in western Indonesia were still prominent destinations for internal migration, the share of out-migrants from Java to the Rest of Indonesia region increased from 7% in 1980 to nearly 20% in 2010 (Sukamdi & Mujahid, 2015).

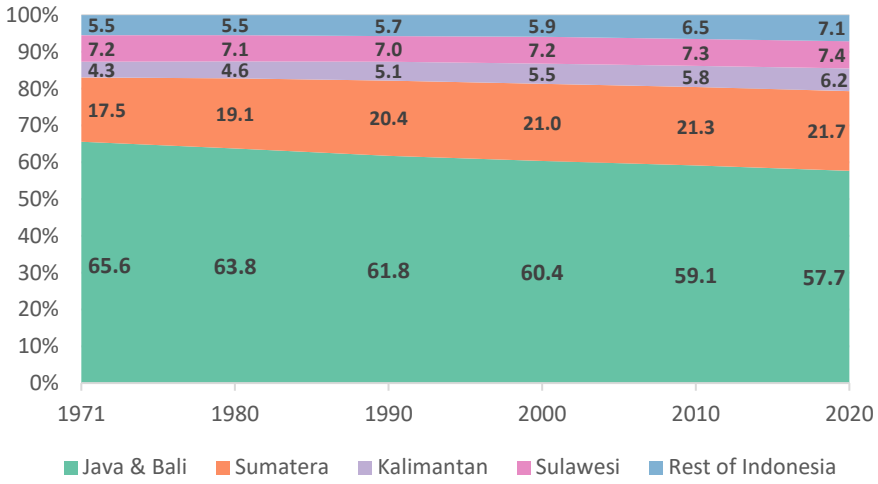

Figure 3.3 Population distribution in major regions in Indonesia, 1971–2020

Source: Statistics Indonesia (n.d., 2021e)

The unequal population distribution in Indonesia has resulted in wide variations in population density among provinces (Figure 3.4). Jakarta, the country's capital, is shown to be the densest province, with about 14,469 population per km^2. While the province only occupies 0.03% of Indonesia's total area, the capital is the only province with a population density of more than 10,000 people per km^2 due to its role as the nation's centre of government, business, and commercial activities. The surrounding provinces of Banten and West Java are also densely populated with around 1,000 people per km^2. Being situated as peripheral regions of the capital has made these provinces alternative residential places for many people who work in Jakarta (Jones et al., 2016). In addition, Yogyakarta is another province in the Java and Bali region, with population density over 1,000 people per km^2. This province is the second smallest, with just 0.16% of Indonesia's area, but it has been a major region for tertiary study in the country (Malamassam, 2017).

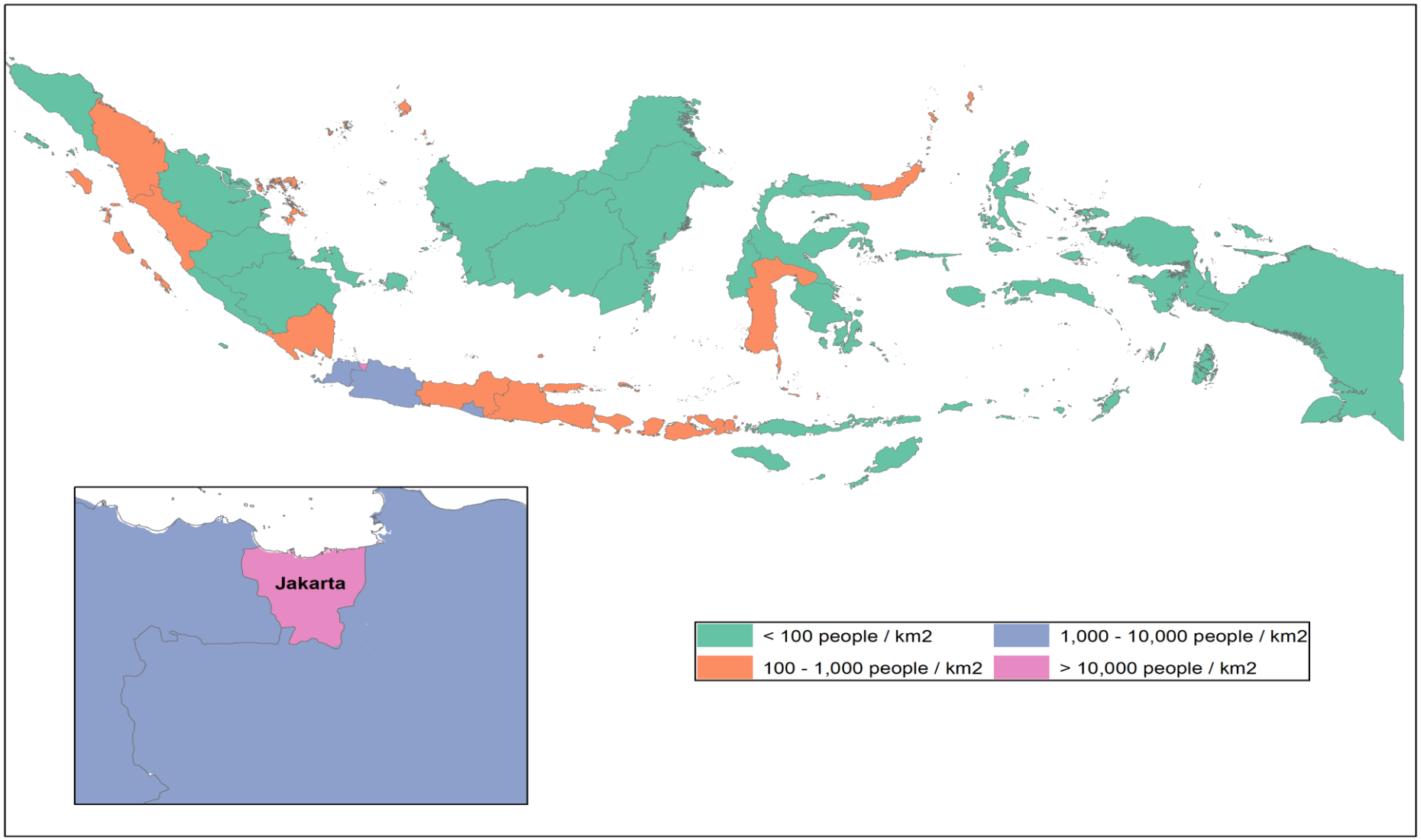

Figure 3.4 Population density by province, 2010

Source: Author's calculation based on data from Statistics Indonesia (2012, 2017b); map boundaries are extracted from diva-gis.org

The population density in most provinces in eastern Indonesia is less than 100 per km^2. In some provinces, such as Central Kalimantan, East Kalimantan, Papua, and West Papua, the average of population density is less than 20 people per km^2. Land abundance, which is not accompanied by large population numbers, has resulted in low population density. This situation might result in less incentive and investment for infrastructure and public service development in these areas. In the long run, disparities in regional development between regions with high and low population densities can also affect variations of human capital outcomes within the country.

3.2.2 Age Structure

Besides its spatial distribution, a critical aspect of population profiles in Indonesia is its age composition. The population pyramids in Figure 3.5 illustrate the population age structure transition over the past twenty years in Indonesia. The broad base and narrow top of the pyramids in 2000 and 2010 represented the demographically young and growing populations in the country. In 2020, the shape of the pyramid has slightly changed with noticeable smaller shares of people in the younger ages compared to the previous censuses. This trend marks the gradual shift towards higher age groups within the age structure of Indonesia's population. Moreover, currently, Indonesia benefits from the large share of productive-age population (15–64 years), which offers a potential booster to the nation's economic development. The proportion of young adult population (15–34 years) will continue to increase at a slower rate in the coming decades, while the older working-age population (35–64 years) is expected to increase rapidly by 2035 (Jones, 2014).

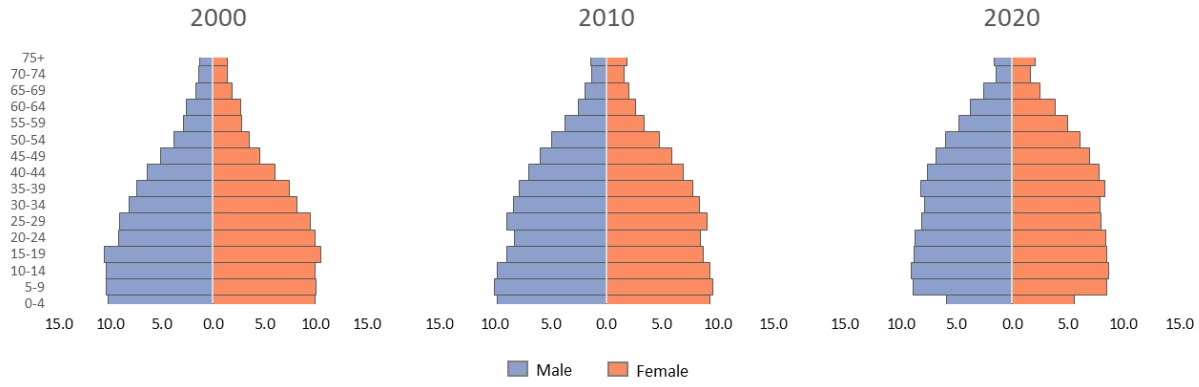

Figure 3.5 Population pyramids, Indonesia, 2000–2020

Source: Statistics Indonesia (n.d., 2001, 2012)

Trends in the age structure can also give insight into the dependency burden of the productive-age group. By measuring the ratio of the number of non-productive population

(aged 0 to 14 years and aged 65 years old and over) to the number of productive population (15 to 64 years old), the potential effect of the shifting age structure for national and regional development can be examined. The dependency ratios of 54% and 51% in 2000 and 2010, respectively, mean that one non-productive person requires two productive individuals to support their living. Further, Figure 3.6 illustrates that the ratios decreased remarkably in the recent census. In 2020, there were about 44 individuals in non-working age groups for every 100 persons in the Indonesian working age population. The young dependency ratio considerably decreased from 47% to 34%, while the old dependency ratio slightly increased from 7% to 9% between 2000 and 2020. Figure 3.6 also indicates noticeable differences in dependency ratios, both young- and old-age across major regions. The Rest of Indonesia region is shown to have the highest dependency ratios over the years, and its young dependency ratios, particularly, are much higher than in other regions. The old-age dependency ratio in the Java and Bali region is the highest in the country.

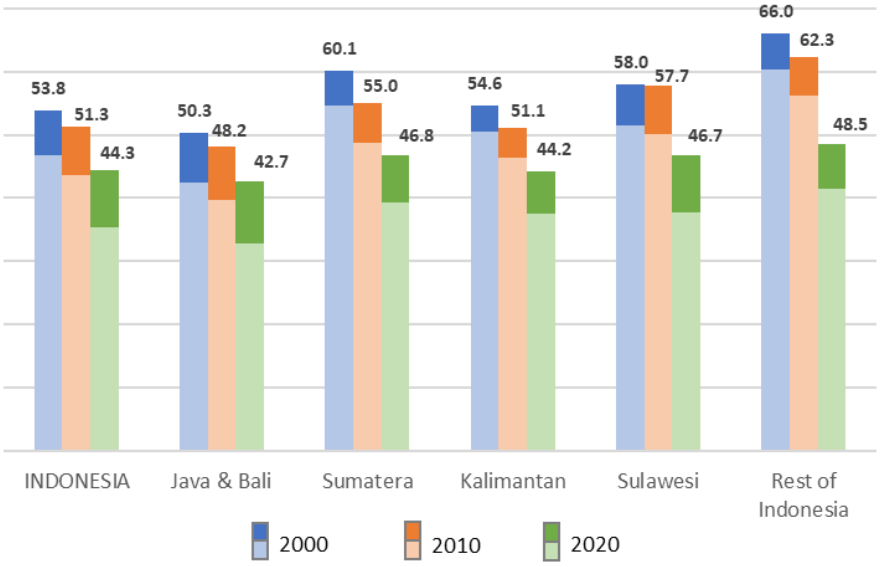

Figure 3.6 Dependency ratio across major regions in Indonesia, 2000–2020

Notes: The lower part of the bar (light colour) represents the young-age dependency ratio, while the upper part (dark colour) illustrates the old-age dependency ratio

Source: Author's calculations based on data from Statistics Indonesia (n.d., 2001, 2012)

3.2.3 Migration

The wide variation of demographic profiles in Indonesia has also been influenced by interregional mobility. Ananta and Arifin (2008) argued that Indonesia is already at the late stage of mobility transition that marked with a considerable increase of interregional mobility. The extensive regional development as well as implementation of decentralisation and regional

autonomy policies in the late 1990s have played a prominent role for this situation. However, two recent censuses show a decreasing tendency in the rate of recent migration (Figure 3.7). Despite the slight drop, Sukamdi and Mujahid (2015) found that the intensity of longer distance migration has increased in recent years. During the past few years, recent migrants were found to have a higher tendency to move further from their areas of origin, and this trend is attributed to transport and communications improvements across regions.

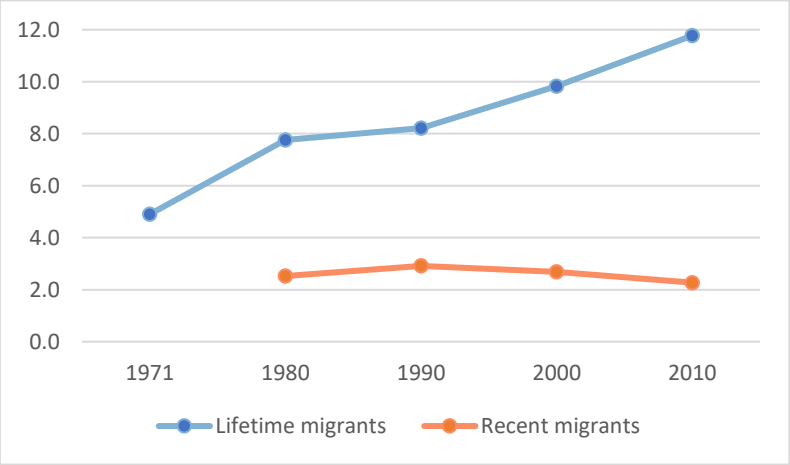

Figure 3.7 Shares of migrants in Indonesia, Census 1971–2010

Notes: - Lifetime migrants are individuals whose census' province of residence was different from their birth province
- Recent migrants are those whose census' province of residence are different from their province of residence five years earlier

Source: Author's calculation based on data from Statistics Indonesia (2016b, 2016c)

Internal migration dynamics in Indonesia can be explained in three main contexts. First, state intervention through the enforcement of a population resettlement program, widely known as transmigration, peaked from the early 1980s until around the 1990s (Charles-Edwards et al., 2016; Tirtosudarmo, 2009). This policy was the national government's attempt to reduce population pressure on Java Island by sending Javanese agricultural households to less densely populated regions beyond the island. The mass migration under this policy boosted the migration rate between 1971 and 1980 (Figure 3.7). Transmigrants were mainly agricultural workers that did not own land and were characterised by a low level of education (Bazzi et al., 2016). The second context mainly discussed within internal migration literature in Indonesia is labour migration motivated by income differentials and employment divergence across regions (Bryan & Morten, 2019; Muhidin, 2018; Sukamdi & Mujahid, 2015; Tirtosudarmo, 2009; Wajdi, Adioetomo, et al., 2017). The migration flows for this motive tended to focus toward urban areas and resulted in shifts to more urbanised economic environments (Jones & Mulyana,

2015). Lastly, cultural background or social norms related to moving traditions by particular communities or ethnic groups have also been influential to migration dynamics in Indonesia (Auwalin, 2020; Tirtosudarmo, 2009). Some highly mobile ethnic groups in this country, such as Minang, Batak, and Bugis, view migration as a rite of passage where young people leave their hometowns to seek knowledge and living experience or to earn a living elsewhere. Migration not only represents spatial transfer over geographical boundaries but also spatial movement across cultural differences (Ananta & Arifin, 2014; Tirtosudarmo, 2009). In some cultural communities, migration is considered the prominent means to achieve wealth and higher social status. However, culturally bound migration is usually seen as a temporary move because many of the migrants still have the intention to return home at later ages (Tirtosudarmo, 2009).

Regarding motivation, migration in Indonesia is mainly driven by family and economic-related reasons (Muhidin, 2018). However, education-related motives have also been important, especially among the young population. Sukamdi and Mujahid (2015) emphasised that migration from rural to urban areas is mainly driven by aspirations to earn higher wages and have better access to education and healthcare facilities. Also, nearly a fourth of young adult migrants move away from their areas of origin for education-related motives (Malamassam, 2016). Migration for education, in particular, shows a tendency of short-distance mobility in the form of intra-province moves. However, long-distance mobility can also be found, particularly toward regions on Java Island, which offer better quality tertiary education compared to other areas in Indonesia.

The domination of the young population within the internal migration system in Indonesia is shown by the peak age at migration being around 15 to 22 years (Wajdi, Mulder, et al., 2017). In addition, nearly half of young Indonesians have experienced spatial movements before age 30 (Muhidin, 2018). Moreover, those with tertiary degrees are 3.6 times more likely to move compared to their peers without formal education (Bernard & Bell, 2018). Adioetomo et al. (2014) added that young Indonesians living in urban areas are more likely to be migrants. Additionally, young females and former child migrants are also more likely to be migrants (Malamassam, 2016). However, the higher likelihood of young female migration is mainly found within the lowest-educated group.

Regarding destination areas, regions with the greatest net gains of young migrants were all associated with the growth of Jakarta and its surrounding districts (Adioetomo et al., 2014). Similarly, Wajdi, Adioetomo, et al. (2017) found a high level of migration flows toward areas

with more advanced levels of development, i.e., the western part of Indonesia. The concentration of migration to more developed regions depicts inequality in access to education and economic opportunities across regions in the country (Malamassam, 2016). However, Sukamdi and Mujahid (2015) suggested that Java Island has gradually lost its attraction as a destination region, due to observed decreases in the share of in-migrants over time.

The trend of out-migration flows indicates that regions with high net losses of young migrants are characterised by having large rural segments (Adioetomo et al., 2014). Moreover, Java Island has also been an important sending region (Rangkuti, 2016; Sukamdi & Mujahid, 2015). The out-migration pattern in 2010 also showed an increasing flow toward provinces in the eastern part of Indonesia (Sukamdi & Mujahid, 2015). Ananta and Arifin (2008) also noticed that there had been changes in spatial patterns of interprovincial migration in Indonesia. Some provinces that used to be migrant-receiving regions have become migrant-sending regions in recent years (Jakarta and Lampung) and vice versa (Bali and West Nusa Tenggara). However, there were also provinces which continually acted as migrant-sending regions (East Java and West Java) and migrant-receiving regions (North Sumatera and South Sulawesi) over the years. Muhidin (2018) argued that the present-day patterns could be attributed to the rapid social-economic and infrastructure development across regions.

The existing research on migration dynamics in Indonesia also includes several case studies conducted in major destination regions. Malamassam (2017) examined the future residential preferences of student migrants in a district in Yogyakarta province, i.e., Sleman, one of the prominent study regions with more than 40 tertiary institutions. It was found that about two-thirds of student migrants intended to conduct subsequent migration once they earned their degree. Their subsequent residential preferences were varied, ranging from returning home, moving to metropolitan or big cities, to migrating to less developed regions in the country. Moreover, Malamassam et al. (2017) also explored the narratives behind the secondary graduates' in-migration to Batam, a high-profile industrial city in Riau Islands province, Sumatera region. Its strategic location due to a direct sea border with Singapore and Malaysia has boosted foreign direct investment in this city. Many industries operated by foreign companies have attracted mid-skilled workers since their education background meets the minimum requirement to work as factory labourers. Culturally bound networks have a major role during the migration decision-making process as well as in the early months after they arrive in Batam. Moreover, the limited human capital owned by the migrants has resulted

in fewer capabilities to compete in the global labour market as well as low returns to migration and low levels of job security.

Another case study is tertiary graduate migration to Sorong (an autonomous city in West Papua, a less developed province in the easternmost part of the country) (Malamassam et al., 2021). The decision of the highly educated migrants to move to the less developed region was based on consideration of accelerating their career trajectories. Due to the less competitive labour market, most of them gained career development and improved social status in a relatively short time. Interestingly, most of these graduate migrants had experienced student migration beforehand. This situation depicts the repeat migration patterns performed by educated migrants. Some of them also emphasised that their current school-to-work transition would not be a permanent move, and they planned to migrate again after some years (Malamassam et al., 2021).

Internal migration has been a critical aspect of regional development in Indonesia. The selectivity of migration by age and education emphasises the critical role of population mobility in redistributing human capital across regions. As estimated by Harttgen and Klasen (2009), Indonesian migrants place a higher value on human capital than their non-migrant counterparts. The disaggregation of the human development index by migration status shows that the index for migrants was 0.741, or about 8% higher than the non-migrants' index (0.684). The difference in the education component between these two groups (0.854 and 0.788 for migrants and non-migrants, respectively) is the largest among all components. It can be said that education has a critical effect on human development and migration in Indonesia. The spatial patterns of the internal migration also indicate the potential for human capital gain and loss in particular regions. Therefore, a better understanding of migration dynamics within the context of human capital development is needed as a critical basis to address the cross-regional inequality within Indonesia.

3.3 Human Capital

In order to reap the potential benefits of its population dynamics, it is critical to understand the human capital profile of Indonesia's population. Human capital can be defined as knowledge, skills, and competencies embodied in individuals that can be utilised to improve their personal and economic wellbeing (OECD, 2001). Moreover, human capital depicts the current and future potential of a country's growth, and is considered the critical form of a region's wealth (Liu & Fraumeni, 2020). Therefore, understanding human capital dynamics within a country can give critical insights into pathways of national and regional development.

3.3.1 Indicators

Human capital had been measured in various ways. Several indicators have been established to show how countries develop their human capital potential and their progression over time. One of the prominent indicators is the human development index (HDI) constructed by UNDP. HDI measures the average achievement in critical dimensions of human development, i.e., a long and healthy life, being knowledgeable, and having a decent standard of living (UNDP, n.d.-a). Health is measured by life expectancy at birth, while knowledge is estimated by calculating the arithmetic mean of expected years of schooling and mean years of schooling. Further, standard of living is represented by the measurement of gross national income (GNI) per capita. HDI is calculated as the equally weighted geometric mean of the dimension indexes (UNDP, n.d.-a).

Until 2015, Indonesia was categorised as one of the countries with a medium level of human development. In 2016, with an HDI value of 0.70, Indonesia was considered to have a high level of human development. Figure 3.8 illustrates Indonesia's historical HDI achievement and the trend of each component index. The life expectancy index has consistently exhibited gradual increases over time. Meanwhile, the GNI index dipped slightly around the late 1990s due to the global financial crisis. It bounced back shortly afterward and increased similarly with HDI. Further, among the three component indices, the education index is shown to have the poorest achievement over the years. Until 1998, the education index was relatively low due to the average years of schooling being below six years and the maximum expected years of schooling around 10.6 years. In later years, the education index has continued to improve, but its value is still considered at the middle level (below 0.7).

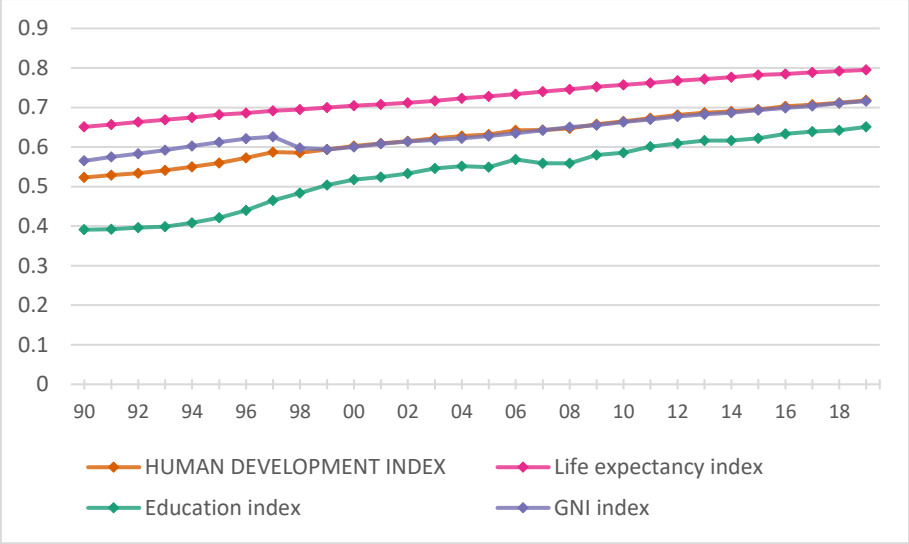

Figure 3.8 Human Development Index (HDI)
and its component indexes, Indonesia, 1990–2019

Source: UNDP (n.d.-a)

UNDP introduced an alternative measure of human capital in 2010 by launching the inequality-adjusted human development index (IHDI). While HDI measures the potential level of human development when there are no disparities within a country, IHDI estimates human development that accounts for inequality across the country's population (UNDP, 2010). IHDI Indonesia in 2010 was 0.547 or about 17.7% lower than its HDI in the same year. In 2019, IHDI in Indonesia increased to 0.590, but the overall loss from HDI was still at a similar rate, 17.8% (UNDP, n.d.-b). While the latest HDI value indicated that Indonesia belongs to the high level of human development group, its IHDI values suggested that the level of human development is still considered low to moderate if inequality within the country is considered. Also, this persistent inequality situation signals how growth in human development in the country is still not followed by equal distribution of human capital among its population. The loss of human development achievement in Indonesia is mainly attributed to inequality in income and education. Both component indices dropped to 55% due to unequal access to education facilities and decent work across populations in the country.

HDI has been adopted at Indonesia's sub-national level since 1996. Figure 3.9 exhibits stark differences in human development levels among provinces in the western and eastern part of Indonesia. Several provinces such as Jakarta, Yogyakarta, and East Kalimantan have consistently reached the highest provincial-level HDI over time. These provinces mainly outranked other provinces in the education component. On the other side, provinces in easternmost Indonesia, i.e., Papua, West Papua, and East Nusa Tenggara, have had the poorest levels of human development.

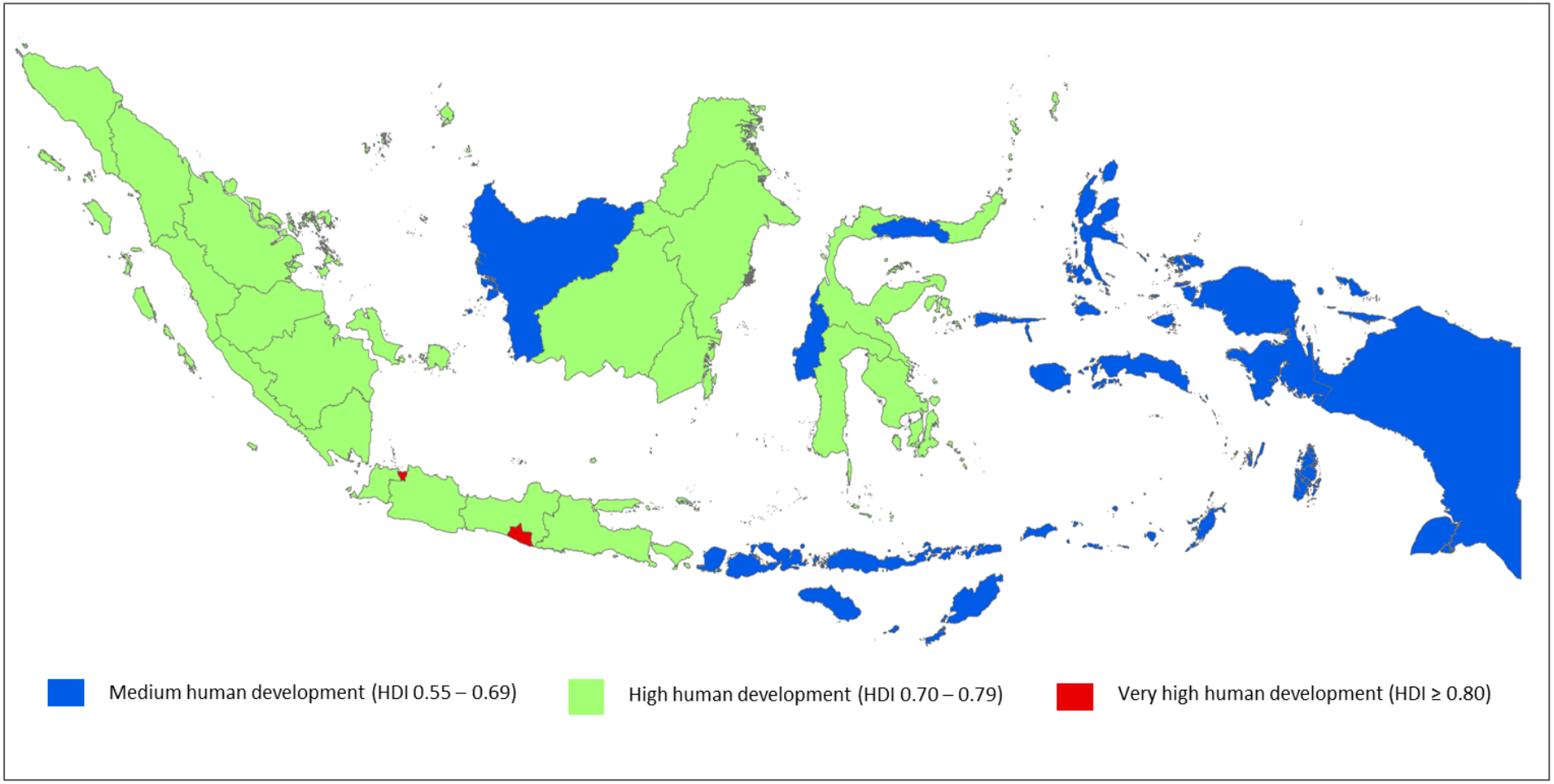

Figure 3.9 Classification of HDI level by province, 2019

Source: Author's calculation based on data from Statistics Indonesia (2021a); map boundaries are extracted from diva-gis.org

Moreover, variations in HDI values within provinces can also be observed. In Jakarta, there is about a 10% difference between the highest and lowest HDIs by districts, while a gap of 50% HDI values is estimated within the Papua province (Statistics Indonesia, 2021a). This situation reinforces the inequality of human capital development, particularly within the least developed regions.

The discrepancy in human capital development across Indonesia can be examined through the educational attainment gaps across provinces. The province with the highest mean years of schooling is Jakarta (11.1 years), while Papua is the province with the lowest mean years of schooling (6.7 years) (Statistics Indonesia, 2021a). A gap of 4.4 years of educational attainment between these two provinces, equal to a level of secondary education, signifies considerable inequality in education opportunities beyond primary level across regions in Indonesia. Moreover, nearly all provinces in Indonesia experience education inequality among their districts. The main gaps within provinces are usually found between capital cities and districts that are far from the capital. Further, 63% of Indonesian districts achieved worse than the average national level of 7.46 years in 2010. The situation was slightly better in 2020, by which time only 58% of districts still had lower mean years of schooling than the national average of 8.48 years (Statistics Indonesia, 2021a).

In 2018, the World Bank launched another measure of human capital performance, namely the human capital index (HCI). HCI is defined as the amount of human capital that can be attained at the age of 18 years by today's newborns. By measuring three components, namely child survival rate, expected learning-adjusted years of school, and health environment, this index examines how current health and education outcomes shape the potential productivity of future generations of workers (Kraay, 2018; World Bank, 2018).

HCI estimated that Indonesian children born in 2010 would be only 50% as productive as they could be in adulthood, even if they are healthy and manage to complete formal education (World Bank, 2020a). The younger cohort – those born in 2020 – would also experience a relatively similar situation since their productivity rate was estimated at around 54%. The health- related measurements show a relatively decent outcome, with 98% and 85% survival rates to ages 5 and 60, respectively, as well as 72% not stunted rate. However, the index pointed out that the learning-adjusted years of schooling was only 7.8 years among the 2020-born Indonesian children, whereas their expected years of schooling was 12.4 years. Since the learning-adjusted years of schooling reflects how much children actually learn during

their formal education, the considerable difference of 4.6 years between the expected and learning-adjusted years in Indonesia signals the gap between the quantity and quality of education in Indonesia as well as implying potential challenges in human capital development in Indonesia.

The measurement of human capital also highlights its critical role in national growth. Lange et al. (2018) argued that the level of development of a country should not only be measured from its national wealth but must also consider the composition of the wealth. The wealth of a country can be divided into several types, namely (i) produced capital that refers to market prices of the country's asset in buildings, equipment, and residential and non-residential urban land; (ii) natural capital that refers to the discounted values of the rent of renewable and unrenewable resources of a country, including energy and minerals, forests, and agricultural land; and (iii) human capital that refers to the discounted value of expected earnings of the labour force in a country by considering their age, sex, and educational attainment. The measurement of human capital as an asset for the country's economic production depicts the earning gains associated with schooling years and working capability (Lange et al., 2018). Countries with high levels of economic development are generally have a higher share of human capital wealth. In contrast, the national wealth of less developed countries tends to be dominated by natural capital wealth (Hamilton et al., 2018).

Human capital wealth in Indonesia in 2014 was estimated at around US$23,701 per capita, or about half of the total national wealth (Lange et al., 2018). Its contribution to the annual growth of national wealth was slightly similar to the total shares of other assets of national wealth, i.e., produced and natural capitals (Managi & Kumar, 2018). Compared to other countries in the Southeast Asia region, Indonesia's share of human capital wealth is lower than that of Malaysia (75%), Singapore (60%), Phillippines (58%), and Thailand (54%), but relatively similar to that of Vietnam (50%). Hamilton et al. (2018) pointed out that the relative valuation of human capital is critical in understanding the country's investment in human development and potential future growth.

At the national level, Indonesia has shown decent human capital development. However, sub-national trends result in persistent disparities across regions. While the gaps among provinces and districts seem to have reduced slightly over time, many regions, particularly in the eastern part of the country, are still far behind in human capital performance. Thus, not only should improvement in human capital acquisition be encouraged for these least developed regions but human capital redistribution should also be supported.

3.3.2 Education

Among several human capital indicators, education is the most common measure for human capital performance. Education enables individuals to acquire knowledge and skills needed to improve their capabilities and productivity. Due to its large school-age population, Indonesia's current education system is one of the largest in the world. Formal primary and secondary education involve 53.1 million children from grades 1 to 12, while about 8 million students are enrolled in 4,670 tertiary education institutions in the country (World Bank, 2020b).

The education system in Indonesia has undergone several critical transitions over the years. It was initially developed from the Dutch education system during the colonisation era. However, access was limited to a small number of privileged children (Bjork, 2005). After Indonesia's independence in 1945, the public school system was introduced, consisting of primary, lower and upper secondary, technical, and tertiary education. Amidst the political instability and unequal provision of schools, there was an upsurge in the number of students enrolled in primary and secondary schools during the system's initial development (Bjork, 2005). Later, during the 1970s and early 1980s, the Indonesian government began to provide equal access to education by building a public primary school in every village (Rosser, 2018). In 1984, the government implemented a policy requiring six years of compulsory education (Suharti, 2013a). These efforts resulted in universal enrolment in primary education in the early 1980s (Suryadarma & Jones, 2013).

In 1994, the Indonesian government extended the period of compulsory education to nine years (Suharti, 2013a). The broader scope of compulsory education was expected to improve the quality of human resources and cater to the changing nature of the labour force, along with the country's evolving economy, which featured a growing need for workers with middle-level technical skills (Suryadarma & Jones, 2013). A further attempt by the Indonesian government to improve the country's educational performance was through the issue of Law No. 20 of 2003 on the National Education System. One of the mandates under the law is that national and district governments must allocate a minimum of 20% of their budget to the education sector. This target was universally achieved in 2009 (World Bank, 2019). Moreover, the Indonesian Minister of Education and Culture launched a 12-year compulsory education program in 2013 (OECD, 2015). This means that all Indonesian children up to 18 years old are expected to have equal access to both primary and secondary levels of education.

The development of the education system in Indonesia has been reflected in trends in educational attainment over the years. Based on estimations from the Barro-Lee educational

attainment dataset, Figure 3.10 exhibits the average years of schooling attained as well as the percentages of primary, secondary, and tertiary education attendance from 1950 to 2015.

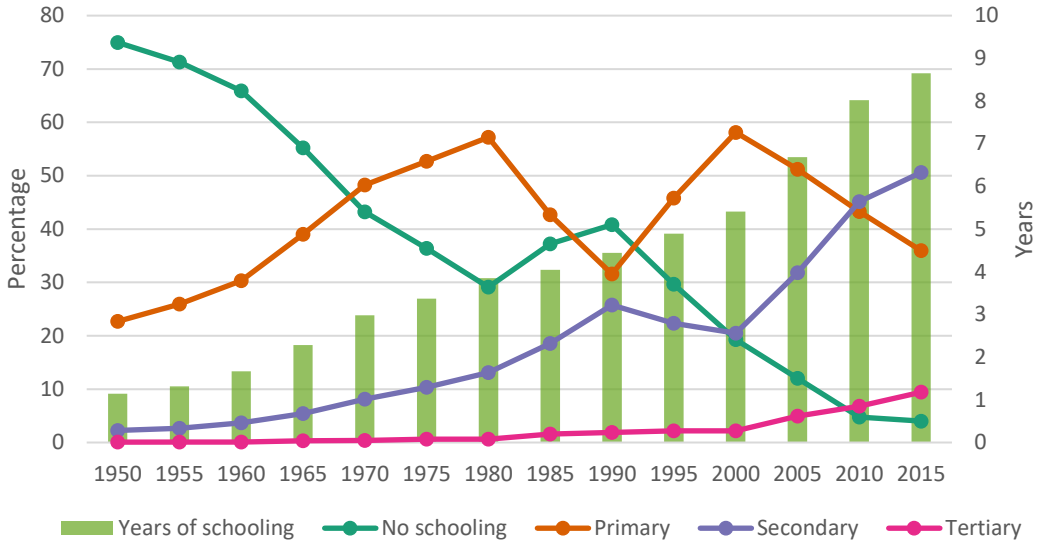

Figure 3.10 Average schooling years and share of primary, secondary, and tertiary education attendance, Indonesia, 1950–2015
Source: Barro & Lee (2021)

A significant drop in the proportion of no schooling population, from 75% to 4% over the years, can be observed. Further, more than half of the population had at least attended primary school in 1970. However, this situation has not been widely accompanied by progression to secondary education. The shares of secondary and tertiary level attendance progressively increased in 2005. The proportion of the population with the highest educational attainment at secondary level rose from 21% to 32%, while the share of tertiary-educated individuals doubled from 2.2% to 4.9%. In the last year observed, the majority of Indonesians had at least attended secondary school. Also, nearly a tenth of Indonesia's population had attended tertiary education.

From the census data, Suharti (2013b) also found a decreasing share of the population aged 19 years old and above who had not completed primary education or had no education, from 33% to 16% between 1990 and 2010. In addition, school progression rates have also been found to increase remarkably over the years. Among school entrants who commenced education in primary school in 1988, only 66% graduated, and about 44% continued to lower secondary school. Within a period of 14 years, it was found that among those who commenced primary school in 2002, about 81% of them fully completed the education level, and 66% of them continued to a higher education level. Continuation from lower to upper secondary school

also increased from 62% in the 1988 academic year to 86% in the 2005 academic year (Suharti, 2013b).

The imposition of the nine-year compulsory education policy in 1994 has not succeeded in realising universal lower secondary school attendance. However, the net enrolment ratio for this education level increased from 64% in 1994 to 74% in 2013 and 80% in 2021 (Statistics Indonesia, 2021g). A similar situation has been occurred during the implementation of 12-year compulsory education since 2013. Eight years after the initiation of this policy, the net enrolment rate for upper secondary school was still around 61%, or about a 7% increase from 2013's rate (Statistics Indonesia, 2021g).

The education sector in Indonesia has encountered various challenges in its development. The World Bank (2019) stated that infrastructure barriers are one of the main challenges in realising educational equity across regions. Many schools, particularly in rural areas and least developed regions, have limited access to electricity and internet and are situated far from the centre of economic activities. Another issue in education development in the country is the provision of teaching staff. Most schools in remote areas do not have teachers, while teachers in rural areas are closely associated with high absence rates (World Bank, 2019).

The limited availability of secondary schools at the sub-district level has also affected the low school progression rate. Suharti (2013a) found that about 17% of sub-districts do not have upper secondary schools, among 6,425 sub-districts. If school type is considered, no public upper secondary school was found in around 31% of sub-districts. Thus, students from a sub-district without an upper secondary school must travel about 29 km daily to continue their education. Lastly, financial issues might also hinder school progression to higher levels of education (Ramchand, 2018). While studying in public schools might cost less than private ones, students in both types of schools are still required to pay for other school-related expenses, such as school uniforms, books, and transportation costs.

The increasing trend of educational attainment is also shown at the tertiary education level. Gross enrolment rates at the tertiary level show a steady rate of only 3% of the population aged 18 to 22 years old in the 1970s. Since the 1980s, tertiary enrolment rates have gradually increased. In 2010, nearly a fourth of the tertiary education-age population was enrolled in higher education institutions (Suryahadi & Sambodho, 2013). With this achievement, Hill and Thee (2013) argued that Indonesia had become one of the world's largest and fastest-growing tertiary education systems. However, the tertiary education system in Indonesia still faces

problems in terms of considerable variations in institutions' quality. Only a few institutions, mostly public universities, are acknowledged as reputable higher education institutions. Also, a growing number of mid-tier universities deliver good quality education and have acclaimed national recognition. However, most of the country's higher education institutions are considered low-ranking institutions with poor quality of education (Hill & Thee, 2013).

The tertiary education system in Indonesia also suffers from unequal distribution of reputable institutions. As indicated in Figure 3.11, most of the top 100 Indonesian universities are situated on Java Island. Moreover, tertiary education institutions are also heavily concentrated in autonomous cities in the provinces. The limited availability and accessibility to higher education institutions in particular regions prompt the migration of young populations to pursue higher education. This situation results in the unequal distribution of the highly educated population and their embedded human capital.

The concentration of tertiary students in a particular region is illustrated by the gross enrolment rate at tertiary institutions in Yogyakarta province, which reached 74.7% in 2020. This rate far exceeds other provinces' rates, which were capped at 48.7% (Statistics Indonesia, 2021f). Yogyakarta is well-known as a major centre of tertiary education systems in Indonesia. Despite its smaller area compared to other provinces, about 135 public and private universities are situated in Yogyakarta, and many of them are classified as reputable tertiary institutions. Therefore, this province has been the major destination area for education-related migration from various regions, including its surrounding areas and provinces beyond Java Island (Malamassam, 2017). Every year, this province simultaneously gains student in-migrants and loses graduate out-migrants. However, Yogyakarta is still able to accumulate human capital stocks. The continual presence of these educated migrants has influenced the local development of knowledge-based economic activities and public amenities. Also, a considerable share of student migrants remain permanently in this province after graduating (Malamassam, 2017).

Despite the efforts to improve education performance in Indonesia, there remains a huge challenge regarding the supply of education facilities across regions. The concentration of educational institutions in particular areas acts as a strong pull factor for highly educated migration that increases the human capital accumulation in such areas. In the long run, this situation might reinforce inequalities in human capital and economic development between regions in the country.

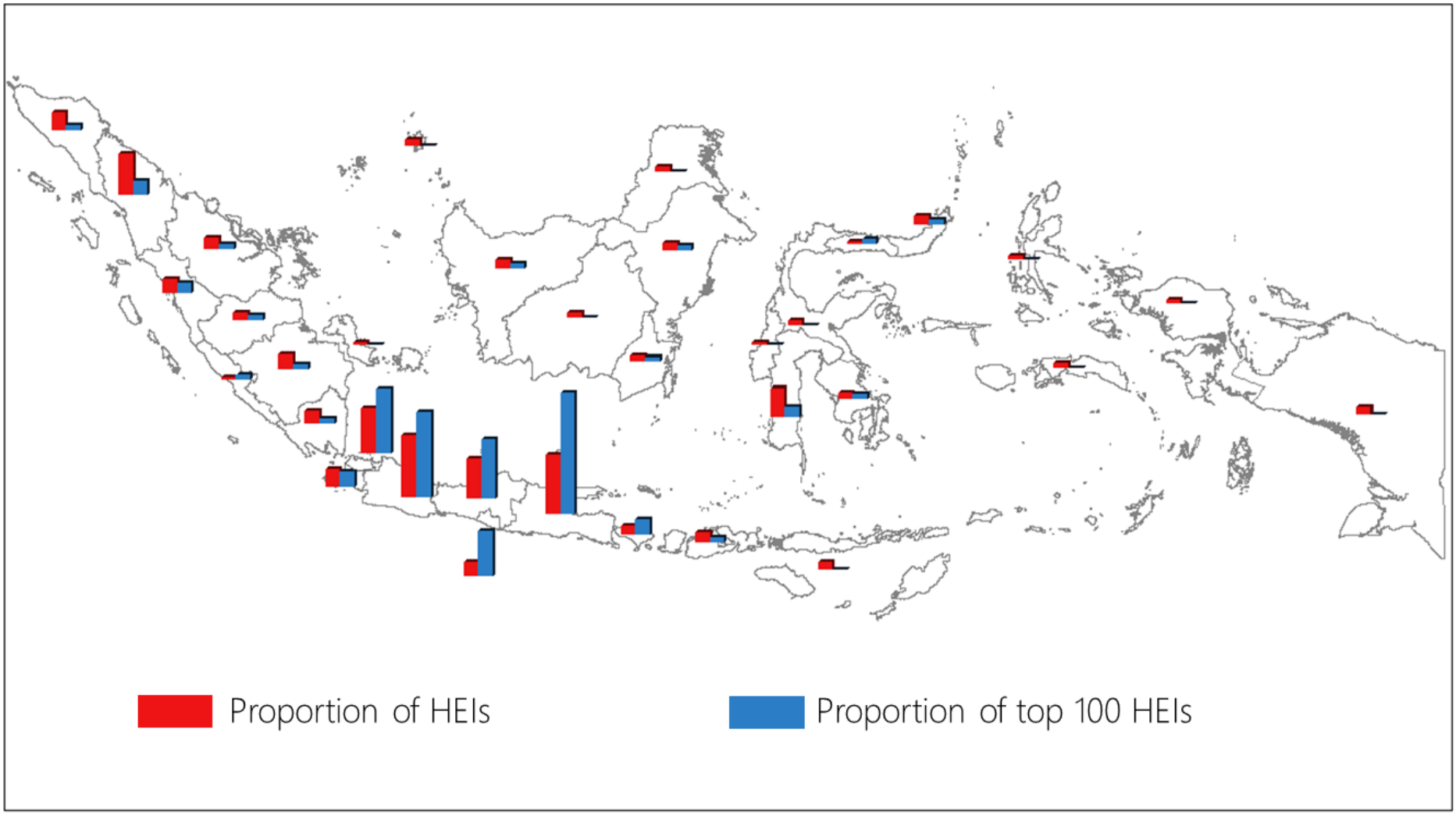

Figure 3.11 Spatial distribution of Higher Education Institutions (HEIs) in Indonesia

Source: Author's own drawing based on data from Kemdikbud (2020); PDDikti Kemendikbud (2020); map boundaries are extracted from diva-gis.org

3.3.3 Employment

Human capital development can also be measured through the productivity of the working-age population. Examination of the productivity of the working-age population should be accompanied by an understanding of their participation in the labour market. Labour force participation can illustrate the utilisation of individuals' human capital to improve their wellbeing. Figure 3.12 exhibits the trends in employment rates at both the national and regional levels. The employment rates are relatively similar across regions over time. More than 60% of the working-age population participated in the labour force. However, the employment rate at the national level as well as across regions, slightly decreased over the past two decades. The decreasing rates are accompanied by the increasing rate of the non-workforce population (Statistics Indonesia, 2001, 2012, 2022a). For example, in the Rest of Indonesia region, a decrease in employment rates by 5% was accompanied by an increase in the share of the working age population who were not economically active by 6% between 2000 and 2020. The rising proportion of the non-economically active population could indicate increasing school participation during working ages, as well as low rates of labour participation by women who prefer to be engaged in home duties or childrearing.

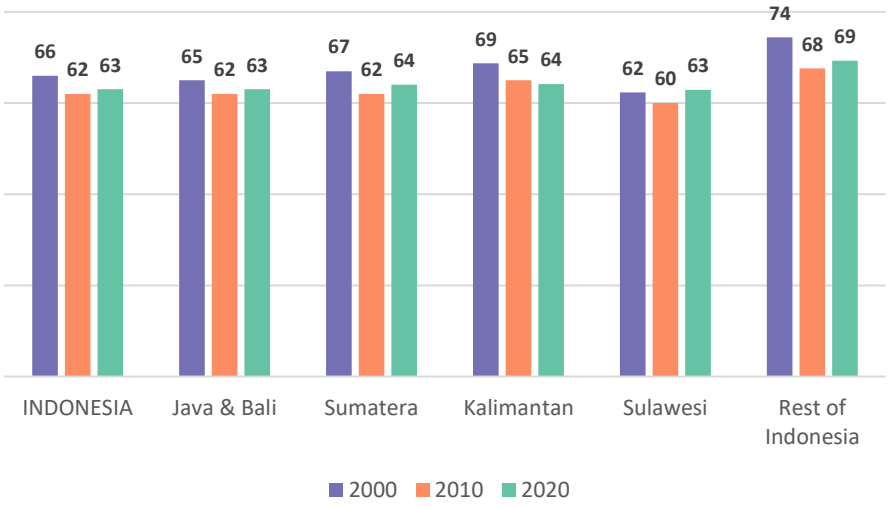

Figure 3.12 Employment rate in major regions in Indonesia, 2000–2020

Source: Statistics Indonesia (2001, 2012, 2022a)

Regarding industry of employment, agriculture-related work was a major industry employing Indonesian labour in 2000 (Figure 3.13). However, its dominance has been decreasing over time. By 2020, the consumer services sector was showing a prominent role in absorbing workers into the labour force. Labour force participation in the manufacturing sector has also increased remarkably in the past 20 years. The transformation of main economic

activities from agricultural to non-agricultural industries can be seen as an integral part of economic development in the country. The large gaps in wages across industries as well as improvements in workers' human capital have been discussed as important determinants in explaining trends in employment industry transformation (ADB, 2018).

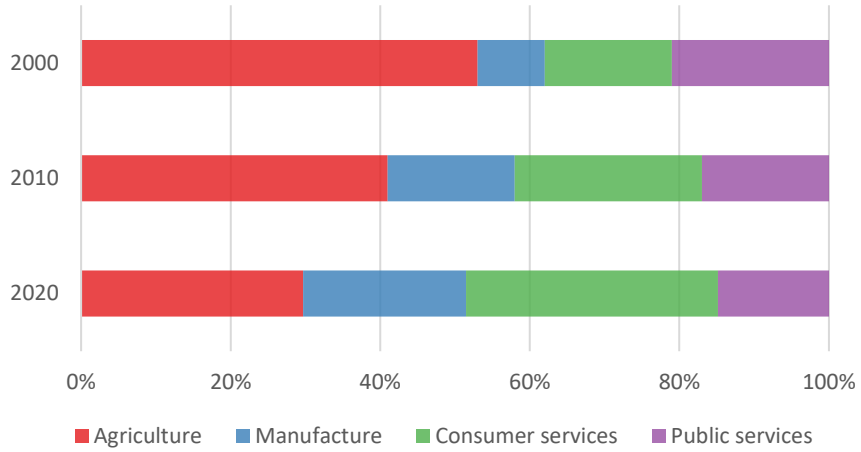

Figure 3.13 Distribution of Indonesian workers by industry, 2000–2020

Source: Statistics Indonesia (2001, 2012, 2022b)

The labour market can be divided into formal and informal sectors based on employment characteristics. The informality of economic sectors might refer to various factors, but informal sectors commonly cover all economic activities conducted by firms or individuals without legal registration in the government system, including taxation and employee social security systems (Rothenberg et al., 2016). Additionally, the informal sector mainly operates under low levels of organisation and technology, with unclear differentiation between labour and capital, as well as high levels of worker turnover (ADB, 2011).

In many developing countries, the informal sector represents a major component of the economic structure. ILO (2018) reported that about 68% of employment in Indonesia is categorised as informal employment. The share of informal activities in total employment in the country has tended to increase over time (Statistics Indonesia, 2021c). Additionally, over 93% of micro, small, and medium-sized firms in Indonesia are categorised as informal enterprises (Rothenberg et al., 2016). The transformation of primary economic activities from agriculture to manufacturing and service sectors that co-occur with rising urbanisation has a critical role in the country's rapid growth in the informal economy (Rothenberg et al., 2016). The types of work in the informal sector are varied, including agricultural and fishery work,

plant and machine operation and assembly, service work, sales and market sales work, craft and related work (ADB, 2011).

The spatial distribution of working sectors indicates that informal sectors dominate economic activities in nearly all provinces. Only Jakarta and Riau Islands provinces exhibited informal employment shares below 50% (Statistics Indonesia, 2021c). The informal sector, particularly, provides extensive job opportunities for low-educated individuals. About 68 to 70% of workers with the highest educational attainment below primary school were engaged in informal economy activities between 2015 and 2021 (Statistics Indonesia, 2021d). Interestingly, the share of informal workers among university graduates rose significantly, from 8.2% in 2015 to 14.6% in 2021. This situation might illustrate the limited opportunities for highly educated workers in the formal sector in recent years. In terms of age range, there has been an increasing trend of the young population's participation in the informal sector. Statistics Indonesia (2021b) reported that about 56% of workers aged 15 to 19 years were employed in the informal sector, a significant rise from 37% in 2015. The profile of the informal sector in Indonesia implies its critical role in the country's economy due to its ability to provide extensive employment opportunities to the workforce.

3.4 Conclusion

Variations in demographic transitions and economic development across regions play a critical role in shaping human capital outcomes at both national and regional levels. Regional inequalities have consistently appeared as major challenges in human capital development in Indonesia over the years. Disparities in education performance, in particular, have been shown to be persistently wide between provinces in the western and eastern parts of the country. Moreover, while migration in Indonesia has been a result of various factors, i.e., mobility traditions, economic divergence, and state interventions, its selectivity patterns exhibit the dominance of the young adult population as well as the greater likelihood of highly educated individuals.

The human capital of migrants has been an essential factor in determining regional development (Tirtosudarmo, 2009). Provinces with high levels of internal migration, such as Jakarta, Yogyakarta, Riau Islands, and East Kalimantan, have also achieved an increase in their achievement on human capital development (Statistics Indonesia, 2021a). The embedded human capital that is redistributed along with migration marks simultaneous human capital loss and gain for the sending and receiving areas. Thus, migration can positively and negatively

impact the region's human capital development. Migration can also be seen as an effort to acquire human capital, by the individuals, to improve their employability and return to their education.

Previous studies have analysed internal migration dynamics in Indonesia. Some studies have explained the significance of education on migration flows in the country (Adioetomo et al., 2014; Bernard & Bell, 2018; Jones et al., 2016; Muhidin, 2018). Moreover, the existing case studies have also highlighted the distinctive narratives of internal migration by education background (Malamassam, 2017; Malamassam et al., 2017, 2021). However, the exploration of the education-specific migration dynamics among young Indonesians remains rare among existing studies. Also, most studies approach migration as a standalone event rather than a critical part of a life trajectory. Therefore, this thesis contributes to the literature by utilising both cross-sectional and longitudinal datasets on migration in Indonesia in exploring variations in the migration dynamics, i.e., spatial structure, as well as initiation and continuation of migration trajectories, that attributed to distinctive educational attainment.

Chapter 4 Data and Method

4.1 Introduction

Based on its aim and the corresponding research questions, this thesis uses secondary data sources. The general forms of migration data in secondary sources are event and transition data (Bell et al., 2020; Bell & Rees, 2006). Event data record occurrences of spatial relocation, whereas transition data are obtained through the comparison of residential places between two time points. Event data are mainly found in administrative registrations or surveys that record individuals' changes of residential address. Meanwhile, transition data are found in population censuses or various nation-wide surveys. These two data types offer different forms of migration information (Bell & Rees, 2006). Also, the distinctive nature of data collection results in different methodological approaches in measuring migration for these two data types.

This chapter describes the data and methodological approaches utilised in this study. The first section explores the various secondary data sources for migration information available in Indonesia. The rationale for the datasets used for the analysis, i.e., census and IFLS, is also discussed. The subsequent sub-chapter discusses the analytical approaches applied and the variables employed for answering the study's research questions.

4.2 Data

Migration information can be derived from a range of statistical data sources. Administrative registers, surveys, and censuses are the main sources commonly used for collecting internal migration data at national level. Administrative registration commonly records the age at the time of migration and the date of migration (Bell & Rees, 2006). Also, this system is able to capture repeat moves by the same person in a certain period. However, not every country has a reliable population registration system or enforces compulsory notification of residential changes. In Indonesia, Malamassam et al. (2016) found that only 6% of recent migrants reported residential changes to population officials in their origin and destination areas. Migration statistics based on population registration in the country only report de-jure changes of residential and might undercount de-facto population flows.

The most common source of internal migration data is censuses and national-level surveys. They generally capture migration using a transition measurement. A fixed interval of one of five years is typically used for comparing usual addresses of individuals and determining

their migration status (Bell et al., 2020). Transition data capture the location at the start and end of an observed period, which can represent origin and destination areas of migration flow. However, the data cannot inform when the residential change occurs and whether more than one move takes place (Bell & Rees, 2006). In Indonesia, censuses and national-level surveys are conducted by the country's national statistical agency: Statistics Indonesia. The agency has been mandated to undertake various official statistical data collections on a regular cycle. Since a nationwide survey on migration has not been conducted in the country,[3] official statistics on migration are obtained from censuses, intercensal surveys, national socio-economic surveys, and national labour force surveys. Table 4.1 presents the migration-related questions from these data sources.

Statistics Indonesia identifies migrants by comparing respondents' residential location at particular time points. Respondents are categorised as lifetime migrants if their place of birth differs from their current place of residence, while those who lived in a different location five years prior to the census date are classified as recent migrants. Another type of migrant, i.e., ever migrants, is obtained from intercensal survey datasets. They are defined as those who ever lived outside their current residential location.

Each dataset from Statistics Indonesia has its own advantages in providing migration-related information. Intercensal surveys provide more detailed information on migration. Meanwhile, labour force and socio-economic surveys are updated annually. Thus, they provide more a up to date migration profile compared to other official statistics. However, the sampling method for these surveys could cause undercounting of migrant populations. For example, the surveys exclude those who lived in non-residential structures (e.g., house, dormitory, boarding house) occupied by more than 10 persons. The limitation of sample size might also result in failure to capture migration flows between districts with less spatial interaction.

The census is considered the most favourable dataset for studying spatial aspects of migration. Since censuses cover everyone in the country, this data source enables more precise examination of origin–destination flows at smaller geographic areas. Also, the dataset allows for more reliable analysis of migration flows for population sub-groups with small sample sizes.

[3] In 2018, Statistics Indonesia ran a pilot national migration survey in five provinces. However, a full-scale survey on this topic has not been conducted to date.

Table 4.1 Nationwide data sources for migration information in Indonesia

Data source	Regularity	Sample size	Migration-related questions	Main Feature	Limitations
Census	Every ten years (years ending with 0)	Whole population (since Census 2000)	• Where were you born? • In which region and province did you live five years ago? • Current residence	• Free from sampling errors	• Only records spatial transitions, not migration events • Miss transitions within the time interval • Individual records cannot be linked across censuses
National Intercensal Survey (*SUPAS – Survei Penduduk Antar Sensus)*	Every ten years (years ending with 5)	0.5% the census households	• Current residence • Where were you born? • Have you ever lived in other regions? If yes, for how long? • Where was your last residence before you lived in your current residence? • Where did you live five years ago? • What was your main reason for moving from your residence five years ago?	• Covers all provinces • Identifies those who have migrated at least once during their lifetime • Detailed information is provided for the most recent migration: duration of staying and reasons for moving	• Limited sample size • Limited information on migration histories • Only records spatial transitions • Missed transitions within the time interval • Individual records cannot be linked across surveys
National Socio-Economic Survey *(Susenas – Survei Sosial Ekonomi Nasional)*	• Annually: core questionnaire • Every three years: module questionnaire (socio-cultural and education; housing and health; household consumption and expenditure)	• Core: 300,000 households • Module: 75,000 households	Only asked in core questionnaire: • Where were you born? • In which region and province did you live five years ago? • Current residence	• Covers all provinces • Migration-related information is updated annually	• Limited sample size • Only records spatial transitions • Missed transitions within the time interval • Individual records cannot be linked across surveys
National Labour Force Survey (*Sakernas – Survei Angkatan Kerja Nasional)*	Every six months (February & August)	• February: 75,000 households • August: 300,000 households	Only asked in February's survey: • Where were you born? • In which region and province did you live five years ago? • Current residence	• Covers all provinces • Migration-related information is updated annually	• Limited sample size • Only records spatial transitions • Missed transitions within the time interval • Individual records cannot be linked across surveys

Data from the nationwide cross-sectional census and surveys can provide representative migration figures in a country due to their wide data collection coverage (Lomax, 2022). However, the data only provide a snapshot of the migration profile in the corresponding year. The composition of the migrant population might be different in each cross-sectional snapshot due to dynamic mobility behaviour (UNECE, 2021). Precise timing of migration and repeat moves, in particular, are missed from migration statistics based on transition data (Bell et al., 2020; Bell & Rees, 2006).

To have better comprehension of the life-course dynamics of migration behaviour, a longitudinal approach where respondents' information is collected from the same individuals over time is needed. This approach provides a more detailed description of the socio-economic outcomes of migration (UNECE, 2021). However, the presence of a longitudinal survey with sufficient spatial coverage in Indonesia is very limited. Based on various publications on migration in Indonesia, Table 4.2 summarises three multi-location longitudinal surveys in Indonesia that cover migration information in their data collection.

Table 4.2 Longitudinal surveys with migration information in Indonesia

Data source	Survey details	Sample size	Main Feature	Limitations
Indonesian Family Life Survey	- Conducted by RAND in collaboration with University of Indonesia, UCLA, University of Gadjah Mada, and Survey Meter - Five waves (1993–2014) - Cover 13 provinces	7,224 households (1st wave)	• Extensive time coverage (20 years) • Extensive spatial coverage • Covers multi-aspects of economic and non-economic wellbeing	• Infrequent intervals • Lack of coverage for regions in Eastern Indonesia
Rural-Urban Migration in China and Indonesia (RUMiCI)	- Conducted by Research School of Economics – ANU - Five waves in five consecutive years (2008–2012) - Four cities in four provinces	2,364 urban households (1st wave)	• Focus on rural-to-urban migration • Covers extensive information on labour supply, poverty, health, and educational attainment of migrant households	• Limited time coverage (only five years) • Only conducted in urban areas • More likely to include migrants who have settled permanently in destination

Data source	Survey details	Sample size	Main Feature	Limitations
Greater Jakarta Transition to Adulthood Survey	- Conducted by Australian Demographic and Social Research Institute (ADSRI) – ANU - Three waves (2010, 2014, 2018) - Three neighbouring cities: Jakarta, Bekasi, Tangerang	3,006 individuals (1st wave)	• Focus on young adult group • Collect detailed retrospective information on education and occupation history on single year basis	• Limited spatial coverage (only Jakarta and its neighbouring cities) • Migration information based on transition data in various time points, no information on the exact time of migration

Source: Resosudarmo et al. (2009); Strauss et al. (2016); Utomo et al. (2013)

As presented in Table 4.2, it is noticeable that the Indonesian Family Life Survey (IFLS) has been the only large-scale longitudinal survey in this country to date. IFLS is a multi-topic survey that includes information on health status, education, migration, labour market, marriage, household consumption, and income. In its initial run in 1993, IFLS interviewed 7,224 households with more than 22,000 individuals in 13 provinces. Figure 4.1 displays the geographical coverage of the survey. IFLS followed the sampling frame of the 1993 national socio-economic survey by Statistics Indonesia, hence the household selection for the initial wave represents 80% of the Indonesian population (Strauss et al., 2016).

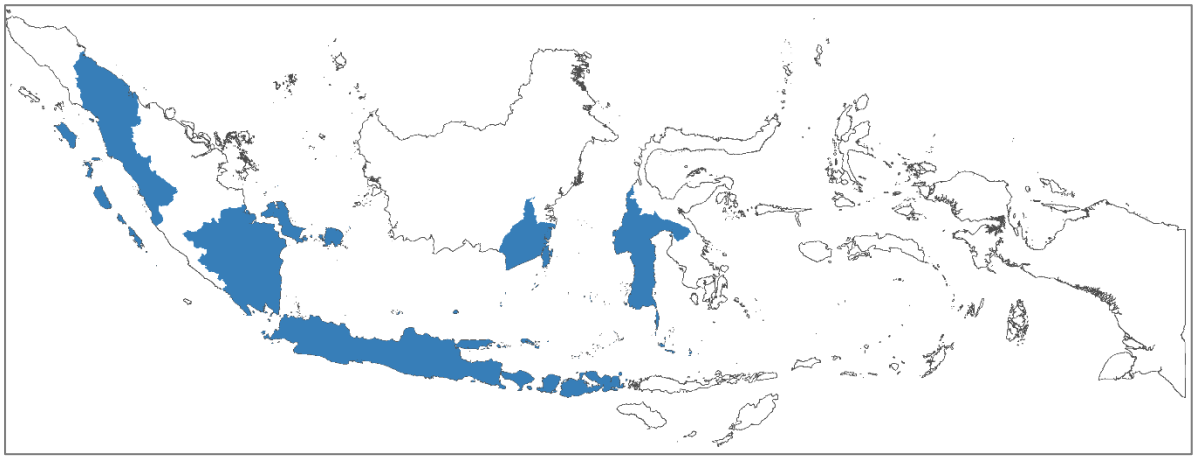

Figure 4.1 Geographical coverage of Indonesian Family Life Survey (IFLS)

Source: Author's own drawing, boundaries used are extracted from diva-gis.org

After its initial run in 1993, further IFLS waves were conducted in 1997, 2000, 2007, and 2014.[4] IFLS attempted to re-interview all original respondents of the households in the first wave in each subsequent wave, including those who had moved. New households are attributed to split-off households from the earlier waves (Strauss et al., 2016). Table 4.3 shows that about 89% of origin households in the first wave were re-interviewed in all subsequent waves. For the subsequent waves, the households' retention rate was more than 90%.

Table 4.3 Household samples in IFLS Waves 1–5

	Households interviewed	Households from 1st wave	Households from 2nd wave	Households from 3rd wave*	Households from 4th wave	Split-off / new households
IFLS1 1993	7,224	-	-	-	-	-
IFLS2 1997	7,698	6,821	-	-	-	877
IFLS3 2000	10,574	6,800	819	-	-	2,955*
IFLS4 2007	13,995	6,596	769	2,597	-	4,033
IFLS5 2014	16,931	6,432	650	2,147	3,687	4,015

* Including split-off/new households from IFLS2+

Source: Strauss et al. (2016)

IFLS presents comprehensive migration-related information by collecting data on retrospective migration events experienced by the respondents. The retrospective questions on migration experiences in each wave allow the examination of respondents' migration trajectories over time. Questions on the migration module in IFLS include:

- Where were you born?
- Where did you live when you were 12 years old?
- How many times have you moved?
- Where did you moved to?
- When did you move?

These questions provide measures of migration events through the collected information on the timing of each spatial movement conducted by the respondents. Retrospective and time-related questions also enable analysis of historical migration characteristics (UNECE, 2021).

Longitudinal data collection, such as panel surveys, generally faces major challenges regarding high costs and sample attrition (UNECE, 2021). The limited geographical and sample coverage of IFLS may have resulted from the high costs of conducting a panel survey.

[4] There are two additional waves in the IFLS datasets. IFLS2+ was conducted in 1998 on about a 25% sample of the earlier IFLS waves to provide insights into the effects of the global economic crisis in Indonesia. Meanwhile, IFLS East in 2012 was a cross-sectional survey that collected data in seven provinces in eastern Indonesia that were not included in the initial run of IFLS. This study only observed respondents in the main waves of the survey.

Due to this limitation, Dong (2016) emphasised that the analysis of IFLS datasets should not be intended to depict a representative profile of the Indonesian population. However, the longitudinal approach of IFLS can be utilised to provide a more nuanced understanding of the demographic behaviours of the population since it offers richer information than other nationwide surveys. Moreover, the panel survey could suffer from potential missed information on initial respondents that migrated between waves and cannot be tracked in new locations. Therefore, migrants commonly have a high attrition rate in longitudinal surveys. Ensuring that the lost samples' characteristics are similar to the remaining ones is critical to ensure that the attrition does not create bias in the study's results (UNECE, 2021)

Based on the main features of each dataset, this study utilises migration information from both cross-sectional censuses and longitudinal surveys. To examine the spatial structure of migration (Chapter 5), the analysis employs the full enumeration records of the 2000 and 2010 Censuses (Statistics Indonesia, 2000, 2010).[5] Since this study focuses on the young adult population, subset samples for persons aged 15 to 34 years were created for each census dataset. This age span marks the dominant group in the migration profiles across countries (Bernard, 2014).

The subsequent analysis extends the migration analysis beyond a single-event approach and focuses on the migration trajectories of individuals (Chapters 6 and 7). Migration information from longitudinal datasets of IFLS (Frankenberg & Karoly, 1995; Frankenberg & Thomas, 2000; Strauss et al., 2004, 2009, 2016) is utilised to answer the corresponding research questions. While IFLS records retrospective residential mobility for lower administrative boundaries (across villages), this study only counts inter-district moves. This is because long-distance moves are largely driven by differences in education and employment opportunities, while short-distance moves are mainly linked to residential preferences (Clark & Huang, 2004). Moreover, the two chapters only considers migration events for persons over the age of 15 years, based on the assumption that this age signifies the onset of individuals' autonomous decision-making (Wajdi, Mulder, et al., 2017). Also, the age of 15 marks the common age of completion of compulsory education (lower secondary school) in Indonesia. However, the sample was restricted to those aged 34 and above in the latest survey in which they participated. This restriction is applied to ensure that all samples are observed within a similar time span. The sample selection starts by pooling together any respondents aged 34 years and above in

[5] While the most recent Indonesian census was conducted in mid-2020 and the first results of the census were released in late 2020, the full redistricted datasets have not been launched as yet.

each wave. Moreover, only those with complete information proceed to the subsequent analysis. This means that the samples provide complete information about other observed trajectories, i.e., marital, employment, and education.

IFLS provides sampling weights to address its limitations on sample selection and geographical coverage. Unfortunately, longitudinal sample weights are only provided for samples who participated in the initial wave of the survey. Since not all observed samples in this study have participated since the initial wave (Appendix 4.1), sampling weights are not applied for the analysis. Okumura (2019) also stated that constructing weights for IFLS datasets can be inaccurate due to the lack of detailed information on the study design, sampling selection, and survey operationalisation.

Due to the limitations of the sample selection approach in this study, IFLS might not be an ideal data source to represent the migrant population in Indonesia. While migration is more common in IFLS datasets than in intercensal surveys (Table 4.4), it is evidenced that the proportion of migrants is remarkably high as education level increased in both datasets. Also, more males migrated than females. There are higher proportions of migrants from younger generations compared to the older cohorts in both data sources. These converging patterns should give grounds for the utilisation of IFLS in explaining the dynamics of migration behaviour in Indonesia.

Table 4.4 Distribution of migrants*, Intercensal Survey 2015 and IFLS Waves 5

	Intercensal Survey 2015**	IFLS Waves 5 (2014)
Proportion of migrants	29%	42%
Proportion of migrants by education background		
- Primary or below	21%	29%
- Lower secondary	33%	43%
- Upper secondary	43%	47%
- Tertiary	53%	62%
Proportion of migrants by sex		
- Female	28%	39%
- Male	31%	45%
Proportion of migrants by birth cohort		
- Before 1960	26%	32%
- 1960s	31%	39%
- 1970s	31%	48%
- 1980s	30%	44%

* Migrants are defined as those who ever moved across sub-provincial/district boundaries
** Only including those aged 34 years old and above
Source: Author's calculation based on data from Statistics Indonesia (2015) and Strauss et al. (2016)

4.3 Method

4.3.1 Analytical Approach

Each analytical chapter applies a specific methodological approach to answer the corresponding research question. The first analytical chapter (Chapter 5) aims to understand the spatial structure of youth migration and its relation to migrants' educational background. In the migration context, spatial structure refers to interaction between places where migration flows start and end or origin and destination areas. The typical two-way origin by destination table can be disaggregated into several components to point out the structural patterns and spatial connectedness between regions. This study adopts work by Rogers et al. (2002) and Raymer et al. (2006) in disaggregating origin–destination flows, as follows:

$$n_{ij} = T * O_i * D_j * OD_{ij}$$

where, n_{ij} : an observed flow of migration from region i to region j

T : overall component (total number of migrants)

O_i : origin component (proportion of migrants leaving region i)

D_j : destination component (proportion of migrants moving to region j)

OD_{ij} : interaction component between origin i and destination j (ratio of observed to expected migration)

A linear regression model is also used in Chapter 5 to study the effects of regional-level factors on the spatial structure of youth migration in Indonesia. The OLS (ordinary least square) method, in particular, is applied to estimate coefficients in a linear regression model and explain the relationship between a set of independent variables and a continuous dependent variable. The regression models developed in this study incorporate all corresponding values from the multiplicative model (O_i, D_j, OD_{ij}). The OLS regression model formulated is as follows:

$$\ln Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots$$

where, Y : component values (O_i, D_j, or OD_{ij})

$X_1, X_2, \ldots$: explanatory variables

The second analysis (Chapter 6) aims to understand the initiation of the migration trajectory and its association with the education trajectory of the migrants. While previous studies have presented age schedules of migration in Indonesia using information from census datasets (Bell & Muhidin, 2009; Sukamdi & Mujahid, 2015; Wajdi, Mulder, et al., 2017), the

age profiles represent the ages of migrants at the time of data collection, not ages at the time when migration occurred. Rather than capturing the timing of migration, information on ages from census data is more suitable for capturing individuals' birth cohorts (Bell & Rees, 2006). Utilising detailed information on migration history from the IFLS datasets, this study captures the exact age at first migration of the respondents.

Examination of age at first migration during the young adult period started with visualisation of the age schedule using kernel density estimation. This is a technique for estimating probability distribution over the values of random variables (Węglarczyk, 2018). Kernel smooths the 'sharp' distribution of the series of $\{X_1, X_2, \ldots, X_n\}$ samples of N observations into a symmetrical or asymmetrical interval centred around X_i. This approach enables better representation of the probability distribution function than a traditional histogram.

Survival analysis is further applied in order to examine the likelihood of migration occurrences among the young adult population. Among various inferential statistics approaches, survival analysis is the preferred method since the main interest in this chapter is time until an event occurs, i.e., first migration. Thus, detailed examinations of the pattern of age at first migration and how it relates to the educational pathways of the migrants are conducted by employing Kaplan-Meier estimates. This method calculates the probability of first migration in whatever year within the age range of 15 to 34 years old. Besides being useful for analysing time to event data, this approach is particularly favourable for comparing the probabilities of experiencing events of interest among several observed groups (Rich et al., 2010). Moreover, the Cox proportional hazard regression model is applied to examine predictor variables to the likelihood of the first migration event. This model is the foremost method in estimating regression models for event history data (Allison, 2014) and it is particularly useful for measuring the effects of simultaneous risk factors or exposures to survival time (LaMorte, 2016). Hazard can be defined as the probability of experiencing the event of interest. By using person-years as the unit of exposure to experience the event of interest, i.e., first migration, the Cox proportional hazard regression model is formulated as follows:

$$h(t) = h_o(t) \exp (b_1X_1 + b_2X_2 + b_3X_3 + \ldots)$$

where h(t) is the expected probability of first migration at age t, $h_0(t)$ is the baseline probability and represents the probability when all the predictor variables are equal to zero. X_1 is the main predictor variable, i.e., educational attainment, and X_2, X_3, … are other predictor variables.

The analysis in Chapter 7 is conducted to understand variations in youth migration trajectories by educational attainment. Bell (1996) argued that migration measures based on census and other cross-sectional data overlook the diversity of individuals' migration experiences. Various measures have been introduced to estimate migration trajectories across lifetimes, including migration expectancies, migration frequency, and duration of residence (Bell, 1996). Bernard (2017b) also emphasised that understanding migration across the life course is critical to identify the demographic processes behind migration behaviour. Based on the availability of migration information from IFLS datasets, this study combines several measures – adopted from studies on cohort migration by Bell (1996) and Bernard (2017b) – to estimate the level of migration during young adulthood. The indicators of levels of migration calculated in this study are presented in Table 4.5.

Table 4.5 Indicators of levels of youth migration

Indicator	Definition	Equation
Youth migration rate	The average number of moves per person between the ages of 15 and 34	YMR = N / P
Single youth migration ratio	Proportion of people who move at least once between the ages of 15 and 34	SYMR = M / P
Additional youth migration ratio	Proportion of moves during young adulthood that are missed by counting only one migration per person aged 15 to 34 years	AMR = (N–M) / N
Repeat youth migration rate	The average number of moves per migrants aged 15 to 34 years	RYMR = N / M
Youth migration frequency distribution	Proportion of population aged 15 to 34 years who have moved exactly *i* times	$YMFD_{(0,i)} = \frac{P_i}{P}$
Youth migration progression ratios	Proportion of individuals who have moved *i* times who went on to move at least once more between the ages of 15 and 34	$YMPR_{(i,i+1)} = \frac{M_{i+1}}{M_i}$
Age at migration	Age at which young people aged 15 to 34 years moved	
Migration interval	Time (in years) between two consecutive moves during young adulthood (15 to 34 years)	

Notes: P = total young population; M = total number of young migrants; N = total number of moves during young adulthood

Source: Adopted from Bell (1996) and Bernard (2017b)

Examinations of individuals' spatial trajectory have been performed through various approaches. Bernard and Kalemba (2022) applied sequence analysis to sort the group individual migration trajectories into clusters, while Klabunde et al. (2017) employed multistate modelling to understand migration decision-making processes over the life course. This study sheds light on the pattern of migration during young adult period and its association with individuals' characteristics and several life-course events. Therefore, multinomial logistic regression is considered an appropriate model for further analytical stages. This model is an extension of binary logistic regression that allows for estimation of category membership on a dependent variable with more than two categories based on multiple independent variables (Starkweather & Moske, 2011). The dependent variable for this model is youth migration pattern.

The migration pattern is categorised based on the number of moves during young adulthood and the migrants' residences by age 34. If the migrants only moved once, they are categorised as primary migrants. Those who conducted repeat moves and lived in their hometowns at age 34 are return migrants, while repeat migrants who stayed in districts other than their birthplaces and initial areas of destination are onward migrants. The model for the analysis consists of two equations and a constraint as follows:

$$\log\frac{P_2}{P_1} = a_1 + b_1X_1 + c_1X_2 + d_1X_3 + \cdots$$

$$\log\frac{P_3}{P_1} = a_2 + b_2X_1 + c_2X_2 + d_2X_3 + \cdots$$

$$P_1 + P_2 + P_3 = 1$$

where, P_1: estimated probability of being primary migrants

P_2: estimated probability of being return migrants

P_3: estimated probability of being onward migrants

X_1 : main predictor variable, i.e., educational attainment

X_2, X_3, ... : other predictor variables.

4.3.2 Variables

The main explanatory variable for each analysis in this study is educational attainment. Due to data constraints, there is a slight difference in the categorisation of education between analytical chapters. Chapter 5, which utilises migration information from census datasets, divides educational background into three groups, i.e., primary, secondary, and tertiary. Since

the datasets are snapshots of migration patterns in corresponding census years, this study uses compulsory education years at the census years as a reference for the lowest school attainment. During both censuses, the policy of nine years of compulsory education was implemented or equal to the completion of lower secondary school. Therefore, primary education refers to the highest educational attainment of lower secondary school or below (including those who graduated from elementary school only and those with no education), while secondary education represents the completion of upper secondary school (year 12). Further, tertiary education covers diploma, undergraduate or postgraduate qualifications. It is important to note that information on respondents' education in the datasets only allows us to understand their educational background at the census. Since no information is available on the time frame of the education trajectories, there is a possibility of imprecise deductions about the link between education and migration structure.

For the analysis of age at first migration as well as levels and patterns of migration (Chapters 6 and 7), the samples from IFLS datasets are categorised into four groups following the division of the formal school system in Indonesia, i.e., primary or below, lower secondary, upper secondary, and tertiary. This categorisation is chosen since the analysis of educational attainment in these chapters emphasises the transitions in the school system. The complete information on the timing of migration and school transition events in the IFLS datasets enables comprehensive discussion of the migration-education nexus within the context of life-course trajectories.

The OLS regression models to explain factors associated with the spatial structure of migration in Chapter 5 include additional regional-level predictors that are also derived from census. The predictors cover three main aspects of regional dynamics in Indonesia, i.e., population profile, regional development, and cultural contexts. Population size and old-age dependency ratios are variables employed for estimating the effect of regions' population profile in differentiating the education-specific spatial structure of migration. Variables of the proportions of tertiary-educated people and non-agricultural workers are also included to represent the influence of the level of regional development on in- and out-migration flows. Further, ethnic heterogeneity captures cultural contexts that could attract or repel migrants.

To estimate factors affecting origin–destination interaction, the predictor variables include regional contiguity and connectivity, lifetime migration stock associations, employment rate ratios, and non-agricultural workers' rate ratios. Regional contiguity and connectivity signify physical distance and networks across regions. Lifetime migration stock

associations illustrate the corresponding ratio between migrant stock from a particular origin area and the migrant population in a destination region. The associations depict social and cultural ties between regions. Moreover, ratios of employment rate and non-agricultural labour rate illustrate relative employment opportunities and economic development associations between regions.

For the estimation of age at first migration in Chapter 6, other explanatory variables included in the Cox proportional hazard regression models are sex, birth cohort, type of origin areas, and childhood migration experience. The multinomial regression model in Chapter 7 also employs similar sets of explanatory variables to those utilised in the earlier chapter. However, additional predictor variables related to migrants' life-course trajectories are also included in the regression model. The life-course trajectories observed in the model cover education, employment, and marital domains. The variables used for explaining migrants' educational careers are highest educational attainment, schooling trajectory after the initial migration, and timing of school continuation. Next, entry to workforce and timing of first work are used as predictor variables for employment trajectories. Lastly, the dependent variables for marital trajectories are changing of marital status after the initial migration and timing of marital-related events.

4.4 Conclusion

This chapter reviews the available data sources for migration analysis in Indonesia. As discussed in earlier sections, the distinctive nature of migration-related information can be observed from cross-sectional and longitudinal datasets. Official statistics provide migration information from nationwide cross-sectional datasets. Wide spatial and sample coverage of these datasets provide a great basis for examining spatial aspect of the migration dynamics. However, the nature of the migration-related questions, which only highlight changes in residential places, offers limited information on the migration dynamics of the observed population. On the other side, a large-scale longitudinal survey, such as IFLS, is handy in bringing a more nuanced understanding of the migration dynamics. While this survey is lacking in its representativeness of the whole Indonesian population, particularly at sub-national level, its comprehensive migration-related questions allow for thorough examination of individuals' migration histories. It can be said that the utilisation of both datasets offers complementary insights into migration dynamics in Indonesia. Therefore, both cross-sectional and longitudinal datasets are utilised to answer this study's research questions.

In order to obtain better understanding of the interrelationships between youth migration and educational outcomes in Indonesia, various methodological approaches are applied during the analytical stages in this study. The variations in the analytical approaches emphasise the multi-dimensional nature of the migration dyamics. The multiplicative component method and OLS regression are applied to understand the spatial structure of education-specific migration flows. Moreover, examination of the initiation of youth migration trajectories and its relation to educational pathways are conducted through several techniques, i.e., kernel density estimation, Cox hazard regression model, and Kaplan-Meier estimates. Further, several cohort measures of migration are adopted to show the levels of youth migration. Lastly, the multinomial logistic regression is conducted to understand the effect of life-course trajectories on migration patterns.

Chapter 5 Spatial Structure of Youth Migration in Indonesia: Does Education Matter?[6]

5.1 Introduction

Young adults in Indonesia are the main contributors to population redistribution within the country. One out of 10 Indonesians aged 20 to 24 years moved between districts in 2015, representing the highest mobility rate among all age groups (Muhidin, 2018). The country's peak migration in young adulthood resembles a typical schedule of age-specific migration that also contains a low rate of child migration and gradually declining levels until retirement age (Rogers & Castro, 1981). Young adult selectivity in migration flows can be viewed as the direct consequence of life-course pathways, such as pursuing higher education, entering the labour force, getting married and childbearing (McDonald et al., 2013).

Besides age, education is another important determinant in explaining migration. Higher levels of education are known to increase propensities to migrate (Bernard & Bell, 2018). However, educational selectivity of migration may vary across regions, age groups and cultural backgrounds (Shryock & Nam, 1965; Williams, 2009). For people living in rural areas, for instance, low- and middle-educated populations have shown high rates of migration. Their moves can be attributed to limited opportunities in origin areas and pressure to obtain higher incomes or more stable employment activities (Maddox, 2010).

Migration is argued to be geographically distinct since regions differ in their attraction, loss and retention of young people (Smith et al., 2014). Young migrants, in particular, have been highly attracted towards big cities. Career opportunities and regional differences in labour market returns have been the main factors in explaining this spatial pattern (He et al., 2016; Liu et al., 2017). Lifestyle amenities can be another crucial factor influencing the young population's spatial preferences (He et al., 2016). Educational background has also become a critical factor in migration direction. Regions that offer more extensive skilled job opportunities and occupational mobility have a greater ability to attract highly educated migrants (Fielding, 1992; Findlay et al., 2009; Liu et al., 2017; Venhorst et al., 2010). In addition, the rapid growth of informal sectors can be a major pull factor for low-educated migration to big cities (Jones et al., 2016; Suzuki & Suzuki, 2016).

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As a large archipelagic country of around 270 million persons with a wide array of social and cultural backgrounds as well as variations in regional education profiles, Indonesia provides a unique context for studying education-specific migration flows. Demographic characteristics and spatial patterns of internal migration in Indonesia have been studied extensively (Rangkuti, 2016; Sukamdi & Mujahid, 2015; Tirtosudarmo, 2009; Wajdi, Adioetomo, et al., 2017; Wajdi, Mulder, et al., 2017). Some studies have also explained the relationship between education background and migration in the country (Adioetomo et al., 2014; Bernard & Bell, 2018; Jones et al., 2016; Muhidin, 2018). However, little is known about the variation of spatial patterns of migration by educational background. It is important to examine the underlying spatial structures of education-specific migration flows since regions' abilities to attract and retain education-specific population groups have implications for their human capital accumulation (Bjarnason & Edvardsson, 2017). Thus, by focusing on the young adult population as the group with the highest migration propensity across all ages in this country, this study aimed to fill the gap in knowledge on the spatial structure of youth migration in the Indonesian context.

The following research questions were explored in this study. First, to what extent can the spatial structure of youth migration and its changes be explained by migrants' education background? Second, what underlying factors explain the education-specific spatial structure of youth migration and its changes? Following Rogers et al. (2002), this study defines the spatial structure of migration as a description of interregional migration flows that explains the relative push and pull factors of each region and identifies levels of spatial interactions between places. Examination of the links between education and the spatial structure of migration in Indonesia provides a foundation for a better understanding the implications of migration for human capital accumulation across regions.

5.2 Literature Review

5.2.1 Internal Migration in Indonesia

Internal migration dynamics in Indonesia can be explained by three major narratives. The first is population resettlement due to state intervention in the form of a transmigration program that peaked in the early 1980s and ran until the end of the 1990s (Charles-Edwards et al., 2016; Tirtosudarmo, 2009). This policy was the national government's attempt to reduce population pressure in Java Island and redistribute agricultural households to less densely populated regions. The second narrative is migration motivated by income differentials and employment

divergence across regions (Charles-Edwards et al., 2016; Muhidin, 2018; Sukamdi & Mujahid, 2015; Tirtosudarmo, 2009; Vidyattama, 2016). Population flows for this reason are mainly towards urban areas (Jones & Mulyana, 2015). The third is population mobility influenced by the cultural or social norms of communities or ethnic groups (Tirtosudarmo, 2009). Some highly mobile ethnic groups, such as Minang, Batak and Bugis, view migration as a rite of passage whereby young people leave their hometowns to seek knowledge and life experience or to earn a living elsewhere. Overall, migration in Indonesia is motivated mainly by family and economic factors (Muhidin, 2018). However, there has been an increasing trend in migration for education-related motives in recent years.

Nearly two-thirds of recent migrants were aged between 15 and 34 (Statistics Indonesia, 2016a). It is also estimated that nearly one-half of young Indonesians have experienced spatial movements before age 30 (Muhidin, 2018). Figure 5.1 shows the schedule of migration by age in 2000 and 2010, with the latter showing a higher migration intensity in the early 20s. The peak age for migration in Indonesia is notably younger than that in many other countries (Charles-Edwards et al., 2017). In terms of education, migrants tend to be better educated than non-migrants (Adioetomo et al., 2014; Sukamdi & Mujahid, 2015). Indonesians with a tertiary education degree, in particular, are 3.6 times more likely to move than their peers with no formal education (Bernard & Bell, 2018). About 36% of migrants have the highest educational attainment of senior high school, whereas only 18% of non-migrants have a similar qualification. Moreover, 11.8% of migrants have a tertiary degree, and only 5% of non-migrants have graduated from tertiary institutions.

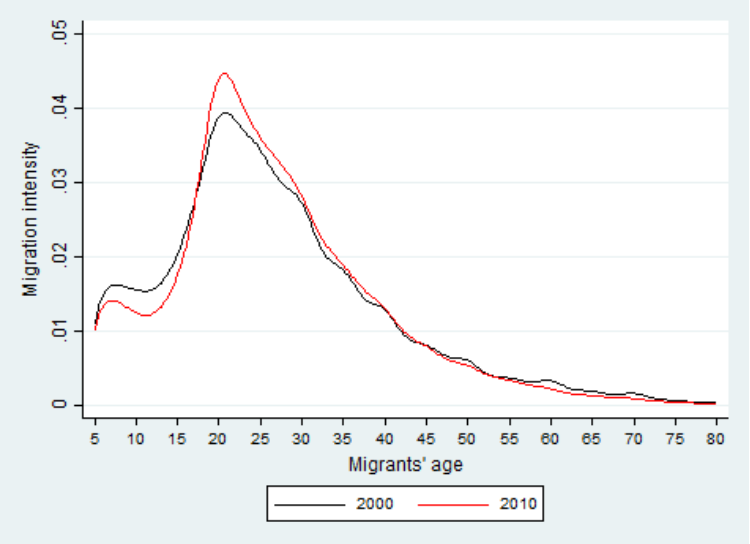

Figure 5.1 Age profile of recent migration in Indonesia, 2000 & 2010

Source: Author's estimations based on data from Statistics Indonesia (2000, 2010)

There has been a decreasing tendency of overall internal migration levels and a higher intensity of longer distance movement in Indonesia in recent years (Sukamdi & Mujahid, 2015). Moreover, regions with the highest net youth migrants were all associated with the growth of Jakarta and its surrounding areas (Adioetomo et al., 2014). The outer regions of Jakarta have become destination regions for highly educated migrants from Jakarta, while the capital city attracts a huge number of low-educated migrants from various provinces in Indonesia (Jones at al., 2016). Similarly, Wajdi, Adioetomo, et al. (2017) found that migration flows in Indonesia are mainly towards more developed regions, such as regions in Java Island. However, Java also acts as an important source of migrants and exhibits an increasingly negative net migration rate (Adioetomo et al., 2014). Increasing migration intensities toward the eastern part of Indonesia – regions that are considered less developed – have become the most noticeable trend of population mobility in recent years (Sukamdi & Mujahid, 2015). Less developed regions are argued to offer accelerated career trajectories for educated migrants because of their less competitive labour market amid the growth of knowledge-based sectors in the regions (Malamassam et al., 2021).

5.2.2 Spatial Patterns of Education-Specific Migration Flows

Education is an important influence on the spatial patterns of internal migration. Less developed areas tend to send highly educated migrants to more developed areas (Corcoran et al., 2010; Whisler et al., 2008). The expansion of economic opportunities for skilled workers increases regions' attractiveness for highly educated migrants. Hence, this situation implies a positive linkage between education and migration (Long, 1973). However, education may also work negatively toward migration when the constraints of finding work opportunities for low-educated individuals in their areas of origin push them to migrate (Gould, 1982). This situation may also drive rural to urban migration amongst low-skilled people. Education may work as a motive for migration, particularly for pursuing tertiary degrees. Although migration for pursuing tertiary education has not been a prominent feature of internal migration in many countries, this type of migration has a noticeable impact on the age and spatial structure of youth migration (Wilson, 2015). Not only is it concentrated mainly in a particular age group, but the spatial structure of tertiary student migration mostly involves movement from rural and small cities to metropolitan or provincial capitals.

Previous studies have emphasised the high intensity of highly educated migration to big cities that offer more skilled job opportunities and higher wages (He et al., 2016; Liu et al.,

2017; Venhorst et al., 2010). However, in developing countries, growth in skilled job opportunities is likely to be followed by the development of informal sectors. Thus, urban labour markets provide not only economic opportunities for skilled workers but also extensive low-skilled job opportunities (Suzuki & Suzuki, 2016). This situation has resulted in migration towards urban areas by both the highest and the lowest-educated individuals. While young migrants tend to move to regions near to their hometowns because of regional familiarity (Fafchamps & Shilpi, 2013; Venhorst, 2013), highly educated migrants have higher propensities to make long-distance movements (Rosenbloom & Sundstrom, 2004; Spring et al., 2016). In addition, flows of highly educated migration have distinct geographical patterns from other types of migration (Engbersen & Snel, 2013). Moreover, rural–rural and urban–urban migrants are likely to be more highly educated than rural–urban migrants (Rebhun & Brown, 2015).

While the pattern of urban–rural migration has substantial implications for rural development (Lomax et al., 2014), rural and remote areas are rarely discussed as popular destinations for young migrants. However, these areas may attract highly educated migrants with specialised qualifications, such as medicine, education or public service (Martel et al., 2013). Their skills and qualifications, along with the additional support provided by the government, may boost their careers and give them higher salaries. At the regional level, since this type of migration often features in-migrants with higher educational attainment than rural natives, this situation can help create more jobs in service sectors, extend social networks, and accelerate economic growth in rural areas (Lomax et al., 2014). Unfortunately, graduates' migrations to such areas are often for short time periods only, as migrants are motivated to secure their first entry to the workforce but plan to migrate elsewhere once they have settled in the labour market (Corcoran et al., 2010). On the other hand, young adults with low earning and less-skilled professions are argued to have higher odds of migrating from urban to rural areas (Stockdale & Catney, 2014), particularly during the life-course stage of household formation.

5.3 Data and Method

This study used the full enumeration records of the 2000 and 2010 Indonesia population censuses along with subset samples for persons aged 15 to 34 years to represent the young adult population. This age range comes close to the legal definition of the youth population in Indonesia of 16 to 30.

Migrants are persons whose census region of residence was different to their region of residence five years earlier. The classification of regions in this study is an extension of Wajdi et al.'s (2015) work on classifying nearly 500 districts in Indonesia, including urban–rural characteristics. The classification of metropolitan regions is based on the Indonesian Government's Mid-Term Development Plan 2015–2019 on Regional Development, which includes eight metropolitan regions. The remaining districts are stratified according to geographical distribution, proportion of urban sub-districts and share of the urban population. The regional classification used in this study is illustrated in Figure 5.2.

The distribution of youth migrants across regions in Indonesia over two censuses is presented in Table 5.1. There were 4,553,363 young interregional migrants in 2000, or about 6% of the total young population in Indonesia. In 2010, the number of young migrants increased slightly to 4,569,146, but the proportion decreased by 0.5%. Most young migrants resided in metropolitan and urban areas, and only about one-quarter lived in rural areas. These patterns persisted between the two censuses. Further, regions in Java and Bali were consistently shown as major origin and destination regions in the country. The youth migrant population in metropolitan regions tended to decrease over the 10 years, while many urban and rural regions in other islands had an increasing share of youth migrants, for example, urban and rural areas beyond Java, Bali and Sumatera islands.

Educational backgrounds are divided into three groups: (i) primary education, which refers to those whose highest educational attainment is junior high school or below (includes those who graduated from elementary school only and those with no education); (ii) secondary education, which represents those who completed senior high school; and (iii) tertiary education, which covers young adults who had earned a diploma, undergraduate or postgraduate qualification.

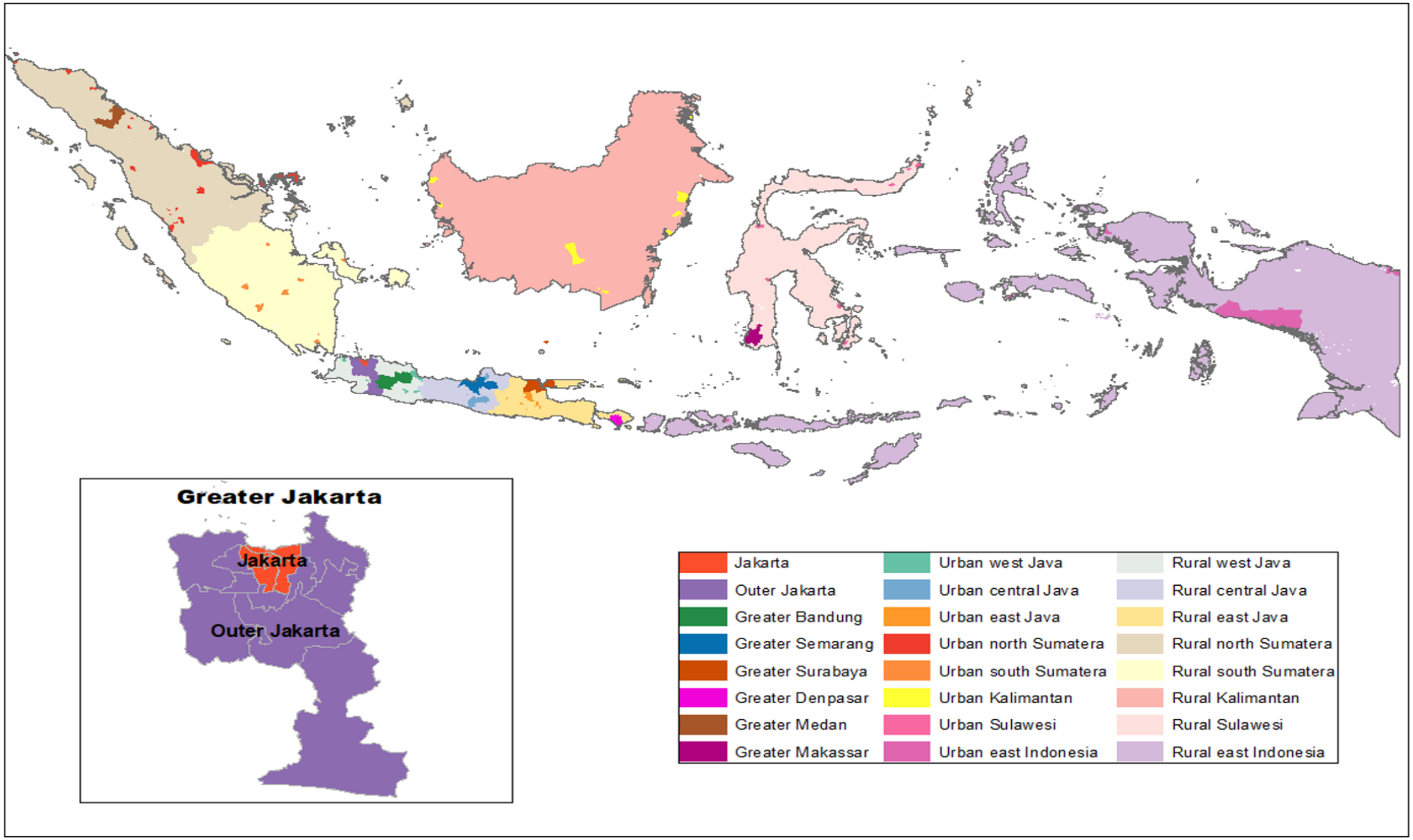

Figure 5.2 Map of regional classification in Indonesia

Source: Author's own drawing, boundaries used are extracted from diva-gis.org

Table 5.1 Distribution of youth migrants across regions in Indonesia

Region type	Island	Region	Number of districts	% population aged 15–34		Share of youth out-migration		Share of youth in-migration		Total youth in-migrants	
				2000	2010	2000	2010	2000	2010	2000	2010
Metro-politan	Java & Bali	Jakarta	6	5.3	4.9	10.0	9.6	12.1	10.7	548,111	489,300
	Java & Bali	Outer Jakarta	9	7.1	8.8	3.7	4.0	17.8	17.3	808,972	791,067
	Java & Bali	Greater Bandung	6	4.4	4.3	3.2	3.2	4.9	4.2	220,138	190,680
	Java & Bali	Greater Semarang	6	2.7	2.5	2.9	2.4	2.7	2.3	121,528	103,789
	Java & Bali	Greater Surabaya	7	4.4	3.9	2.4	2.8	4.1	3.4	184,812	157,273
	Java & Bali	Greater Denpasar	4	0.9	0.9	0.5	0.5	1.9	2.2	84,399	98,770
	Sumatera	Greater Medan	4	2.3	2.0	3.2	3.3	2.1	2.0	94,366	90,955
	Sulawesi	Greater Makassar	4	1.2	1.2	1.2	1.4	1.9	1.9	86,663	86,773
Urban areas	Java & Bali	Urban west Java	9	2.6	3.2	3.1	2.7	2.8	2.9	128,274	131,288
	Java & Bali	Urban central Java	16	6.1	5.3	8.6	7.2	6.4	5.9	291,986	269,010
	Java & Bali	Urban east Java & Bali	10	2.2	1.9	3.1	2.1	1.2	2.4	55,003	111,678
	Sumatera	Urban north Sumatera	22	2.0	2.6	4.0	4.2	6.9	7.5	314,071	341,456
	Sumatera	Urban south Sumatera	12	1.8	2.0	3.6	3.3	2.6	2.9	119,237	134,560
	Kalimantan	Urban Kalimantan	10	1.4	1.7	1.6	2.1	3.2	3.6	145,606	164,202
	Sulawesi	Urban Sulawesi	10	0.7	0.9	0.9	1.7	1.8	2.4	79,724	108,179
	Eastern Indonesia	Urban eastern Indonesia	9	1.2	1.5	1.5	1.3	2.0	2.9	92,510	134,058
Rural areas	Java & Bali	Rural west Java	10	7.9	7.1	8.1	7.5	3.9	2.2	177,521	100,921
	Java & Bali	Rural central Java	18	7.2	6.0	11.3	11.4	3.3	2.6	151,257	117,934
	Java & Bali	Rural east Java & Bali	26	10.8	9.3	8.4	8.9	2.2	2.4	100,705	108,310
	Sumatera	Rural north Sumatera	68	6.7	8.2	6.9	6.3	4.6	5.1	207,908	231,830
	Sumatera	Rural south Sumatera	45	7.4	7.3	3.4	3.8	4.3	3.9	197,102	178,562
	Kalimantan	Rural Kalimantan	45	4.3	4.5	1.8	2.3	3.5	4.6	159,576	211,858
	Sulawesi	Rural Sulawesi	59	5.2	5.0	3.7	4.2	2.1	2.4	96,531	108,345
	Eastern Indonesia	Rural eastern Indonesia	82	4.1	5.0	2.9	3.7	1.5	2.4	67,363	108,348
Share of total population aged 15–34				37.5	34.5	Total youth migrants				4,553,363	4,569,146

Source: Author's estimations based on recent migration data from Statistics Indonesia (2000, 2010)

In analysing the spatial structure of migration, this study applied the multiplicative component methodology (Raymer et al., 2006; Raymer & Rogers, 2007; Rogers et al., 2002). The multiplicative component model disaggregates migration flows into four components, namely, (i) level of migration (overall component); (ii) relative push factors from each region (origin component); (iii) relative pull factors to each region (destination component); and (iv) other factors affecting migration that are not explained by the push and pull factors, such as physical or social distance (interaction component). Using the multiplicative component method, the analysis indicates the relative push and pull factors of each region as well as the spatial connectedness between each pair of regions within the migration system (Rogers et al., 2002). This method provides a conceptually straightforward tool to study the spatial structure of migration.

For each education level, the disaggregation of migration flows in multiplicative form is as follows:

$$n_{ij}(x) = T(x) * O_i(x) * D_j(x) * OD_{ij}(x)$$

where,

$n_{ij}(x)$: an observed flow of migration from region i to region j for education level x

$T(x)$: overall component (the total number of youth migrants for education level x)

$O_i(x)$: origin component (the proportion of youth migrants leaving region i for education level x)

$D_j(x)$: destination component (the proportion of youth migrants moving to region j for education level x)

$OD_{ij}(x)$: interaction component between origin i and destination j for education level x

The origin–destination flows of youth migration – $O_i(x)$ and $D_j(x)$ – corresponding to primary, secondary and tertiary education levels in 2000 and 2010 are visualised in circular plots. The application of circular plots to illustrate migration flows was first introduced by Abel and Sander (2014). These plots allow us to observe directional migration flows and identify prominent spatial patterns. The outer sectors of the circular graph represent the regions, whereas the cords connecting them indicate migration flows. The size of the cords is scaled to the volume of migration flow in thousands. The direction of the spatial movements is illustrated by arrows pointing toward the region of destination.

This study focused on analysing the spatial structure of migration regarding three components, namely origin, destination and interaction components, and examining these three

components by education level. A subsequent analysis was also included to explore how demographic, geographical, socio-economic and cultural factors are related to education-specific youth migration flows in Indonesia. The estimation of factors associated with origin, destination and interaction components was performed by running ordinary least squares (OLS) regression models. Assuming that migrants moved five years prior to the census year, all predictors in the models were lagged by five years. The lagged explanatory variables for the analysis were estimated by applying geometric interpolation and extrapolation from the data in the 2000 and 2010 censuses.

To predict factors associated with the education-specific origin and destination components of young adult migration in Indonesia, Models 1 and 2 were specified respectively as below:

$$\ln O_i = \beta_0 + \beta_1(EDU) + \beta_2(EDU*POP_i) + \beta_3(EDU*ODR_i) + \beta_4(EDU*TERT_i) + \beta_5(EDU*NAG_i) + \beta_6(EDU*EFI_i)$$

$$\ln D_j = \beta_0 + \beta_1(EDU) + \beta_2(EDU*POP_j) + \beta_3(EDU*ODR_j) + \beta_4(EDU*TERT_j) + \beta_5(EDU*NAG_j) + \beta_6(EDU*EFI_j)$$

where,

O_i : origin component from region i

D_j : destination component to region j

EDU : education level

POP : population size (in thousands, natural logarithm),

ODR : old dependency ratio (ODR)

TERT : proportion of tertiary-educated population

NAG : proportion of non-agricultural workers

EFI : aggregated ethnic fractionalised index

Regions with a large population size were expected to send and receive a large number of migrants (Raymer et al., 2011). In addition, regions with low old-age dependency ratios were expected to have a higher number of out-migrants. The proportion of tertiary-educated people represents the regions' human development levels (Venhorst et al., 2010), whereas the proportions of non-agricultural workers indicate economic development in a region. Regions with a higher development level were assumed to attract more migrants as well as to have more mobile populations. Finally, the ethnic fractionalised index was used to capture cultural heterogeneity in a region, with a higher index representing more ethnic heterogeneity. It is argued that internal migration is not free of cultural motivations because regions that offer

cultural amenities through their population's ethnic heterogeneity are likely to attract more migrants, particularly those who are educated (Crescenzi et al., 2017). This study followed Arifin et al.'s (2015) method in quantifying ethnic diversity in Indonesia.[7]

For the estimation of factors contributing to the interaction component, Model 3 was specified below:

$$\ln OD_{ij} = \beta_0 + \beta_1(EDU) + \beta_2(EDU*CONT_{ij}) + \beta_3(EDU*CONN_{ij}) + \beta_4(EDU*LT_{ij}) + \beta_5(EDU*EMP_{ij}) + \beta_6(EDU*NAG_{ij})$$

where,

OD_{ij} : interaction component between origin region i and destination region j

EDU : education level

$CONT_{ij}$: contiguity (i.e. whether region i and j share physical borders or not)

$CONN_{ij}$: connectivity (i.e. whether region i and j have direct transportation connection)

LT_{ij} : natural logarithm of lifetime migrant stock associations between region i and j

EMP_{ij} : ratio of employment rate between region i and j

NAG_{ij} : ratio of non-agricultural workers rate between region i and j

Regional contiguity and connectivity are indicators to represent physical distance and transportation networks across regions. Factors beyond physical distance are also argued to have effects on migration interaction between regions, such as social networks and relative economic factors between regions (Raymer et al., 2011). Lifetime migration stock associations were used to show social networks and cultural ties between regions. It is argued that social networks and cultural ties have prominent roles in facilitating migration (Ryan, 2011). Ratios of employment rate between origin and destination regions illustrate the relative employment opportunities between regions. Economic development associations between origin and destination areas were represented by ratios of non-agricultural worker rate. While sex has been argued as a critical determinant in explaining individuals' migration behaviour (Coulter & Ham, 2013; Kõu et al., 2015; Mulder, 1993; Ravenstein 1885, 1889), the sex of the migrants is excluded from the analysis since this model is focused on regional-level determinants. Moreover, the sex composition between regions in this study is relatively similar.

[7] Indonesia is one of the most ethnically diverse nations in the world; 1,331 ethnic categories were recorded in its 2010 census (Ananta et al., 2015). Population in-migration can have impacts on the increasing ethnic heterogeneity in destination areas and greater interactions among people with different ethnic backgrounds. In calculating the ethnic diversity in Indonesia, Ananta et al. (2015) reclassified the ethnic categories into more than 600 groups. However, this classification applies only to 2010 census data. Since this study used both 2000 and 2010 census data, the initial classification by Statistics Indonesia (2011a) that aggregated ethnic categories in Indonesia into 31 groups is preferred for the ethnic categorisation.

5.4 Origin–Destination Flows of Youth Migration Indonesia

The origin–destination flows of youth migration corresponding to primary, secondary and tertiary education levels in 2000 and 2010 are visualised in Figures 5.3, 5.4 and 5.5, respectively. The graphs highlight the top three sending and receiving regions in each education group. The blue cords indicate regions with the largest in-migration flow, and the red cords represent those with the largest out-migration flow. For Figures 5.4 and 5.5, there is an addition of yellow cords, which signify regions with a high number of both in-migrants and out-migrants.

Migration flows by those with the lowest education level (Figure 5.3) show that rural regions in Java Island accounted for the majority of out-migration flows in 2000 and 2010. Out-migration from rural central Java shows more dispersed patterns of destination regions. In contrast, out-migration from rural west Java was mainly directed to Jakarta and Outer Jakarta. Rural east Java sent mainly primary-educated migrants towards its metropolitan counterpart (Surabaya). Moreover, Jakarta and Outer Jakarta also show their dominance as destination regions for migration by the lowest education level. These two regions attracted mainly in-migrants from rural areas in Java, but it is also noticeable that they gained primary-educated migrants from other urban and metropolitan regions. Primary-educated level migration can imply a situation of higher opportunity costs of higher education in areas of origin. This situation can encourage school discontinuation, which is followed by labour market entry in other areas. Migration by this group is seen as a response to labour market demands in destination areas that do not entail high skills. For example, the rapid growth in informal sectors, alongside the expansion of economic activities, in Jakarta and Outer Jakarta can explain the high in-migration flows of low-educated migrants (Jones et al., 2016).

The migration patterns of the secondary-educated population (Figure 5.4) show that rural regions are no longer the only prominent source of young out-migrants. Jakarta sent a considerable proportion of secondary-educated migrants. At the same time, this region also attracted a high share of in-migrants with secondary level qualifications. The graphs show that Jakarta sent its young secondary-educated population mainly to its surrounding region (Outer Jakarta). However, no region shows dominance as a source of in-migration flows towards Jakarta. A similar situation was found in the in-migration pattern towards Outer Jakarta. Besides a great proportion of in-flows from Jakarta, the rest of the in-migrants originated from various regions. A great number of manufacturing plants, as well as rapid development in service sector industries such as retail and hospitality services, may explain the high level of

in-migration towards both regions. This is because early entry to work in such fields usually requires only a senior high school qualification.

Figure 5.5 shows the origin–destination patterns of tertiary-educated migration. Since tertiary education systems are mainly concentrated in metropolitan and urban areas, these regions became a prominent source of tertiary-educated migration, except for rural east Java in 2010. It is interesting to note that Jakarta in both censuses and urban central Java in 2000 simultaneously attracted and lost a remarkable proportion of highly educated migrants. The three top sending regions of tertiary-educated migrants in both censuses, namely, Jakarta, Bandung and urban central Java, are home to a great number of reputable universities, which highlights the crucial role of these regions for human capital formation in the country. However, they suffered from net outflows of highly skilled migrants due to the low retention of tertiary graduates. While Jakarta sent tertiary-educated migrants mainly to the outer part of this region, urban central Java and Bandung lost their tertiary-educated population to various regions. The remarkable tertiary-educated out-migration from Jakarta to the surrounding cities can be attributed to the rapid development of housing estates in Outer Jakarta (Jones et al., 2016).

In contrast, the increasing importance of rural areas as destination areas for tertiary-educated migrants was evident in 2010. This may indicate the existence of less centralised knowledge-based industries across regions in the country over the years. Not only did rural north Sumatera become one of the top destinations in 2010, but nearly a quarter of migrants with a tertiary degree moved toward rural regions outside Java Island between 2005 and 2010, an increase from a 13% in-migration rate in 2000. This situation may have been due to the regional decentralisation policy initiated in 1999, followed by the proliferation of many new districts across the country. The establishment of new administrative regions offered wide working opportunities in local civil services (World Bank, 2003) that commonly required tertiary education qualifications. In recent years, Indonesian governments have also launched higher incentives for certain skilled workers, such as teachers, in less developed regions (World Bank, 2008b). This policy encourages urban–rural migration by tertiary-educated groups, particularly new graduates. As suggested by Corcoran et al. (2010), some tertiary graduates are willing to take job opportunities in peripheral or remote areas for their early career entry.

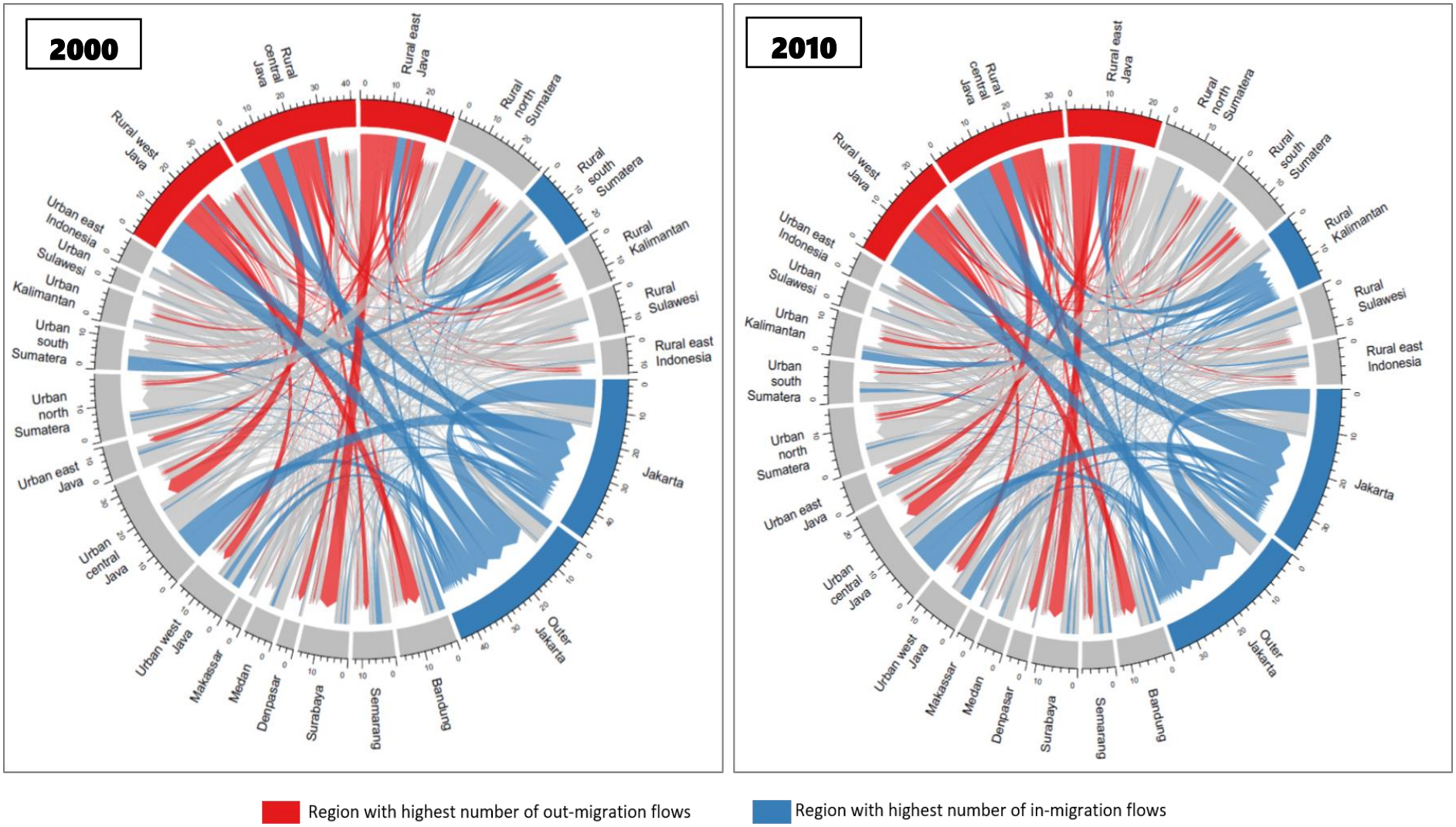

Figure 5.3 Origin–destination primary-educated migration flows, 2000 and 2010 (in thousands)

Source: Author's calculations

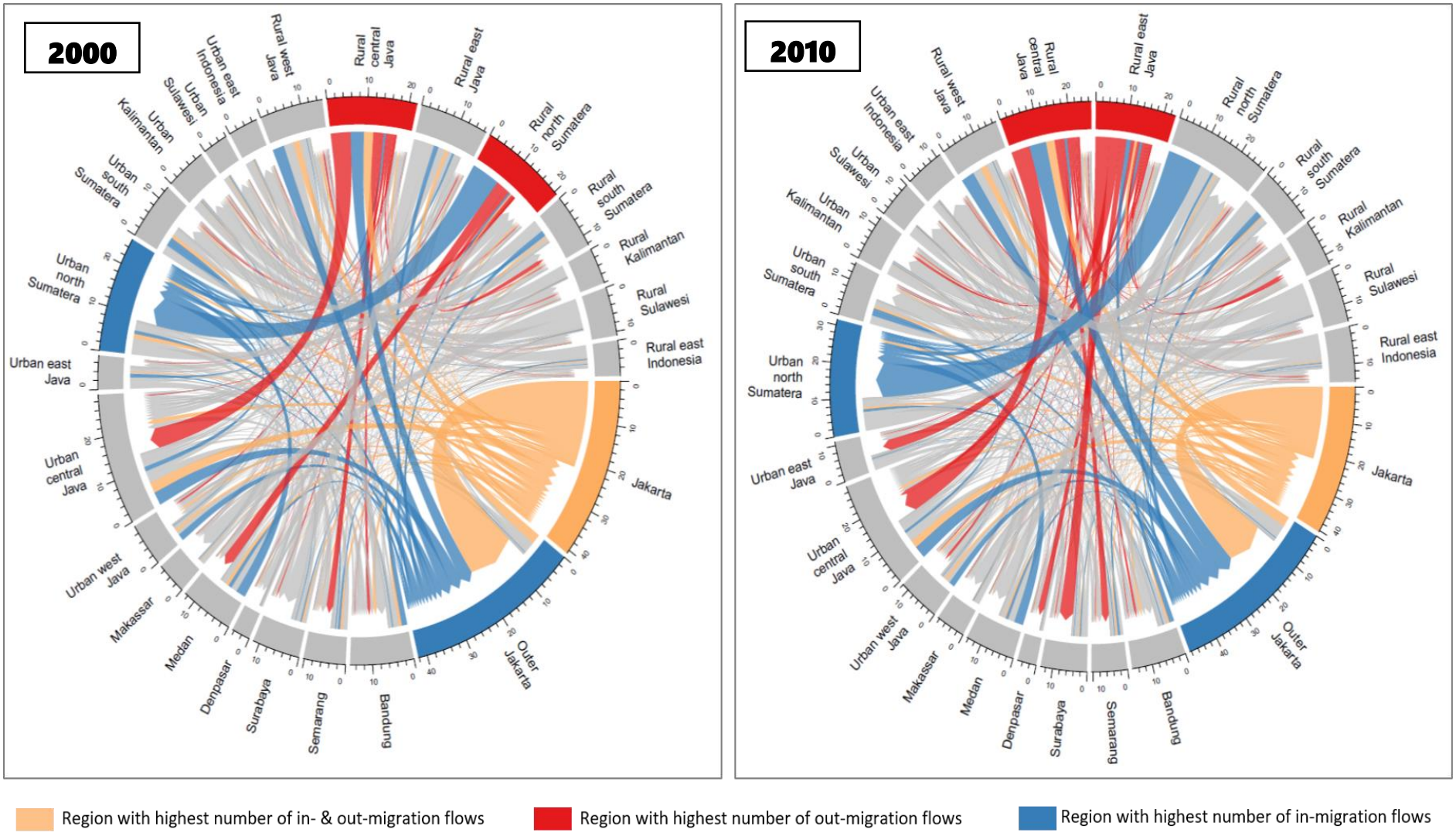

Figure 5.4 Origin–destination secondary-educated migration flows, 2000 and 2010 (in thousands)

Source: Author's calculations

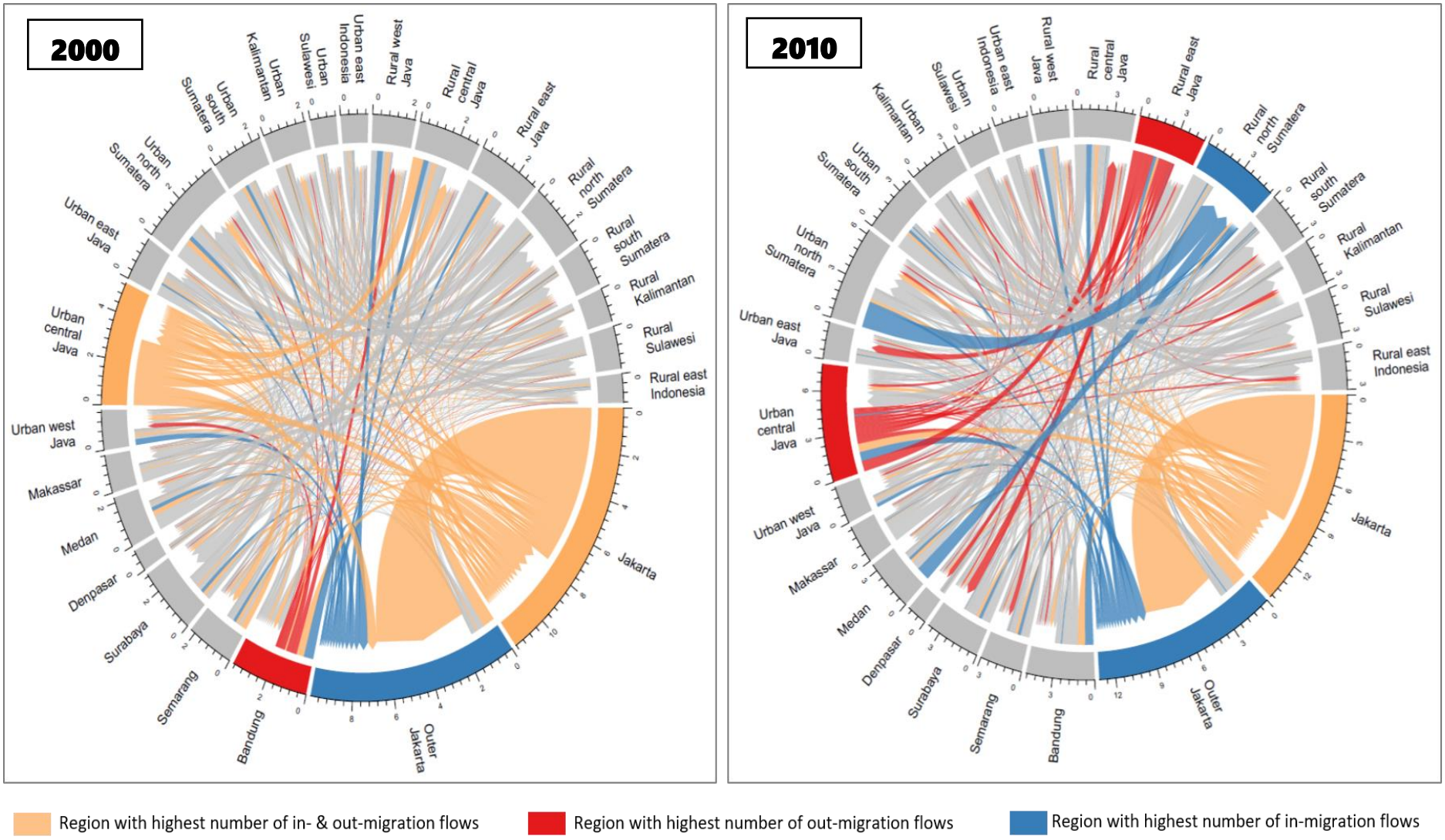

Figure 5.5 Origin–destination tertiary-educated migration flows, 2000 and 2010 (in thousands)

Source: Author's calculations

Overall, persistent patterns of origin–destination flow can be found within youth migration's spatial structure in Indonesia over the 10 years. Rural regions acted as prominent sources of primary- and secondary-educated migration, while metropolitan and urban areas sent the highest share of tertiary-educated migrants. Moreover, Greater Jakarta – which covers Jakarta and its surrounding cities – became the main destination for young migrants at any educational level.

5.5 Origin–Destination Interaction within Youth Migration Structure

Origin–destination flows show the prominent role of regions with bigger population sizes in the interregional migration structure. The interaction components from the multiplicative component model, on the other hand, illustrate the relative level of connections occurring between regions by controlling for overall levels of migration from origin regions and to destination regions.

The interaction components for education-specific migration flows in 2000 and 2010 are set out in Appendices 5.1 to 5.6. Following Raymer et al. (2006), one of the examples for the ratio interpretation of origin, destination, and interaction components of primary-educated migration in 2000 (Appendix 1) is as follows:

$$n_{(\text{Jakarta, Outer Jakarta})}(p) = T(p) * O_{\text{Jakarta}}(p) * D_{\text{Outer Jakarta}}(p) * OD_{\text{Jakarta, Outer Jakarta}}(p)$$
$$= (2{,}334{,}329) * (0.067) * (0.156) * (3.761) = 92{,}256$$

In other words, among 2,334,329 primary-educated young migrants in Indonesia in 2000, 6.7% moved from Jakarta and 15.6% moved to the cities surronding Jakarta. The interaction component of 3.761 implies that there were about 37 observed young migrants for every 10 expected migrants from Jakarta to the outer parts of this region. An interaction ratio of one or above indicates a strong association between these two places, while any ratio below one illustrates a weak association between a pair of origin and destination regions. As indicated in the appendices, the interaction ratios show a very strong association between regions within the same island. This situation illustrates a tendency for short-distance migration among young adults in Indonesia at any education level.

The following discussion emphasises the interaction components of several prominent regions in education-specific origin–destination flows, namely, in-migration towards Jakarta and Outer Jakarta, in-migration and out-migration in urban central Java, and in-migration towards rural east Indonesia.

Jakarta's importance in attracting young migrants is amplified by examining the spatial interaction values within Java Island. Figure 5.6 shows that Jakarta consistently has strong interactions with other metropolitan cities in Java for tertiary-educated migration. This situation illustrates the tendency of spatial movements within a similar development level of origin and destination areas for highly educated migrants. Working opportunities may not be the only factors influencing migration decisions within metropolitan areas. The similarity of lifestyle amenities can also be a major consideration for this type of migration. Interactions between Jakarta and rural and urban areas are particularly strong at the primary and secondary education levels. However, strong associations are shown only for regions in west and central Java, while patterns of weak associations towards Jakarta are exhibited in the interaction ratio of urban and rural areas in east Java. Since Jakarta is situated in the westernmost part of the island, regions in east Java have the least spatial connectedness with the region. This situation emphasises how geographical proximity matters for spatial interaction among regions.

Figure 5.6 Interaction components of migration by education level within Java Island towards Jakarta
Source: Author's calculations

Another prominent destination region in education-specific migration flows in Indonesia is Outer Jakarta. Figure 5.7 displays the interaction components of migration within Java towards the Outer Jakarta region. While Jakarta shows strong interactions with all other metropolitan areas within the island, Outer Jakarta had strong interaction only with Jakarta and Bandung, the two metropolitan cities with the least spatial distance to this region. In addition, the interactions for tertiary-educated migration were generally weaker than the interaction for the other two education levels.

Figure 5.7 Interaction components of migration by education level within Java Island towards Outer Jakarta
Source: Author's calculations

Urban central Java was consistently one of the top sending regions for tertiary-educated migration. The origin components illustrate that nearly 9% of tertiary-educated migrants came from this region in both censuses (Appendices 5.5 & 5.6). In addition, urban central Java simultaneously gained a noticeable portion of secondary-educated migrants (Appendices 5.3 and 5.4). Since tertiary-educated migrants may include previous secondary-educated migrants who remigrated after finishing their study, migration interactions linked to this region may also be related to the structure of tertiary student migration. Although Malamassam (2016) found that only 23% of migrants aged 15 to 24 in Indonesia moved for education-related reasons, this type of migration has a remarkable impact on the age profile of migration at the regional level (Wilson, 2015)

While metropolitan and rural counterparts of urban central Java show remarkable interactions within the secondary education in-migration patterns, this region also had strong associations with several regions beyond Java, such as urban south Sumatera, urban Kalimantan and urban east Indonesia (Figure 5.8). The strong interactions can be attributed to several factors, such as regional connectivity through ease of transportation between these urban areas, as well as the relative education and employment opportunities between pairs of origin and destination regions. Moreover, the interaction components of tertiary-educated out-migration from urban central Java show that this region's strong interactions were not limited to regions outside Java. The dispersed patterns of the origin–destination pairs illustrate more

diffuse economic opportunities for skilled workers. In addition, the interactions between urban central Java and other rural areas show increasing ratios over the years. While the pattern of urban–rural migration is more common in late adult or elderly migration, this flow is increasingly found in young adult migration (Stockdale & Catney, 2014), particularly amongst highly educated people with specific skills (Corcoran et al., 2010; Martel et al., 2013). The pattern of urban–rural migration represents the critical impact of this spatial transition on the deconcentration of the highly educated population and restructuring of rural economies (Lomax et al., 2014).

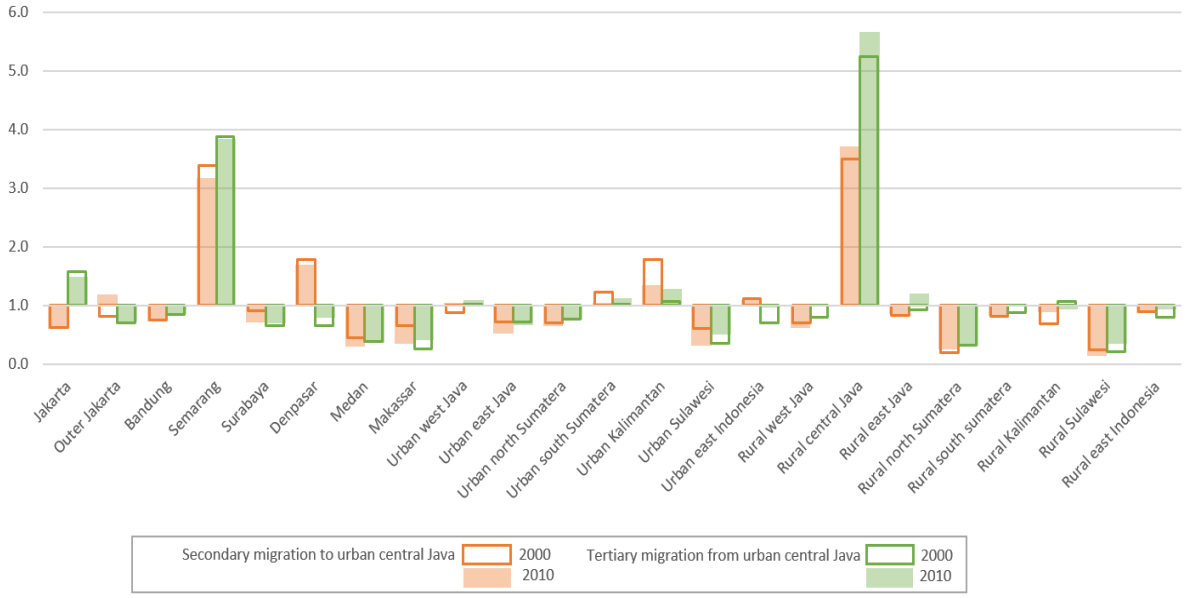

Figure 5.8 Interaction components of secondary-educated migration to urban central Java and tertiary-educated migration from urban central Java

Source: Author's calculations

The destination component for tertiary-educated migration towards rural east Indonesia markedly increased from 1.8% in 2000 to 4% in 2010 (Appendices 5.5 and 5.6). Since rural east Indonesia is generally considered the least developed region in the country, this situation may illustrate improved attraction towards this region over time. Figure 5.9 shows a tendency of weaker interactions of tertiary-educated migration towards this region between 2000 and 2010, particularly with some nearby regions, such as Denpasar, Makassar, urban and rural east Java, and urban east Indonesia. However, interactions with regions in the western part of Indonesia show slightly increased ratios. Improvement in regional connectivity between the western and eastern parts of the country may have affected this situation. In addition, better knowledge-based working opportunities between more developed regions and rural areas may have also been an influential factor in the increasing interaction ratios. Since rural areas are

highly linked to lower human development levels, knowledge-based opportunities in such areas are considered less competitive than those in migrants' origin areas. Thus, in-migration toward rural areas can be seen as a means to gain occupational mobility (Malamassam et al., 2021).

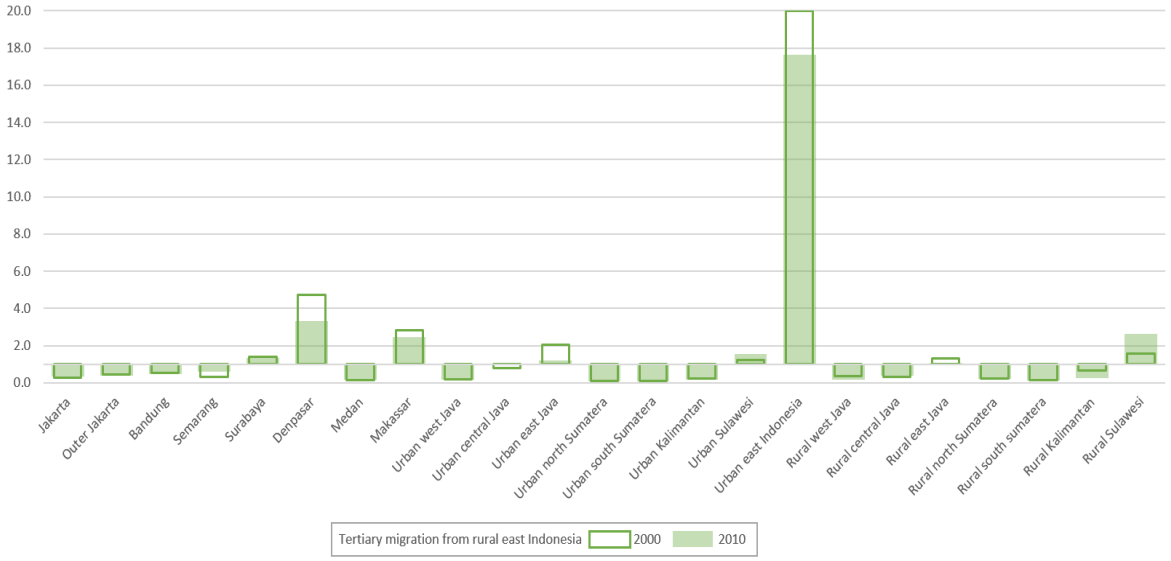

Figure 5.9 Interaction components of tertiary-educated migration towards rural east Indonesia
Source: Author's calculations

5.6 Contributing Factors to Origin–Destination Interactions

Further analysis was conducted to explain underlying factors of youth migration's spatial structure in Indonesia. Table 5.2 presents the determinants of origin (Model 1) and destination (Model 2) components.

Results from Model 1 indicate that population size is a significant predictor in explaining regional attraction at any education level over the years. This finding confirms the patterns from the circular plots that show regions with the highest out-migration flows were centralised in Java, the most populous island in the country. Further, the population's age structure in origin areas is not significantly associated with outflows of young people.

The proportion of the tertiary-educated population in origin areas consistently shows a significant influence on the outflows of tertiary-educated migrants in both censuses. The results indicate a stronger likelihood of human capital flows from regions with higher human development levels. Moreover, the proportion of non-agricultural workers in origin areas has no significant association with the origin component at any level of education. Thus, the level

of regional development in origin areas appears to have less significance in explaining youth out-migration flows.

Table 5.2 OLS regression results for origin and destination components

Variable	Model 1 (origin component)		Model 2 (destination component)	
	2000	2010	2000	2010
	Coef.	Coef.	Coef.	Coef.
Constant	−13.136***	−14.195***	−11.065***	−10.922***
Education				
- Primary (reference)	–	–	–	–
- Secondary	0.864	1.098	1.273	2.496
- Tertiary	0.594	0.872	1.109	1.161
Interaction with population size				
- Primary	0.944***	0.969***	0.881***	0.872***
- Secondary	0.878***	0.922***	0.700***	0.593***
- Tertiary	0.878***	0.857***	0.755***	0.796***
Interaction with old dependency ratio				
- Primary	0.102	0.144	−0.197**	−0.153*
- Secondary	0.060	0.109	−0.244**	−0.195**
- Tertiary	0.006	0.079	−0.219**	−0.178*
Interaction with proportion of educated population				
- Primary	0.014	−0.010	−0.034	0.076
- Secondary	0.086	0.075	−0.024	0.061
- Tertiary	0.255***	0.210***	−0.009	0.084
Interaction with proportion of non-agricultural workers				
- Primary	0.010	0.013	0.021**	0.006
- Secondary	0.004	−0.002	0.031***	0.015*
- Tertiary	0.010	0.006	0.023***	0.002
Interaction with ethnic fractionalisation				
- Primary	0.443	0.962	−0.293	−0.195
- Secondary	0.865	1.369	−0.840	−1.007
- Tertiary	−0.530	0.114	−0.672	−0.496
Adjusted R^2	0.69	0.68	0.65	0.60
Number of observations = 72 * , **, *** indicate significance at the 90%, 95%, and 99% levels, respectively				

Source: Author's calculations

Most of the areas within Java, except for Jakarta, are considered culturally homogeneous because of the dominance of Javanese and Sundanese ethnicities in their population. Meanwhile, regions beyond Java are more heterogeneous. Cultural heterogeneity in the origin area may reflect migration culture through its population. Thus, it was expected

that regions with high ethnic fractionalisation would have high migration rates. However, this determinant was insignificant as a push factor of youth migration in both censuses.

The results from Model 2 show significant effects of population size in attracting young migrants over the years at any level of education. Again, these results confirm the expectation that more populated regions would attract a higher number of migrants. The old dependency ratio is also shown to have significantly affected young in-migrant flows at any level of education in both censuses. Indonesia's age structure shows a decreasing trend in the dependency ratio during 2000 and 2010 (Statistics Indonesia, 2011b). However, the ratios still varied highly across regions. The negative direction of the association indicates that regions with a higher share of young population were likely to attract more young migrants.

The proportion of tertiary-educated individuals representing the human development level of a region is argued to be an attraction force for youth in-migration, particularly for those who are educated (Faggian et al., 2014). However, the result from the regression shows that the effect of this predictor on young in-migrant flows was not significant. The proportion of non-agricultural workers is also described as a major migration attraction since it represents industrialisation and urbanisation in a region. This variable was significant for most education-specific in-migration flows, except for primary- and tertiary-educated migration in 2010. Thus, agriculturally dominant regions are less likely to gain in-migrants, particularly those who are least educated and those who are highly educated. Finally, while it is argued that regions with a multicultural background have stronger pull factors for in-migrants (Crescenzi et al., 2017), ethnic fractionalisation had an insignificant effect on youth in-migration flows at any education level over the years.

Model 3 was run to understand contributing factors to the interaction components. The OLS regression results are summarised in Table 5.3. Here, both predictors related to the regions' physical connectedness; that is, contiguity and connectivity had significant effects on the spatial interactions for all levels of education over both periods. Migrants tended to move to nearby regions, and this pattern was found to be more pronounced as education levels increased. While highly educated migrants are argued to be more likely to make long-distance moves (Rosenbloom & Sundstrom, 2004; Spring et al., 2016), the present study suggests that tertiary-educated migrants are likely to move to nearby regions. As shown in the case of a great number of tertiary-educated migrants from Jakarta to its surrounding regions, migration by this particular group can be viewed as a strategy to maximise their return on education by

simultaneously accessing affordable housing in the peripheral areas and commuting to work in the capital city (Jones et al., 2016).

Table 5.3 OLS regression results for the interaction component

Variable	2000	2010
	Coef.	Coef.
Constant	−6.313***	−6.815***
Education level		
- Primary (reference)	–	–
- Secondary	1.566***	1.867***
- Tertiary	2.016***	2.201***
Interaction with regional contiguity		
- Primary	1.405***	1.357***
- Secondary	1.450***	1.394***
- Tertiary	1.540***	1.550***
Interaction with regional connectivity		
- Primary	0.401***	0.320***
- Secondary	0.521***	0.454***
- Tertiary	0.512***	0.484***
Interaction with lifetime migrant stock		
- Primary	0.343***	0.405***
- Secondary	0.333***	0.394***
- Tertiary	0.232***	0.253***
Interaction with ratio of employment rate		
- Primary	1.312***	1.208***
- Secondary	0.049	−0.369
- Tertiary	0.955***	1.074***
Interaction with ratio of non-agricultural workers		
- Primary	0.525***	0.526***
- Secondary	0.345***	0.343***
- Tertiary	0.120**	0.082
Adjusted R^2	0.61	0.63
Number of observations = 1,656 * , **, *** indicate significance at the 90%, 95%, and 99% levels, respectively		

Source: Author's calculations

Lifetime migrant stock associations between origin and destination areas indicate social networks and cultural ties. The effect of lifetime migrant stock was statistically significant across the three education groups. However, the effect seems to be more pronounced in groups with lower levels of education. The key roles of communities of origin in destination regions can mainly be observed when migrants face obstacles during their migration, such as financial, living arrangements or community integration problems (Ryan, 2011). For low-educated migrants, in particular, the presence of social networks and cultural ties might work to complement the limited human capital they have.

The ratio of employment rate had a positive effect on the interaction components of primary- and tertiary-educated migration. Interestingly, it had no significant effect on origin–destination interaction within the secondary-educated migration structure. For the lowest and highest education levels, the destination regions were more likely to provide wider employment opportunities than their origin regions. However, for secondary-educated migration, the insignificance of this predictor can be partially attributed to variations in the migration motives of this group. Economic- and family-related motives have been the main reasons for youth migration in Indonesia (Malamassam, 2016), but education-related motives were found to be a prominent feature in youth migration towards regions that provide access to elite higher education institutions. Such regions may have lower employment rates than migrants' regions of origin because of their higher share of unemployed students. Further, the ratio of non-agricultural workers showed significant effects on primary- and secondary-educated migration in both censuses. This situation may provide an overview of the migration structure at lower education levels, which entails less urbanised origin areas and more industrialised destination regions. The insignificant effect of this variable on the interaction component of tertiary-educated migration in 2010 illustrates that spatial interactions of tertiary-educated migration in recent years were likely to occur between regions with similar development levels. These results indicate the likelihood of migrants within similar regional types being more highly educated than those who move across different regional types (Rebhun & Brown, 2015).

5.7 Conclusion

This chapter investigated the spatial structure of youth migration in Indonesia by education level and explored factors contributing to the education-specific migration structure. While previous studies on migration patterns have focused mainly on the push and pull factors of each region, this study provides a more comprehensive discussion on the spatial structure of youth migration. The spatial structure of migration is defined as a decomposition of migration into relative push and pull factors of each region and levels of spatial interactions between places. Spatial structures of youth migration vary among different educational backgrounds. Rural regions have acted as prominent sources for primary- and secondary-educated migration, while tertiary-educated migrants have originated mainly from metropolitan and urban areas. Moreover, Jakarta and its surrounding cities have become the main destination regions for young migrants. A noticeable pattern exists in the increasing proportion of tertiary-educated in-migration towards rural regions. In addition, strong origin–destination interactions were

found within intra-island migration and nearby regions. For tertiary-educated migration, more dispersed patterns of origin–destination pairs were observed.

Regions with higher populations sent and attracted higher numbers of migrants. For primary-educated migrants, the urbanisation levels of origin and destination areas appeared to have a pronounced effect on the spatial structure of their migration. Regions with better human development levels exhibited higher likelihood of sending tertiary-educated migrants. Moreover, regional connectedness was shown to be stronger as education levels increased. The reverse occurred with the inclusion of social networks and cultural ties. Relative employment opportunities had mixed effects on education-specific interaction components. For the lowest and highest education levels, the destination regions were more likely to provide wider employment opportunities than their origins. However, for secondary-educated migration, the opposite patterns were found. Further, the effects of relative urbanisation levels between regions indicate that primary- and secondary-educated migration flows were more likely to occur between regions with different economic development levels.

Education and employment opportunities across regions in Indonesia have suffered from a wide inequality gap over time. The spatial structures of education-specific youth migration flows have reinforced this situation in light of the prominent role played by more developed regions as sending and destination regions. However, the increasing importance of rural areas in the tertiary-educated migration structure suggests that knowledge-based sectors play a substantial role in improving human capital accumulation in rural areas. Amid the rapid development of informal sectors alongside the economic growth of big cities and metropolitan areas in Indonesia, economic opportunities appear to have had a more pronounced effect in the migration structure of the least-educated group in this study. This situation may affect not only social issues, such as poverty and housing problems, but also the human capital composition in destination regions. Thus, it is important for national and local governments to design social policies that address the implications of education-specific migration flows in human capital redistribution across regions.

Research on migrants' human capital contribution to regional development should also examine migrants' retention in their areas of origin. Since young adults may experience repeat moves during their lifetime, further work on the migration dynamics of the young population is highly encouraged. Future studies should be directed at expanding migration datasets used for analysis to improve understanding of young adults' migration dynamics and their effect on human development in Indonesia.

Chapter 6 Age at First Migration: Understanding Its Relation to Educational Attainment of Young Indonesians

6.1 Introduction

Individuals are confronted with a range of migration choices at critical stages in their life-course trajectories, and these choices determine whether one remains or migrates to live elsewhere. Various factors throughout life trajectories potentially increase or diminish individuals' propensity to migrate. For young adults, particularly, critical life stages of transitioning to adulthood can trigger spatial mobility (Bernard, 2014; Clark, 2013; Liu et al., 2017; Mulder, 1993; Plane, 1993). Thus, migration rates are notably high around the peak ages of leaving the parental home, pursuing higher education, entering early-career jobs, and forming a family (Mulder, 1993; Plane, 1993; Plane & Heins, 2003; Wilson, 2015).

Several studies have examined age at migration across countries (Bell & Muhidin, 2009; Bernard et al., 2016; Rogers & Castro, 1981). Age at migration of all orders is known to be remarkably persistent across countries (Rogers & Castro, 1981). However, variations in socio-economic and cultural contexts can affect the diversity of migration age profiles between regions (Bernard et al., 2016). Additionally, the shift in the usual timing of education, family, and employment transitions in recent decades has also been reflected in variations in the age profile of migration across cohorts (Mulder, 1993; Vidal & Lutz, 2018).

Among various types of spatial movement, first adult migration is considered an important milestone in an individual's life trajectories. First migration signals the beginning of one's migration career as an independent adult and affects subsequent migration behaviour throughout his or her adult life (Bernard, 2017a, 2022a). Also, the variations in the timing of the first adult migration signifies critical contextual factors – such as economic development, regional opportunities, and social values – that shape individuals' migration trajectories (Bernard, 2022a). Life-course events related to education transitions, particularly, are shown to be critical drivers of first migration by young adults. Completion of formal schooling career might lead young adults to aspire to conduct their first independent migration and gain access to better opportunities in other areas (Corcoran & Faggian, 2017). Alternatively, first migration can also attributed to education discontinuation due to the high opportunity costs of continuing schooling (Semela & Cochrane, 2019). Young individuals then decided to move out of parental housing for work- or marriage-related reasons (Pardede & Mulder, 2022). Further, pursuing

higher education is also a critical first adult migration motive for a considerable share of young migrants (Faggian & Franklin, 2014; Liu et al., 2017; Wilson, 2015).

In Indonesia – a highly populated developing country with significant gaps in human capital and economic development across regions (Statistics Indonesia, 2021a; UNDP, n.d.-b)– the age schedule of migration peaks in the early twenties and steadily decreases until retirement age (Muhidin, 2018). The high concentration of migration during earlier years of young adulthood implies a relatively younger peak in migration in this country compared to developed countries (Bell & Muhidin, 2009). However, this age profile cannot disclose information on the exact age at migration, due primarily to data limitations. The age profile mainly refers to move of all orders and cannot specifically explain the timing of first migration. As a result, studies of the onset of individuals' migration career remain rare in the existing literature on migration in Indonesia.

To fill the knowledge gap in the current understanding of age at first migration in Indonesia, particularly in the context of human capital development, this study examined the link between age at first adult migration and individuals' educational careers. As a developing country with a vast range of regional inequality in educational opportunities, Indonesia provides a unique context to study the relationship between migration and education trajectories. This research addressed the following research question: To what extent can the educational attainment of young adults explain the age schedule of first migration in Indonesia? The findings of this study were expected to provide insight into the returns of migration to education and human capital aspects of internal migration in a developing country context. This study utilised data from individual migration biographies collected in the Indonesian Family Life Survey (IFLS). To date, IFLS is the only longitudinal survey in the country with decent spatial coverage that collects information on various life-course transitions, including migration.

6.2 Literature Review

6.2.1 Overview of Education in Indonesia

Indonesia's current education system is one of the largest in the world. Formal primary and secondary education involve 53.1 million children from grades 1 to 12, while about 8 million students are enrolled in 4,670 tertiary education institutions (World Bank, 2020b). Over the years, the education system in Indonesia has undergone several critical transitions. In 1984, the

government implemented a policy of six years of compulsory education, and these efforts resulted in universal enrolment for primary education (Suharti, 2013a; Suryadarma & Jones, 2013). The period of compulsory education was extended to nine years in 1994 (Suharti, 2013a). In 2013, the Indonesian government launched a new policy of 12-year compulsory education (OECD, 2015). The development of the education system in Indonesia has been reflected in trends in educational attainment. From 1950 to 2015, there was a significant drop in the proportion of population without education, from 75% to 4% (Barro & Lee, 2021). In contrast, the shares of secondary and tertiary level attendance progressively increased from 2005 to 2015. Proportion of the population with the highest educational attainment at secondary level rose from 21% to 32%, while the share of tertiary-educated individuals doubled from 2.2% to 4.9%. In 2015, the majority of Indonesians had at least attended secondary school and nearly a tenth of Indonesia's population had attended tertiary education (Barro & Lee, 2021).

With an average number of years of schooling that is still below nine in 2020 (Statistics Indonesia, 2021a), school-level completion and transition are major challenges in education performance in Indonesia. A considerable amount of school drop-out and education discontinuation can still be observed, particularly at the lower level of education (Suharti, 2013b). Inequality in education opportunities across regions has also remained a critical challenge for the completion of formal education. The average year of schooling varied greatly among nearly 500 districts, ranging from 1.1 to 12.7 years (Statistics Indonesia, 2021a). Infrastructure barriers are one of the main challenges in realising educational equity across regions (World Bank, 2019). The limited availability of secondary schools at the sub-district level has also affected the low school progression rate. Suharti (2013a) found that about 17% of sub-districts do not have upper secondary schools, among 6,425 sub-districts. Financial issues might also hinder school-age children's progression to higher levels of education (Ramchand, 2018).

For the tertiary level, its enrolment rate reached 23% in 2013, a significant increase from 3% in the 1970s (Statistics Indonesia, 2021g; Suryahadi & Sambodho, 2013). However, the tertiary education system in Indonesia also faces problems in terms of significant variations in the institution's quality. While Indonesia has become one of the largest and fastest-growing tertiary education systems globally, only a few universities, mostly public ones, are acknowledged as reputable, and most universities are considered low-rank institutions with poor quality of education (Hill & Thee, 2013). The tertiary education system in Indonesia also suffers from the centralised distribution of reputable institutions on Java Island.

6.2.2 Age at Migration

The age profile of migration has shown strong regularity across countries and various spatial scales (Rogers & Castro, 1981). It is typically high among infants and young children and then lowers in adolescence. Subsequently, it rises and peaks in the young adult period, followed by a gradual decline as the age increases, and shows a slight rise around retirement age. Since migration propensities, intensity, and timing are highly influenced by stages in the life course, it is argued that the regularity of the migration schedule correlates with the stability of timing and intensity of transitional events in the life cycle (Plane, 1993). However, substantial variations in age at migration across countries are observable (Bell & Muhidin, 2009). Migration patterns in Southeast Asian countries, including Indonesia, are highly concentrated in the early twenties, and their intensity decreases sharply at later ages. In developed countries in Europe and Northern America, migration rates apparently peak at older ages and are more dispersed across a broader range of ages (Bell & Muhidin, 2009).

Higher migration intensity at a young age seems to be more prevalent in countries where life-course transitions are more likely to occur in early adulthood. Conversely, patterns of delayed age at migration are common in regions where life-course events occur at older ages (Bernard, 2014). Also, country-specific regulations directly linked to life-course transitions can influence variations in age at migration (Bernard et al., 2016). For example, the period of compulsory education, the minimum legal age at marriage, or child employment laws. In middle-income countries with rapid growth in the informal economy and significant socio-economic inequality across regions, migration intensity commonly spikes during late adolescence between 15 and 17 years (Yaqub, 2009).

Variations in age at migration are also evident across cohorts due to the constant changes in socio-economic contexts over time. The baby boom generation, with a large cohort size, often delayed their first move, while the earlier, smaller cohort tended to move at an earlier age (Plane & Rogerson, 1991). Delays in a large cohort's migration are greatly influenced by labour market situations such as an over-supplied labour force and a high unemployment rate (Plane & Rogerson, 1991). Furthermore, Vidal and Lutz (2018) argued that older generations' migration was highly linked to their having little education, and family formation at younger ages. In contrast, younger cohorts' migration is structured around longer years in education careers and delayed onset of family-related transitions. Migration motives can also explain patterns of age at migration, and education-related motives are dominant during the earlier period of young adulthood. The age structure of college-bound migration peaks at a younger

age than the average peak rates of migration flows and it commonly involves peripheral regions that lose their high school graduates due to the absence of major universities (Plane & Heins, 2003). Meanwhile, migration for housing reasons peaks in the 18 to 21 year and 30 to 39 year age groups, while motives related to household formation seem dominant in the population aged 18 to over 30 years (Mulder, 1993). Young individuals starting their independent housing trajectories and continuing their education careers are highly likely to concentrate in large cities and university regions, while entry into the workforce in the early and mid-twenties might shift human capital concentration to core economic centres (Kooiman et al., 2018). Also, peripheral regions might attract individuals in the mid- or late stages of their working trajectories as they start to put more consideration into life amenities and family-rearing motives (Kooiman et al., 2018; Plane & Heins, 2003).

Migration plays an essential role in shaping individuals' life trajectories. The first adult migration, in particular, plays a major role in influencing subsequent migration behaviour and shaping individuals' migration career (Bernard, 2022c). For example, previous studies have shown that later age at first migration is negatively associated with the number of migrations during one's lifetime (Bernard, 2017a, 2022a; Bernard & Pelikh, 2019). Moreover, while mean age of all moves is relatively similar across regions and population groups, the mean age at first migration is highly varied across countries. In Europe, Bernard (2022a) found that Sweden and Denmark are countries with the lowest mean age at first migration of 22 years, and Italy and Malta have the highest mean age at first migration of over 25 years. In China, the average age at first migration is around 23 years, but those who migrated frequently conducted their first migration earlier, at around 21 years (Tian et al., 2016). Further, younger cohorts tend to have first migration at the later age compared to their older counterparts. A study by Bernard (2022a) shows that the mean age at first migration of the youngest generation is delayed by 1.66 years compared to the oldest cohort. Variations in age at first migration can indicate distinctive socio-cultural contexts and behavioural attributes that underpinned the onset of individuals' migration trajectories (Bernard, 2022a). Also, the timing of first adult migration influences individuals' wellbeing. Those who migrated for the first time at a younger age are arguably much better off than those who moved later (Hartog & Winkelmann, 2003). Additionally, moving at a younger age can benefit individuals with high educational attainment levels, providing substantial returns to their migration and education (Aisa et al., 2014).

6.2.3 Education-Migration Nexus

Education arguably reflects the social context and social identity contributing to migration behaviour (Rao, 2010). Education potentially drives migration since a higher level of education can bring more opportunities and incentives to migrate (Corcoran & Faggian, 2017; Liu et al., 2017). Those with high education levels are more willing to migrate when entering an occupational career since they have had greater human capital investment and more knowledge and access to opportunities available in other regions. Also, highly educated individuals are expected to be more capable of dealing with intervening obstacles encountered while moving to new places. Thus, the higher individuals' educational attainment, the higher their propensity to migrate (Bernard & Bell, 2018). However, while high educational attainment is largely attributed as the main determinant of migration, it is also evident that youth migration is a life event linked to lower levels of educational attainment. Migration at a young age for employment-related motives, in particular, is commonly linked to unconventional age schedules of education trajectories (Heckert, 2015) and negatively affects migrants' educational attainment (van Ours & Veenman, 2006). The dominance of the informal economy offering opportunities for secondary and less-skilled jobs in large cities and metropolitan areas arguably greatly triggers low-educated migration (Ginsburg et al., 2016). Higher opportunity costs to continue schooling might influence young individuals' decisions to terminate their education and migrate to seek informal employment opportunities (Semela & Cochrane, 2019). The presence of cultural and social networks in destination areas can also help the migration of those with limited human capital (Semela & Cochrane, 2019).

On the other hand, migration can also drive education. Migration opens access to a broader range of higher educational opportunities for young populations with limited education resources in their hometowns (Crivello, 2011). Migration can be understood as a prolonged period of human capital investment and a means for diversifying risk across economic sectors and geographic regions (Heckert, 2015). Education-driven migration is a critical feature of migration in the earlier years of young adulthood. Moving away from home to pursue higher education is the first step in youths' transition to gain residential and economic independence (Mulder, 1993). The interregional mobility of university entrants has a remarkable impact on the high concentration of migration intensity around 18 to 19 years old (Wilson, 2015). Thus, age patterns of entry to higher education significantly affect the variation in migration schedules between countries (Bernard et al., 2016) and tend to have a relatively younger age profile compared to migration for family, housing, and lifestyle reasons (Bernard & Kalemba,

2022). Education-driven migration is strongly associated with youth who follow the standard age schedule of schooling and those born outside capital cities (Heckert, 2015). Those who migrate for education are mainly individuals who face less risk in investing in both migration and schooling (McHenry, 2013). For example, those with sufficient financial resources to cover the costs of the human capital investments.

Whether migration drives education or vice versa, the returns from human capital investment in both forms are expected to improve. Sjaastad (1962) noted that age was an important variable in examining returns to human capital investment. Individuals with the same educational attainment level who migrate at different ages may obtain different levels of returns from their human capital (Brezis, 2019). Those who migrate before acquiring their highest education level are more likely to earn higher returns from their migration and education. Similarly, Pratomo (2017) argued that migrants with post-migration education have a higher propensity to be employed in the formal sector and be paid more than migrants with no experience of post-migration education. Therefore, knowledge of the age at migration is critical in better understanding the contribution of migration to human capital accumulation across regions. Age at first adulthood migration, in particular, is important since it marks the beginning of one's migration trajectories (Bernard, 2017a). The exploration of this issue offers new insight on individuals' migration behaviour and overall internal migration trends (Bernard & Pelikh, 2022).

6.3 Data and Method

This study utilised the Indonesian Family Life Survey (IFLS) to analyse the first migration during young adulthood in Indonesia. IFLS is a longitudinal survey in Indonesia covering 13 provinces and represented about 83% of the whole population in its initial run in 1993. Consecutive waves were conducted in 1997, 2000, 2007, and 2014. The first wave of ILFS observed about 30,000 individuals in over 7,000 households, while the last wave covered around 50,000 in over 16,000 households. IFLS attempted to re-interview all original respondents of the households in the first wave in each subsequent wave, including those who had split off from their initial households. The fifth wave of IFLS successfully re-contacted about 76% of the individuals from the first wave (Strauss et al., 2016).

The utilisation of longitudinal surveys in migration analysis allows detailed consideration of the timing of migration and its relation to respondents' demographic characteristics (Findlay et al., 2015). While IFLS recorded any residential mobility across

village boundaries for a minimum of six months stay in the destination after age of 12 years, this study only considers inter-district move as migration. This study defines first adult migration as the first spatial movement across sub-province (city/regency) boundaries between ages of 15 and 34 years. Therefore, those who had never moved across sub-province boundaries and those who had their first migration at the age of 35 years or later were considered non-migrants. Additionally, any inter-district migration before age of 15 years was considered as childhood migration. Moreover, the individuals observed in this study were restricted to those aged 34 and above in the latest survey in which they participated. Also, only those with complete retrospective information on migration and education trajectories proceed to the subsequent analysis. By this restriction, this chapter observes first adult migration among 27,075 observations in the survey.

This study followed the categorisation of Indonesia's formal education systems, which comprises four levels of education, i.e., primary (grades 1–6), lower secondary (grades 7–9), upper secondary (grades 10–12), and tertiary education. Observed respondents were categorised based on the highest school level they attended at their respective final wave. For the analysis, educational attainment was treated as a time-invariant variable as this study focused on the interrelationships between the timing of first migration and the outcomes of educational pathways. Moreover, individuals were classified into five large ethnic groups to understand the influence of cultural background on migration decision during young adulthood. Also, the illustration of individuals' location-specific capital was represented by the type of their hometown. This study defined hometown as city/regency lived during childhood period (before the age of 15 years). Table 6.1 presents the summary statistics of respondents' characteristics.

Table 6.1 Summary statistics of observed individuals, IFLS Waves 1–5

Variables		Proportion (%)
Migrant status	- Non-migrants	59.8
	- Migrants	40.2
Sex	- Female	50.8
	- Male	49.2
Highest educational attainment	- Primary or below	53.5
	- Lower secondary	15.0
	- Upper secondary	21.1
	- Tertiary	10.4

Variables		Proportion (%)
Birth cohort	- Born before 1960 - Born in the 1960s - Born in the 1970s - Born in the 1980s	41.1 22.8 29.0 7.1
Ethnic groups	- Javanese - Sundanese - Sumatera - East Indonesia - Others	45.5 14.8 14.7 11.5 13.5
Hometown in province's capital	- No - Yes	77.5 22.5
Migrated during childhood	- No - Yes	87.3 12.7
		N = 27,075

Source: Author's calculations

A survival analysis approach is applied to examine the probability of migrating for the first time between the ages of 15 and 34. Firstly, by applying Kaplan-Meier estimates, the model tested the probability of first migration in whatever year the respondents turned 15 years old and ended in whatever year the respondents turned 34 years old. The analysis also incorporated a separate set of models to analyse the age variation at first migration across generations. Furthermore, by using person-years as the unit of exposure to risk (first migration), the following analysis is the Cox proportional hazard regression model that formulated as follows:

$$h(t) = h_o(t)\ exp\ (b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6)$$

where h(t) is the expected probability of first migration at age t, $h_0(t)$ is the baseline probability and represents the probability when all the predictor variables are equal to zero. X_1, X_2, X_3, X_4, X_5 and X_6 are predictor variables, i.e., highest educational attainment, sex, hometown type, childhood migration, ethnic group, and birth cohort, respectively.

Higher educational attainment arguably increases one's migration propensity (Bernard & Bell, 2018). Life-course transitions during the young adult period are suggested to have a more pronounced effect on females' age pattern of migration (Bernard, 2014). Additionally, those whose hometowns are outside capital cities are more likely to migrate at a younger age (Heckert, 2015). Previous childhood migration might increase the likelihood of migration during adulthood (Bernard & Vidal, 2020). Due to their social and cultural norms, different

ethnic groups may show variations in attitudes and preferences toward migration (Auwalin, 2020). Lastly, birth cohorts represent structural changes over time in the country, including changes in the governmental system, economic development, and interregional connectivity (Vidal & Lutz, 2018). An additional Cox regression model was performed by adding an interaction term between educational attainment and birth cohort to examine any effect of contextual changes over time in migration propensity across educational backgrounds.

While IFLS attempted to follow all the original households for the subsequent waves, it had limitations on tracking migrants since it could only track down those who moved within the first wave's original coverage area. This resulted in panel attrition of individuals that moved beyond the survey's coverage in the later waves. The panel attrition rate in this study was about 11%. Appendix 6.1 exhibits characteristics of observable and unobservable respondents. The summary statistics show that attrition of unobservable respondents might not have occurred randomly. Since attrition is closely linked to out-migration, the characteristics of unobservable respondents are inevitably related to the selectivity of migration, i.e., concentrated among those with higher education backgrounds and younger individuals. However, the characteristics of observable migrants and unobservable respondents are relatively similar. While the findings of this study might understate migration dynamics among young adult Indonesians, the attrition bias should not affect the consistency of the estimation of their first migration.

6.4 Age at First Migration of Young Adult Indonesians

By utilising information on the exact timing of migration events, Figure 6.1 displays the profile of age at first migration for young adult Indonesians. The peak intensity of first migration occurred around 18 to 19 years old. However, the mean age at first adult migration of young Indonesia (21.4 years) is relatively similar to the peak age at migration of all orders in Indonesia that occurred in the early twenties (Bell & Muhidin, 2009; Muhidin, 2018). Overall, the age schedule of the first adulthood migration of young Indonesians was also younger than the classical schedule of migration, irrespective of their order, which generally peaks around 20 to 24 years (Collinson, 2009; Rogers & Castro, 1981). The substantial difference between age at first migration and age at migration of all orders signifies wide variations in migration careers of young Indonesians.

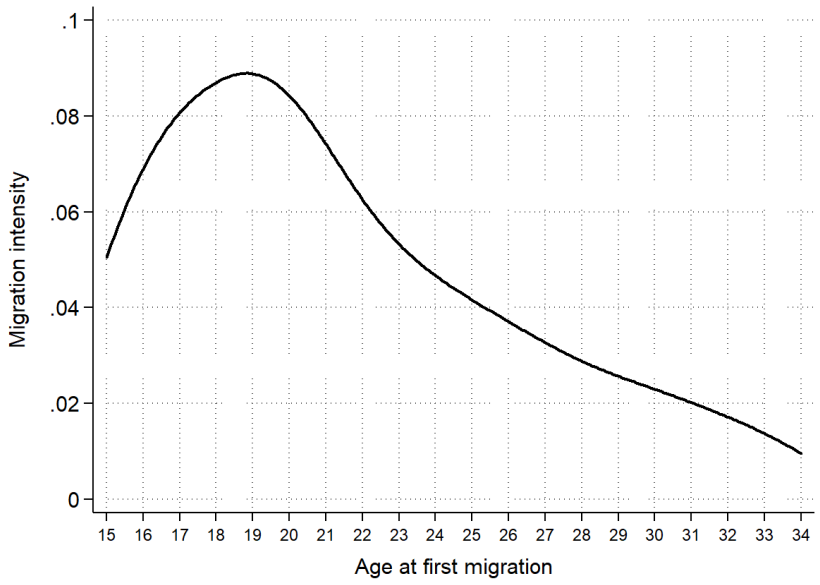

Figure 6.1 Age schedule of first migration of young adult Indonesians

Source: Author's calculations based on inter-district migration data within the age period of 15 to 34 years. Migration data were normalised to sum to unity and smoothed using kernel density estimation

The timing of first adult migration can be attributed to transition to adulthood events in Indonesia's socio-economic contexts. For example, Statistics Indonesia (2017a) found that one in five Indonesian women aged 20 to 24 years had married by the age of 18. Also, the minimum age for admission to employment, according to Indonesian law, is 15 years old (ILO, 2014) and most Indonesian workers enter the workforce at school age (Suryadarma & Jones, 2013). The escalation of first migration at a relatively young age can also indicate significant educational and employment opportunity gaps within the country (Yaqub, 2009).

Further examination shows that the patterns of first migration intensity are different for each education level (Figure 6.2). The differences in intensity at the peak of first migration by highest educational attainment can reflect the various ways in which young adults negotiate their migration and other life-course trajectories, including education-related events. The age schedule of first migration by tertiary-educated individuals peaks sharply at 18 to 19 years. Moreover, the migration intensities of lower and upper secondary groups peak at 17 to 18 and 19 to 20 years, respectively.

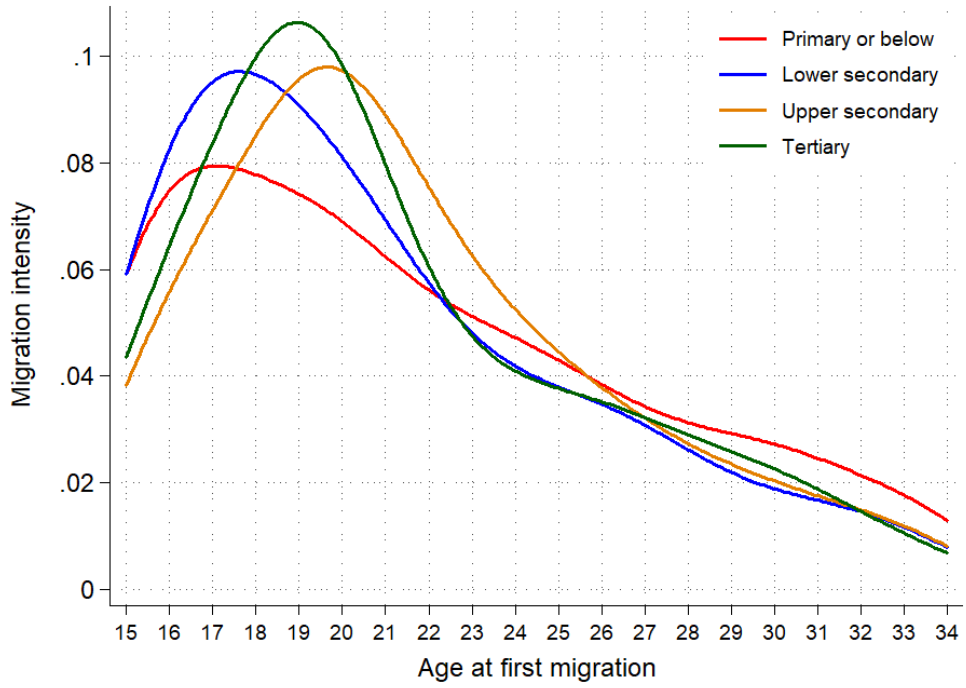

Figure 6.2 Age schedule of first migration by highest educational attainment

Source: Author's calculations based on inter-district migration data within the age period of 15 to 34 years. Migration data were normalised to sum to unity and smoothed using kernel density estimation

The primary-educated group displays a flatter age profile than the lower and upper secondary groups and moderately peaks around 17 years old. The flatter age profile might imply less influence on major life-course transitions on migration decision (Bernard et al., 2016). For lower and upper secondary groups, peak ages at first migration exhibited a gap of one to three years between school termination and first migration. The gap is likely associated with other transition to adulthood events, such as entry into the labour force or family formation.

Those who pursue higher education after completing upper secondary school enter tertiary institutions around the age of 18 or 19 years. Figure 6.3 shows further evidence of the importance of education-related motives for first migration around this age. Tertiary-educated individuals' peak age at first migration shows evidence of education-related transition in triggering migration for a substantial proportion of respondents in this group. It is plausible that the first migration enabled them to gain their highest educational attainment. This situation implies a stronger association between the initiation of migration and education transition than the compared to other domains of life-course trajectories.

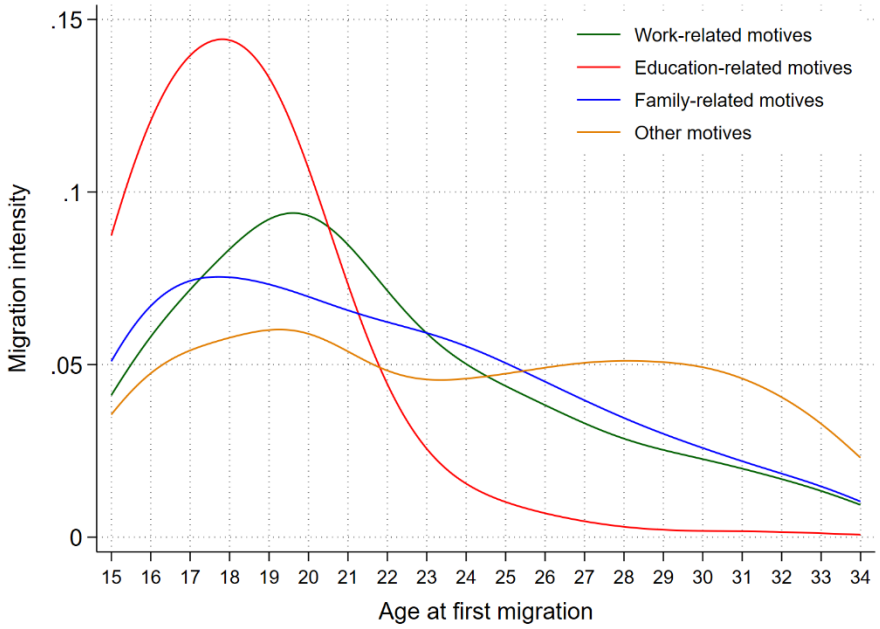

Figure 6.3 Age schedule of first migration by main motive of migration

Source: Author's calculations based on inter-district migration data within the age period of 15 to 34 years. Migration data were normalised to sum to unity and smoothed using kernel density estimation

6.5 First Migration Probability Across Educational Attainment

This study examines the cumulative probability of first migration by highest educational attainment by applying Kaplan-Meier estimation (Figure 6.4). At the age 34 years, nearly seven out of ten tertiary-educated individuals have migrated at least once, while about half of observations with upper secondary education have migrated. For the lower secondary and primary education groups, over 40% and 20% have migrated, respectively.

At the beginning of the young adult period, the probability of first migration is similar at every education level. However, the probability of migrating of the lowest education level remains low until the end of the observed period. The probability of first migration for the lower secondary group is noticeably high between 16 and 19 years old. More than half of the first adult migration is predicted to occur within the first five years of the observation period. Since the completion of lower secondary school is around 15 to 16 years old, the high migration probability at an earlier age for this group is closely linked to the discontinuation of their formal schooling careers. However, schooling career disruption is unlikely to trigger migration events. Instead, factors related to entry into the labour force and early marriage are behind the first migration event.

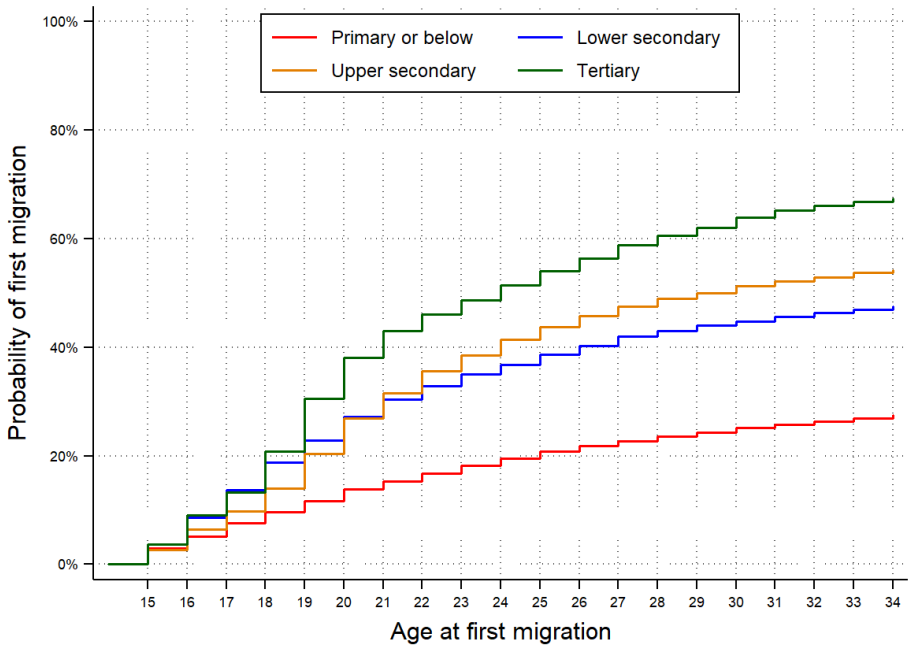

Figure 6.4 Probability of age at first migration by highest educational attainment

Source: Author's calculations

For the upper secondary level, the highest likelihood of first migration is around 18 to 20 years. This suggests that the first migration for this group may act as a direct follow-up from the completion of upper secondary school. Meanwhile, low migration propensity in the earlier years of young adulthood indicates how school progression hinders migration at a younger age. Since upper secondary level schooling was beyond the scope of compulsory education until recently, educational attainment at this level was already considered exceptional, particularly for populations living in rural areas and less developed provinces (Jones & Pratomo, 2018). This qualification enables many workers to access various job opportunities elsewhere that require middle-level technical skills (Suryadarma & Jones, 2013). In this regard, migration can serve as an alternative to human capital investment and improvement of their returns to education.

The tertiary-level educated group showed high probabilities of first migration between 18 and 20 years. This situation signifies the major role of pursuing higher education as the trigger of the first adult migration by those who attended universities. This finding supports increasing empirical evidence suggesting the importance of entry to higher education in explaining youth migration in developing countries (Crivello, 2011; Heckert, 2015). University-bound migration contributes to movements towards large cities and metropolitan areas, mainly on Java Island where many national flagship universities are situated (Hill & Thee, 2013).

To understand the period effects on the age variation in first migration by education, Figure 6.5 illustrates more detailed explanations of the probability of first migration by educational attainment and birth cohorts. The cumulative probability of first migration for the primary-educated group has increased remarkably, from 20% within the oldest cohort to 40% for the youngest cohort.

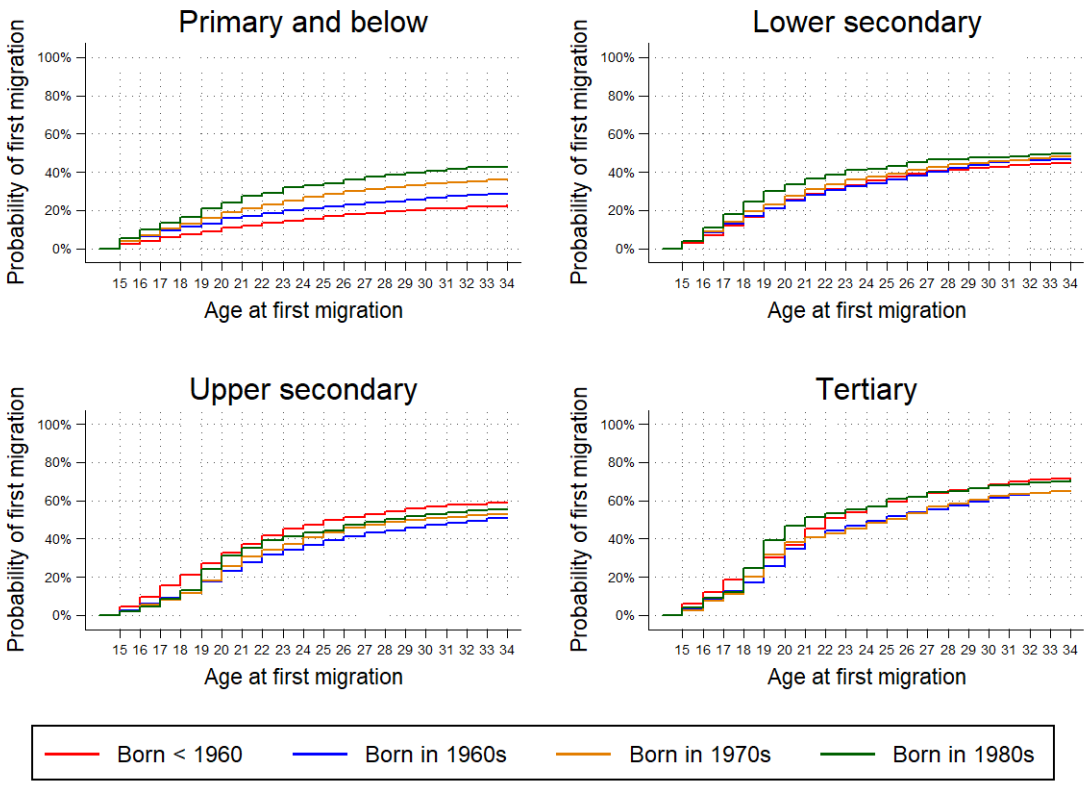

Figure 6.5 Probability of age at first migration by highest educational attainment and birth cohort
Source: Author's calculations

The evidence of negative educational selectivity is shown by high propensity of first migration by primary group for the younger generations. The migration rates for the lower secondary group at 15 to 17 years are distinctively higher for the youngest cohort. Moreover, a less apparent gap in the probability of first migration across cohorts can be observed among lower and upper secondary groups. Low-educated individuals are commonly associated with low migration propensity due to their limited human capital, which may hinder their ability to overcome intervening obstacles during migration. The changing nature of labour markets in Indonesia with rapid expansion of informal sectors in major cities in recent years (Jones et al., 2016) are related to increased low-educated migration. Informal sectors usually recruit younger workers since they are not restricted to working age regulations.

The tertiary-educated group consistently shows the highest cumulative propensity of first migration. Also, the propensity of the tertiary group is noticeably high before the age of 20 years. However, there are slight pattern differences across cohorts. Among the tertiary-educated born before the 1960s, a fifth of them migrated by 17 years old. This situation implies that during earlier years, the first migration might not be only attributed to the continuation of tertiary education but also enrolment in upper secondary education. Low migration propensities at earlier ages for the younger cohorts may indicate an improvement in the secondary education system. Additionally, higher propensities for migration at 18 to 19 years old are found as cohorts become younger for the tertiary-educated group, indicating the continued importance of tertiary educational opportunities over time. While the tertiary education system in Indonesia has grown rapidly over the years (Hill & Thee, 2013), this study finds that first migration probability of the youngest cohort was remarkably higher than their older counterparts around the age of entering tertiary study. Furthermore, low probability of first migration after completing tertiary education (after the age of 20 years)[8] is observed across cohort.

Two additional Cox proportional hazard regression models were run to examine the determinants of first migration between 15 and 34 years. Results of the regression models are presented in Table 6.2. The first model finds that all predictor variables are statistically significant in explaining the probability of first migration. Educational attainment was the most important predictor influencing the propensity to migrate at any age within the young adult period. The first migration probabilities of lower and upper secondary groups are 1.7 and 2.0 times higher than that of the primary educated group, respectively. Also, at each observed age, the probability of first migration of the tertiary-educated group is nearly three times higher than that of the lowest-educated group. These results align with findings from previous studies (Bernard & Bell, 2018; Muhidin, 2018; Wajdi, Mulder, et al., 2017) that found the odds of migrating within Indonesia progressively increased with each level of educational attainment.

[8] The age of completing tertiary degrees varies, depending on the type of degree. Indonesia's tertiary education system offers degrees with a wide range of minimum study time i.e., one year (Diploma-1/D1), two years (Diploma-2/D2), three years (Diploma-3/D3), three to four years (Diploma-4/D4 and *Strata*-1(S1)/bachelor's degree). The students are allowed to finish later but should not exceed double the minimum study time. About two thirds of tertiary-educated respondents in this study enrol in bachelor's degrees, and the rest take diploma degrees.

Table 6.2 Results of Cox regression for first migration during young adult period

Variables	Model 1		Model 2	
	Hazard ratio	95% confidence interval	Hazard ratio	95% confidence interval
Highest educational attainment (ref. primary or below)				
- Lower secondary	1.788***	1.690 – 1.892	2.217***	2.003 – 2.453
- Upper secondary	2.019***	1.916 – 2.128	3.168***	2.874 – 3.492
- Tertiary	2.781***	2.619 – 2.952	4.409***	3.940 – 4.934
Female	0.853***	0.821 – 0.886	0.854***	0.821 – 0.889
Hometown in province's capital	0.957*	0.914 – 1.001	0.966	0.921 – 1.013
Birth cohort *(ref. born before 1960)*				
- Born in 1960s	1.135***	1.077 – 1.196	1.344***	1.239 – 1.457
- Born in 1970s	1.274***	1.213 – 1.338	1.825***	1.684 – 1.978
- Born in 1980s	1.429***	1.329 – 1.536	2.302***	1.985 – 2.672
Migrated during childhood	1.901***	1.811 – 1.995	1.919***	1.819 – 2.025
Ethnic groups *(ref. Javanese ethnic group)*				
- Sundanese	0.951*	0.899 – 1.006	0.935**	0.882 – 0.992
- Sumatran	1.123***	1.066 – 1.184	1.126***	1.065 – 1.191
- Eastern Indonesian	0.801***	0.749 – 0.857	0.786***	0.734 – 0.843
- Other	0.746***	0.701 – 0.795	0.731***	0.684 – 0.780
Interaction of birth cohort with educational attainment *(ref. born before 1960 & highest educational attainment of primary or below)*				
- Born before 1960 # lower secondary				
- Born before 1960 # upper secondary			2.217***	2.003 – 2.453
- Born before 1960 # tertiary			3.168***	2.874 – 3.492
- Born in 1960s # primary or below			4.409***	3.940 – 4.934
- Born in 1960s # lower secondary			1.344***	1.239 – 1.457
- Born in 1960s # upper secondary			2.396***	2.135 – 2.690
- Born in 1960s # tertiary			2.643***	2.414 – 2.894
- Born in 1970s # primary or below			3.915***	3.527 – 4.345
- Born in 1970s # lower secondary			1.825***	1.684 – 1.978
- Born in 1970s # upper secondary			2.650***	2.423 – 2.898
- Born in 1970s # tertiary			2.949***	2.738 – 3.175
- Born in 1980s # primary or below			3.891***	3.544 – 4.273
- Born in 1980s # lower secondary			2.303***	1.984 – 2.672
- Born in 1980s # upper secondary			2.867***	2.461 – 3.341
- Born in 1980s # tertiary			3.130***	2.769 – 3.538
			4.843***	4.187 – 5.600
Number of observations = 27,075 *, **, *** indicate significance at the 90%, 95%, and 99% levels, respectively				

Source: Author's calculations

The results from the first model indicate that young female Indonesians are less likely to be migrants than males. Those who were born or grew up in capital cities have lower likelihoods of conducting first migration during young adulthood. Further, younger cohorts show higher migration propensities than older generations. Migration experience during childhood increases migration propensity within young adults to nearly twice that of those without childhood migration. Bernard and Vidal (2020) argued that migration is a learned behaviour, and past moves during childhood positively affect subsequent adult moves. In terms of cultural background, young Sumatrans have the highest propensity to conduct first adult migration among all other ethnic groups. For some ethnic groups in Sumatra, such as Minang and Batak, migration is viewed as a rite of passage to seek knowledge or to earn a living elsewhere (Tirtosudarmo, 2009).

The second model that includes interaction terms between birth cohort and educational attainment levels, displays a growing effect of education on the rate of first migration. With the addition of interaction terms, the propensities of first adult migration by the lower and upper secondary groups are 2.2 and 3.2 times higher than that of the primary educated group, respectively. In addition, the likelihood of first adult migration by the tertiary-educated group is 4.4 times higher than that of the primary group. However, a closer examination of the interaction terms indicates changes to the importance of educational attainment across birth cohorts. Figure 6.6 shows how the effect of education has substantially decreased in explaining the rate of first migration as cohorts get younger. The differences among educational groups are clearly pronounced for those who born before 1960. The cohort born before 1960 with upper secondary and tertiary education exhibited higher ratios than for those born in the 1960s and 1970s. However, the confidence intervals indicate that the differences of predicted probabilities are not statistically significant. For the youngest cohort, the rate of first adult migration for the tertiary groups are significantly higher than other educational groups. The overlap confidence intervals between lower and upper secondary groups suggest that there are no substantial differences in the probability of first migration among those with mid-level educational attainment for the youngest generation.

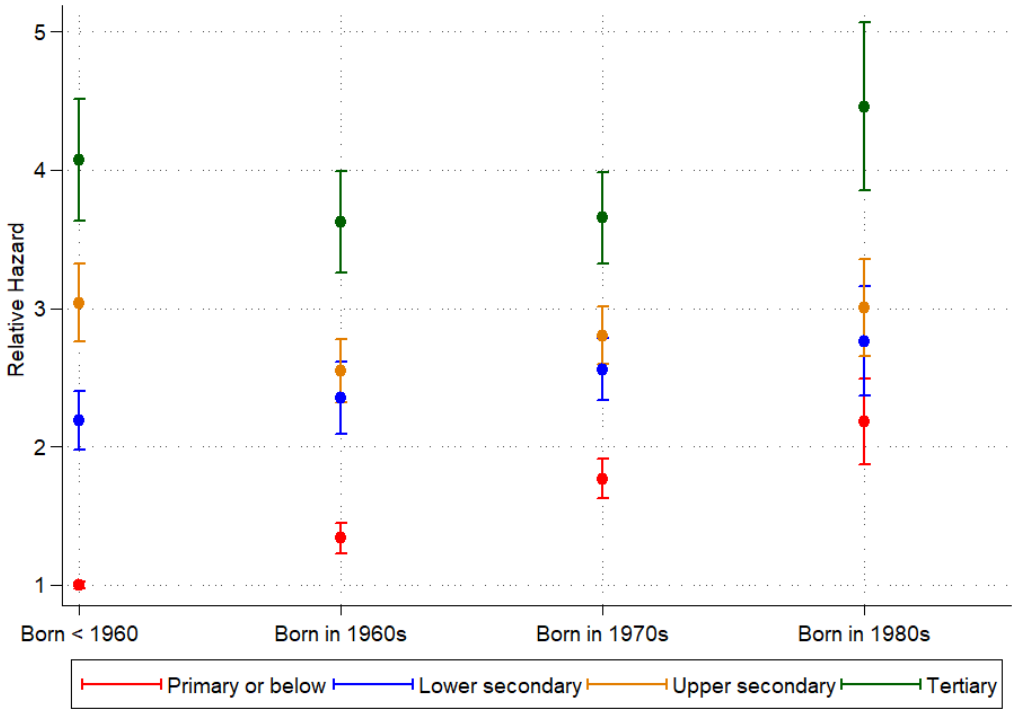

Figure 6.6 Predicted probabilities of first migration between 15 and 34 years by highest educational attainment and birth cohort
Source: Author's calculations

6.6 First Migration and Education Nexus in the Indonesian Context

Migration events at a younger age by primary- and secondary-educated groups indicates that school termination precedes their first adult migration. However, the moderate peaks in their age at migration suggest that first migration events might not be directly linked to the cessation of education careers. Termination of the formal schooling career is more likely to directly influence early initiation to other domains in life-course trajectories, such as career and family-related events. Entering these trajectories subsequently triggers the first migration. While migration at an earlier age arguably positively influences migrants' career outcomes and economic wellbeing (Aisa et al., 2014; Hartog & Winkelmann, 2003), this might not be the case for low-educated migrants that are generally employed in precarious informal sectors. Their migration could serve as a strategy to accumulate economic gains by taking advantage of less-skilled economic opportunities elsewhere. Additionally, the cumulative propensity for low-educated migration at younger ages has tended to increase over time. Not only does this indicate continual challenges to secondary and tertiary education survival in Indonesia, but it also implies stronger negative education selection on the flow of youth migration in recent years. This pattern may also suggest that, in recent years, those with a low level of human

capital have overcome migration barriers, such as financial costs and geographical distance. As discussed in Chapter 5, easy and cheaper means of transportation, as well as support from cultural groups in destination areas, might explain this situation.

Young adults' first migration can also be triggered by education continuation. This relation is highly pronounced within the age schedule of tertiary-educated migration that peaked around the common age of entering tertiary education. Tertiary student migration has not only been a response to limited access to higher education institutions in origin areas but the decision may also be influenced by individual aspirations, family norms, and community culture (Crivello, 2011). While education-related motives are not prominent within the migration structure in Indonesia (Malamassam, 2016; Muhidin, 2018), this study shows the importance of education-related motives in explaining the high migration propensity around the age of 18 to 19 years. As suggested by Wilson (2015), pursuing further education might not be the major driver of internal migration across all ages; however, it has a notable impact on migration systems due to its high concentration in particular age range. Since post-migration education arguably provides more advantages to migrants' career trajectories, such as higher earnings (Brezis, 2019; Pratomo, 2017), a younger age at first migration might enable improved returns to migration and education.

Migration events at later ages by the tertiary-educated group can imply the occurrence of first adult migration after formal education completion. However, this migration pattern is less pronounced across cohorts. Since migration by tertiary graduates is more likely influenced by the prospect of skilled job opportunities elsewhere (Liu et al., 2017; Venhorst, 2013), this situation could signal a persistent pattern of less centralised employment opportunities in knowledge-based sectors, particularly for local tertiary graduates. Moreover, migration by tertiary-educated is more apparent in subsequent moves by former tertiary student migrants (Venhorst et al., 2010; Winters, 2011b). This situation may also reflect a tendency toward native graduates' retention in their areas of origin. While higher levels of education offer a wide range of opportunities and incentives to move, location-specific capital in origin communities may work as a strong retention factor for non-migrant tertiary graduates. Local graduates may prefer to remain in their areas of origin since human and social capital that they have acquired might only be beneficial in these places (Malamassam, 2017; Winters, 2011b). Also, as Indonesia's evolving economy resulted in a growing need for workers with middle- and high-level technical skills in the 1980s and early 1990s (Suryadarma & Jones, 2013),

younger skilled individuals might have had more options and chosen to remain in their home regions.

By assuming that individuals' educational careers involve a set of different educational transitions, including school completion and termination, this study finds that the educational attainment of an individual can explain the timing of his or her first migration. From the various ways in which education careers of young adults are intertwined with their first migration occurrences, the ways migration is linked to education differ by age at first migration and highest educational attainment. Age and education can reflect youth's socio-economic background and local contexts that contribute to the initiation of migration trajectories.

6.7 Conclusion

This study examines the timing of the first migration of young Indonesians. Generally, the peak age at first migration is around 18 to 19 years old. The peak intensity of the age of first migration at a relatively young age implies that transition to adulthood events – such as family formation and labour market entry – also take place at earlier ages. This situation also indicates interregional inequality in accessing economic opportunities. This study confirms that highly educated individuals are most likely to be migrants during the young adult period. Furthermore, exploring the probability of first migration gives a clearer understanding of the relations between education careers and migration trajectories. Lower-educated individuals tend to migrate for the first time at younger ages, likely after the cessation of their schooling careers. In addition, for a substantial portion of the highly educated migrants, their first adult migration can be attributed to continuation to tertiary education. For some highly educated individuals, their first adult migration is occurred at later ages after completion of their schooling career. The various relations between education and migration are consistently shown across generations, though their intensities vary over time.

This study fills the knowledge gap on the timing of first adult migration, particularly in the Indonesian context. By focusing on the distinct ways young people negotiate their migration and education pathways, the findings suggest that both positive and negative educational selectivity is observable from the age schedule of first migration. The increasing probability of first migration at a younger age for low-educated groups across cohorts raises concerns about the high opportunity costs of school continuation for many young Indonesians. This situation may also reflect the rapid growth of low-skilled working opportunities in urbanised regions that simultaneously trigger school discontinuation, early entry into the labour

market, and first migration. Additionally, a remarkably high propensity of first migration around the age of tertiary enrolment for the most educated group reinforces the continual challenge of equal access to higher education institutions across regions. The findings in this study are helpful as a basis for designing social policies that address the implications of education opportunities on human capital distribution across regions. Further research should continue to examine the migration careers of young adults to understand the extent of the relationship between education and migration within the context of interregional human capital development.

Chapter 7 Spatial Trajectories of Young Indonesians: Variations in Migration Progression by Education

7.1 Introduction

Migration is considered a major event in one's life-course trajectory. Various life transitions, such as family formation, labour market entry, as well as education level entry and exit, can shape individuals' residential mobility and interregional spatial movements. Due to variations in individual backgrounds, migration dynamics may differ, from a one-time event to repetitive or seasonal events over time. Individuals' past migration experiences as well as regional opportunities and structural constraints can have important roles in shaping migration trajectories (Bernard & Perales, 2021; Coulter & Ham, 2013; Kley, 2011, Zufferey et al., 2020).

Zelinsky's (1971) theory of mobility transition emphasises that repeat migration is a major feature in more developed societies. In Europe, the average number of migrations varied greatly over countries in Europe (Bernard, 2017a). Denmark, England, and Sweden are countries with the highest migration rates, with an average of four to five migrations per individual, while Greece, Czech Republic, Austria, and Poland show relatively low levels of migration with an average of one or two between the ages of 17 and 50. In Australia, it is estimated that 52% of migrants recorded more than one migration (Bell, 1996). Moreover, repeat migration has also been a common practice in many developing countries. On average, about 60% of the population in African and Asian countries have migrated at least once, and nearly 40% of them have migrated twice or more (Cattaneo & Robinson, 2020).

Variations in migration trajectories are also apparent across different population groups. Males have a higher tendency to conduct repeat migration than females (Amcoff & Niedomysl, 2013; Cattaneo & Robinson, 2020). Younger cohorts, particularly in countries where migration rates have increased, exhibit higher migration levels than older generations (Bernard & Pelikh, 2019; Kolk, 2019; Pelikh & Kulu, 2018). Individuals with previous migration experience, especially during childhood, have higher tendencies to migrate again (Bernard & Perales, 2021). In terms of educational backgrounds, a higher number of years of schooling is strongly associated with repeat migration (DaVanzo, 1983; Kooiman et al., 2018). Post-migration education, particularly, is found to positively impact the likelihood of conducting subsequent migration (Faggian et al., 2015).

Previous studies have shown the significance of repeat migration within the population mobility system in various regions (Bell, 1996; Bernard, 2017a; Cattaneo & Robinson, 2020). In addition, the directions of repeat migration, in particular, can have implications for the mitigation of potential human capital loss and redistribution of human capital across regions (Constant & Zimmermann, 2011). Individuals' preferences for returning to areas of origin or moving to new regions are arguably linked to life-course events (Geist & McManus, 2008). This is because the events can influence individuals' evaluation of the anticipated living environment and shape their choices about destinations.

Despite its importance, the exploration of individual migration histories has received limited empirical focus in many countries, including Indonesia, due to limited data availability. Therefore, this study aims to fill the gap in the knowledge of migration dynamics in Indonesia by exploring levels and patterns of migration progression of the young adult population. By defining migration progression as a continuous series of an individual's long-distance moves or inter-district migration during a certain period, the following research questions are explored in this chapter: (i) How do the levels of migration progression during young adulthood vary by education background? and (ii) How do life-course events in education, employment, and family trajectories affect patterns of migration progression during young adulthood?

The exploration of spatial trajectories during young adulthood is critical to obtain insights into migration behaviour of Indonesians. Moreover, young adulthood is a 'demographically dense' period when individuals will go through various life-course transitions. Exposure to major life-course events, such as entering higher education, forming a family, or entering the labour market, can be accompanied by migration decisions (Bernard et al., 2016; Coulter & Ham, 2013; Mulder, 1993; Plane et al., 2005). By examining variations of migration progression by education, this study has relevance for the understanding of human capital redistribution across regions in Indonesia.

7.2 Literature Review

7.2.1 Migration Dynamics in Indonesia

Migration trends and patterns in Indonesia are mainly captured using transition data from censuses or national surveys and other cross-sectional studies. In the census, information about migration is collected through questions about birthplace and residence five years before census time. An intercensal survey is also conducted every ten years by Statistics Indonesia to

examine population dynamics between censuses. It contains additional migration-related questions, such as whether respondents have ever lived in another place, place lived before current residence, and duration of living at current residence. Thus, the survey records a maximum of four places that migrants ever lived in, i.e., birthplace, place lived before current residence, place lived five years ago (only asked if duration in current place is less than five years), and current residence. The latest intercensal survey in 2015 provides some general characteristics of migration in Indonesia (Table 7.1). Using the four questions on residential places, persons aged 15 years old and above are classified into three groups, i.e., stayer (no migration recorded), primary migrant (records one migration away from birthplace), and repeat migrant (records at least two migrations).

Table 7.1 Summary statistics of Indonesians aged 15 years and over by migration status, 2015 Intercensal Survey

Respondents' characteristics	Stayer	Primary migrant	Repeat migrant
	%		
Total proportion	74	19	7
Sex			
- Female	50	50	48
- Male	50	50	52
Age group			
- 15–19	14	6	4
- 20–24	12	10	8
- 25–29	11	11	12
- 30–34	11	12	14
- 35–39	10	13	14
- 40–44	9	12	13
- 45–49	8	11	12
- 50+	25	25	23
Highest educational attainment			
- Primary or below	48	32	27
- Lower secondary	22	20	19
- Upper secondary	24	35	35
- Tertiary	6	13	19
Marital status			
- Unmarried	28	18	14
- Married	63	74	78
- Divorced/widowed	9	8	8
Main activity			
- Working	55	58	61
- Attending school	10	7	4
- Homemaking	28	30	30
- Other	7	5	5

Source: Author's calculation

The intercensal survey shows that only around 26% Indonesians migrated at least once. Among migrants, most only record one migration. While there is an equal share of males and

females in the primary migrant group, there is a slightly higher proportion of males who have conducted repeat migration. Those with migration experience have a relatively higher education background than those who have not migrated. Also, the proportions of migrants are higher for married individuals and those currently working. However, the associative patterns between migration trajectories and respondents' characteristics could be misleading because most of the individual characteristics are time-variant variables. The survey does not provide information on the timing of respondents' status changing.

While findings from cross-sectional datasets can provide straightforward information on the internal migration system, it is not possible to examine the complexity of individuals' experiences and the possibility of repeat migration over a lifetime. Several studies have attempted to understand migration dynamics in Indonesia by examining individuals' migration histories. Muhidin (2018) found that about a fourth of Indonesians moved at least four times during their lifetime, including district boundary moves and within-district residential mobility. However, repeat migration is more likely by those who moved long distances earlier (Pardede et al., 2020). In terms of directions of repeat migration, those with higher education, as well as earlier age and longer distance of first migration, are more likely to conduct onward migration (Pardede et al., 2020, 2016). Additionally, Malamassam et al. (2021) found increasing importance of onward migration to least developed regions by highly educated individuals. Most of them are former student migrants and have entered the labour market in their study regions or other places. The choice of their latest migration is linked to efforts to improve their career trajectories. Moreover, career acceleration in destination areas is related to the duration of migration (Susanti & Damayanti, 2015). Also, migrants with repeat migration histories commonly move without family members during their earlier moves (Sugiyarto et al., 2019). While repeat migration is evident in the migration dynamics in Indonesia, the exploration of levels and patterns of migration trajectories in this context, particularly its association with life-course events, remains rare within the existing studies.

7.2.2 Migration Careers within Life-Course Trajectories

Examining migration as an integral part of life-course trajectories has been highlighted in recent literature (Bernard, 2017a, 2017b, 2022b; Kley, 2011; Kolk, 2019). The rising importance has resulted from an increasing trend of repeat migration patterns observed in both developed and developing countries (Bernard, 2022b; Kolk, 2019; Pelikh & Kulu, 2018). Migration patterns in several European countries show a large proportion of frequent migrants

among the migrant population (Bernard, 2017a). In countries with high rates of internal migration, such as Denmark, England, and Sweden, over 40% of their populations migrated at least five times between ages 17 and 50. In contrast, less than 5% of individuals migrate frequently in countries with lower migration rates, e.g., Poland, Austria, Czech Republic, and Greece. Also, Bell (1996) found that the measurement of migration based on five-year transition periods overlooked the total number of migrations in Australia by 52%. In low- and middle-income countries, about 700 million internal migrants have migrated at least twice (Cattaneo & Robinson, 2020).

The pathways of individual migration trajectories could be planned or unplanned. Individuals who have planned their spatial trajectories before their initial migration are generally those with more resources (Constant, 2019; Sage et al., 2013). Meanwhile, those with limited capital and low levels of education are more likely to conduct unplanned migration (Faggian et al., 2015; Sage et al., 2013). The unplanned migration might act as corrective strategy due to unmet or miscalculated expectations of the previous life-transition events (Coulter & Ham, 2013; DaVanzo, 1983). Further, among those who conduct repeat migration, some make subsequent migration immediately after their initial migration, while others remain for some time. The propensities of having shorter periods between two migrations are higher for female and unmarried migrants, while those just entering a marital union are more likely to stay longer in their initial areas of migration (Coulter & Ham, 2013).

Previous studies have explored other determinants that explain individuals' repeat migration. Earlier age at first migration, as well as shorter intervals between consecutive migrations, have been associated with a higher number of spatial movements or repeat migration over individual lifetimes (Bernard, 2017a, 2017b). Also, repeat migration is more likely to be found among those who have childhood migration experience (Bernard & Perales, 2021) and those who once migrated to pursue higher education (Amcoff & Niedomysl, 2013; Faggian et al., 2007a). Past migration is argued to shape capabilities and attitudes toward future migration and work as reinforcement to re-migrate (Bernard, 2022c; Bernard & Perales, 2021).

The discussions of the individuals' migration trajectories have also highlighted the spatial directions of their subsequent migrations. Bernard (2022d) argued that the choice to return or move onward is a combination of various factors, including working opportunities, living amenities, and housing availability. Return migration is found in 20 to 30% of internal migration in developed countries (Niedomysl & Amcoff, 2011). In developing countries, the

majority of urban–rural migration flows are return migration (Cattaneo & Robinson, 2020). Location-specific capitals, such as social networks and home ownership in areas of origin, are suggested to be main determinants of return migration (DaVanzo, 1981, 1983). Also, those who return home tend to have stayed for a short time in the initial migration destination (Dustmann & Kirchkamp, 2002).

In terms of individual characteristics, male migrants have higher propensities to return home compared to their female counterparts (Amcoff & Niedomysl, 2013; Cattaneo & Robinson, 2020). Moreover, highly educated migrants are more likely to migrate to new locations (Bernard, 2022d; DaVanzo, 1983; Faggian et al., 2017; Rérat, 2014). In addition, once graduated, many tertiary student migrants prefer to remain living in their regions of education or move to a new city (Winters, 2011b). However, return migration is also found as a planned strategy for a substantial part of student migrants following their education completion (Mulder et al., 2020). On the other side, low- educated migrants place more importance on stability and settlement, hence their low tendency to have repeat migration (Zufferey et al., 2020). More permanent moves by low-educated migrants are associated with a lower ability to obtain information on opportunities in other areas and stronger dependence on family and friend networks (Faggian et al., 2015).

Employment trajectory can also have a critical effect on one's migration trajectory. If the first migration is driven by unemployment in origin areas, it has a higher likelihood to be followed by subsequent migration, particularly if the unemployment status persists after the first migration (Amcoff & Niedomysl, 2013; DaVanzo, 1983). The decision to migrate again is argued to improve migrants' chances of finding employment. However, preferences for returning home or moving to a new location are both found in this situation (Amcoff & Niedomysl, 2013; DaVanzo, 1983). Moreover, Kooiman et al. (2018) explained that entry into the workforce in the early and mid-twenties might encourage student migrants to have subsequent migration to core economic centres in the country. Around their early thirties, some highly skilled migrants in the mid- or late stages of their working trajectories might consider migrating again, as they start to look for more affordable areas to live in as well as looking for opportunities for career advancement (Kooiman et al., 2018). Further, parallel advancement in migration, education, employment, and family careers are more apparent among male migrants (Kõu et al., 2015). On the other side, these life-course transitions are more likely to be separate events from migration events for their female counterparts.

Young graduates' subsequent migration is not merely a result of education-job market mismatch but is an embedded part of their life course. The family formation pathway also acts as a critical factor in explaining migration dynamics through the lens of life-course transitions (Falkingham et al., 2016; Kolk, 2019). Being married, in particular, lowers one's propensity to migrated back to their hometown (Amcoff & Niedomysl, 2013), particularly if the partner originated from another regions (Rérat, 2014). However, other family-related events, such as childbirth and marital separation, can trigger return migration (Mulder, 2018; Spring et al., 2021). Such events often made migrants be in need of supports from non-resident family members and prompted return migration.

The level and pattern of migration progression can affect returns to migrants' prior human capital investment (Knapp et al., 2013). Also, the trend of migration progression can shape labour market sorting and economic performance across regions. For highly educated migrants, repeat migration is linked to higher returns for their education and skills. Human capital acquisition through initial migration has enabled migrants to improve their skills and knowledge, resulting in a greater ability to access opportunities in various locations and leading to decisions to conduct subsequent migration (Faggian et al., 2007a). Onward migration following education completion, in particular, can provide long-term economic benefits for the migrants (Thomas et al., 2016). In contrast, making subsequent migration, particularly to rural areas, by low-educated migrants, is associated with a penalty in returns to human capital (Knapp et al., 2013). While educational attainment has been recognised as a critical determinant of repeat migration, the exploration of how different educational outcomes are attributed to variation of migration trajectories still remains rare among existing studies.

7.3 Data and Method

To analyse relationships between migration progression and life-course transitions, this study utilises life-course trajectories information from all waves of the Indonesian Family Life Survey (IFLS). IFLS has been the only multi-topic and large-scale survey that is capable of providing comprehensive information on various life-course transitions by the Indonesian populations. To date, IFLS has been conducted five times i.e., in 1993, 2000, 2007, and 2014. In its first wave, IFLS interviewed 7,224 households with more than 22,000 individuals in 13 provinces (Strauss et al., 2016). In its subsequent waves, IFLS tried to re-interview all respondents in the first wave, including those who had moved out from their original

households. Strauss et al. (2016) reported that the household retention rates for the later waves were more than 90%.

Migration-related information was collected in this survey through questions on the respondents' retrospective migration events. Respondents were asked about the details of their spatial movements, including information about the frequency, direction, and timing of the moves. Thus, IFLS datasets enable analysis of migration progression levels and patterns. Furthermore, observations for this study are restricted to respondents who had reached the age of 34 years in the last survey wave in which they were interviewed. Also, this study defines migration as spatial movement across sub-province (city/regency) boundaries between 15 and 34 years. This study only considers migration over the age of 15 in the analysis, based on the assumption that this age signifies the onset of individuals' autonomous decision-making (Wajdi, Mulder, et al., 2017). Also, the age of 15 years marks the common age of completion of compulsory education (lower secondary school) in Indonesia. Summary of respondents' characteristics is presented in Table 7.2.

Table 7.2 Summary statistics of young adult respondents aged 34 years by migration status, IFLS Waves 1–5

Variables	Never migrated	Migrated once	Migrated more than once
	%		
Total proportion	60	15	25
Sex			
- Female	54	51	42
- Male	46	49	58
Birth cohort			
- Born before 1960	47	41	27
- Born in 1960s	22	23	24
- Born in 1970s	25	29	38
- Born in 1980s	6	7	11
Highest educational attainment			
- Primary or below	65	46	30
- Lower secondary	13	18	18
- Upper secondary	16	24	31
- Tertiary	6	12	21
Marital status			
- Never married	5	4	7
- Married	84	92	88
- Divorced/widow	11	4	5
Working experience			
- Never worked	19	14	7
- Have worked	81	86	93
N=27,075			

Notes: Migration is defined as spatial movement across sub-province boundaries

Source: Author's calculation

The measurement of migration progression in this study examines its variation by highest educational outcomes. The educational outcomes of the respondents are determined based on the highest school level they had attended at the age of 34 years. Therefore, education is treated as a time-invariant variable in the analysis. For categorisation of the education level, this study uses four levels in Indonesia's formal education system, i.e., primary or below (no school or grades 1–6), lower secondary (grades 7–9), upper secondary (grades 10–12), and tertiary education.

The first part of the analysis examines several key measures of the level of young adult migration progression in Indonesia, including youth migration rate and distribution, youth migration progression ratios, age at migration and migration spacing. Youth migration rate depicts the average number of migrations among all observations within young adulthood, while youth migration distribution shows the share of youth population by their number of migration and discloses the decomposition of non-migrants, infrequent and frequent migrants (Bernard, 2017b). Youth migration progression ratios measure the proportion of the youth population who make a subsequent migration after a certain number of migrations. Examination of variations in migration progression ratios across sub-groups can help in understanding how differences in migration frequency shape patterns and levels of migration dynamics (Bernard, 2017b). Lastly, age at migration and migration spacing can give insight into how migration timing affects the dynamics of migration progression.

By employing a multinomial logistic regression model, the second analysis explores the association between the patterns of migration progression at the age of 34 and the transitions in education, marital, and employment trajectories from ages 15 to 34. The dependent variable for the model is the migration progression pattern, which is categorised into three groups, namely primary migration (only record one migration between 15 to 34 years), return migration (migrated more than once and the residential district at the age of 34 is the same as any district they lived in before the age of 15), and onward migration (migrated more than once and the residential district at the age of 34 is different to childhood residence).

The predictors for the model consist of variables that represent migrants' characteristics and life-course trajectories. Migrants' characteristics include sex, birth cohort, type of areas of origin (capital cities or beyond capital cities), and childhood migration experience. This study extends the coverage of migrants' areas of origin to not only include their birthplaces but also their residential places until the age of 12 years. Rérat (2014) argued that the strong social ties

with regions where migrants spent most of their childhood and adolescence play an important role in affecting the pattern of their subsequent migration.

Life-course trajectories observed in the model cover education, employment, and marital domains. The variables used for explaining migrants' educational careers are highest educational attainment, schooling trajectory after initial migration, and whether first migration and continuation to higher education occurred simultaneously. Next, the timing of first entry to the labour market (before or after the first migration and whether it occurred within the same year as the first migration) is used as a predictor variable for employment trajectories. Lastly, the dependent variables for marital trajectories are marital status before and after first migration and the co-occurrence between first migration and marital-related events.

Only those who have migrated at least once and have complete information on the timing of migration, education, employment, and marital trajectories are included in the regression model. Total observations in the regression model are 10,569. About 3% of migrants are excluded from the analysis due to incomplete information on the timing of life-course events. The exclusion of these migrants should not affect the consistency of the estimations in this study since the individual characteristics between the observed and excluded respondents are relatively similar. Appendix 7.1 presents the comparison of descriptive statistics between these two sample groups.

7.4 Levels of Migration Progression

Table 7.3 shows various measures of youth migration progression in Indonesia. The single youth migration ratio indicates that about 40% of Indonesian youths are migrants. This proportion far exceeds the share of the migrant population based on the 2015 intercensal survey (26%). It can be said that examination of migration that only underscores spatial transition status might overlook the actual number of migrants and their migration events. This situation arises since transition data with a fixed interval (generally five years) fails to capture repeat and return migration (Bell et al., 2020). When migration is counted as a series of events, the migration rate should increase significantly since the proportion of additional migrations per migrants would be approximately 53% higher. Also, while the youth migration rate is below one, the repeat youth migration rate indicates that those who migrated tend to conduct subsequent migration. This is shown through the average of 2.14 migrations per young migrant. Thus, it can be said that a pattern of repeat migration is apparent among young adult migrants in Indonesia.

Table 7.3 Levels of youth migration progression

	Youth migration rate	Single youth migration ratio	Additional youth migration ratio	Repeat youth migration rate
All observations	0.86	0.40	0.53	2.14
Sex				
Female	0.72	0.36	0.50	1.99
Male	1.01	0.45	0.56	2.28
Highest educational attainment				
Primary/below	0.51	0.27	0.46	1.85
Lower secondary	1.04	0.47	0.54	2.18
Upper secondary	1.25	0.54	0.57	2.30
Tertiary	1.66	0.67	0.59	2.46
Birth cohort				
Before 1960	0.61	0.32	0.48	1.93
1960s	0.89	0.41	0.54	2.16
1970s	1.10	0.49	0.56	2.28
1980s	1.27	0.54	0.58	2.37
Type of initial areas of origin				
Non-capital cities	0.81	0.38	0.54	2.17
Capital cities	1.03	0.49	0.52	2.08
Childhood migration				
No	0.80	0.37	0.54	2.16
Yes	1.28	0.62	0.52	2.07

Notes:
Youth migration rate: Average number of migrations per young population
Single youth migration ratio: Proportion of young people who migrate at least once
Additional youth migration ratio: Proportion of migrations that are missed by counting only one migration per young population
Repeat youth migration rate: Average number of migrations per young migrants

Source: Author's calculation

The male group not only have a higher share of the migrant population but also a higher average number of migrations compared to their female counterparts. The substantial differences in migration rates between men and women are argued to be associated with gender roles and social norms, e.g., marital union and childbearing as well as participation in higher education and the labour market (Cattaneo & Robinson, 2020). The highest youth migration rates are also found among those who attended tertiary education and the youngest cohort. Highly educated individuals are expected to have greater capabilities, access and opportunities in supporting their migration that result in highly mobile characteristics (Corcoran & Faggian, 2017). Further, changes in contextual background in recent years, such as increased education participation, higher levels of youth employment, greater access to information and communication, as well as rising individualisation norms among young people, can be attributed to the increasing migration rates amongst younger generations (Mulder, 1993).

Nearly half of migrants whose hometowns are in the province's capital migrated at least once during young adulthood. This proportion is about 10% higher than those with hometowns outside the capital cities. However, the latter group shows a slightly higher number of additional migrations and repeat migration rates. Thus, there is a higher proportion of migrants from more developed areas who conduct permanent migration. Additionally, around 62% of those who experienced childhood migration have migrated again during their young adulthood. Bernard and Perales (2021) argued that prior migration experience strongly triggers subsequent migration since it shaped one's capabilities and attitudes toward migration. Moreover, the effects of child migration are less apparent in the additional migrations of the young adults since the levels of repeat migration are relatively similar between those with and without childhood migration experiences.

Educational attainment has become a critical variable in explaining the level and pattern of migration progression (DaVanzo, 1983; Faggian et al., 2015; Kooiman et al., 2018). Figure 7.1 illustrates how migration trajectories of young adult Indonesians vary by their educational attainment. Most primary-educated individuals never migrated. The proportions of young persons never migrating lower as educational attainment increases. Parallel to the reduction in persons never migrating, the higher the educational attainment, the bigger the proportion of repeat migration. More than half of the tertiary-educated respondents have migrated at least twice, and about a fifth of them recorded three or more migrations. The patterns of repeat migration are argued to be a form of path-dependency, where an initial migration decision is easily followed by another migration in the future (Faggian et al., 2015).

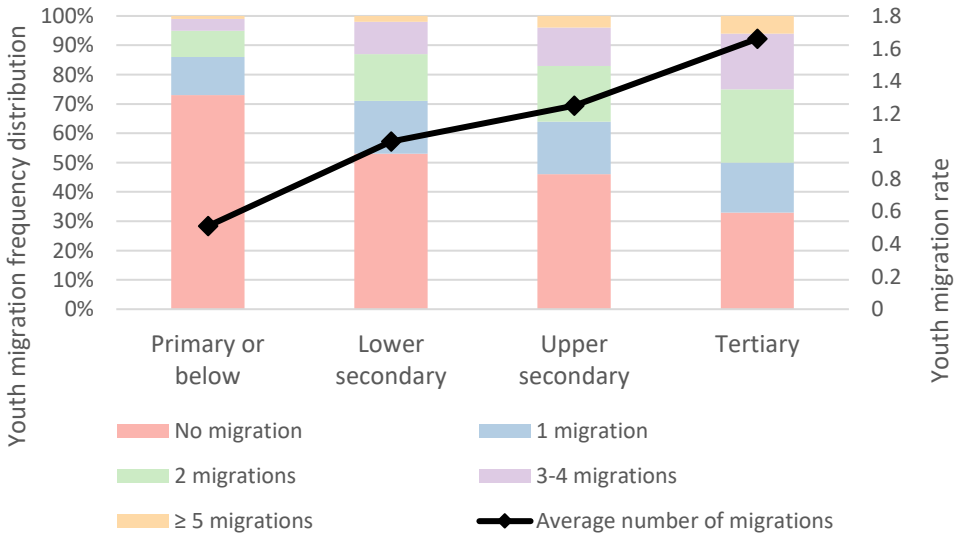

Figure 7.1 Youth migration frequency distribution and youth migration rate by highest educational attainment
Source: Author's calculations

Figure 7.2 illustrates the progression from being a non-migrant to a first time migrant ($m_{(0,1)}$) to conducting subsequent migration. Not only is there a stark contrast in first migration probabilities across different education groups, but also the extent of repeat migration is highly varied for each group. Only about half of primary-educated migrants proceed to the second migration. For the lower and upper secondary-educated groups, about a third of migrants in each group do not progress to second migration. The highest educated group displays the highest migration progression ratio to the second migration, with only a fourth of tertiary-educated migrants remaining in their first migration destination. The patterns of migration progression to the third migration are quite similar across education groups, except for the least educated group. While about half of migrants in more educated groups proceeded to a third migration, only about a third of their primary-educated counterparts did so. For the fourth and fifth migrations, all groups show a similar declining pattern with about a 50% drop in the proportions for each subsequent migration.

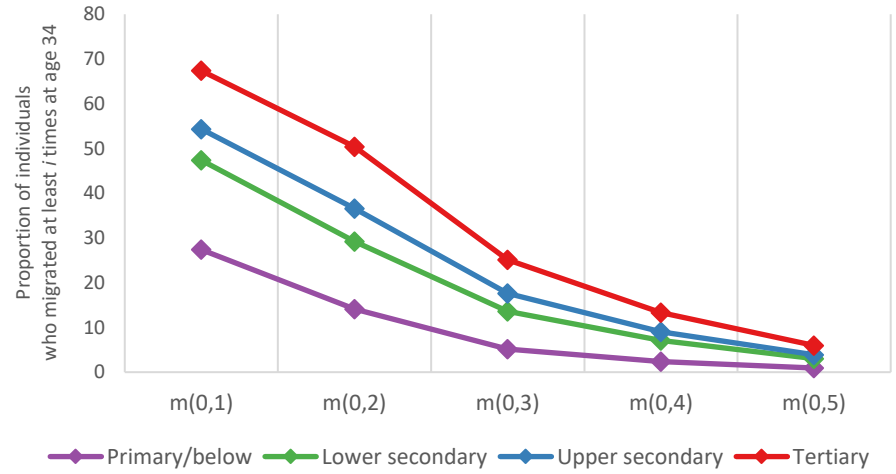

Figure 7.2 Youth migration progression ratios by highest educational attainment

Source: Author's calculations

Younger ages at the onset of migration trajectories are highly associated with higher migration rates (Bernard, 2017b). Figure 7.3 shows that all education groups, except upper secondary, have similar median ages of first migration. However, the first quartile of the primary and lower secondary groups began their migration trajectories slightly earlier than the upper secondary and tertiary groups. Longer time spent in education might explain later age at first migration by the higher-educated groups (Mulder, 1993; Vidal & Lutz, 2018). Further, about half of the tertiary-educated migrated for the first time below the age of 20 years. This means that their first migration took place before the completion of their educational careers. In terms of higher-order migrations, most young adults were still in their 20s when they

migrated for the fifth time. However, the median ages for the upper secondary and tertiary groups were slightly later than those of the lower educated groups. For low-educated migrants, the high number of migrations at young ages might reflect their vulnerable condition toward disruptive life events that can trigger repeat unplanned migration (Clark, 2016). Meanwhile, for highly educated migrants, the higher order of migrations around age thirty can be attributed to career advancement and settling down stages (Kooiman et al., 2018).

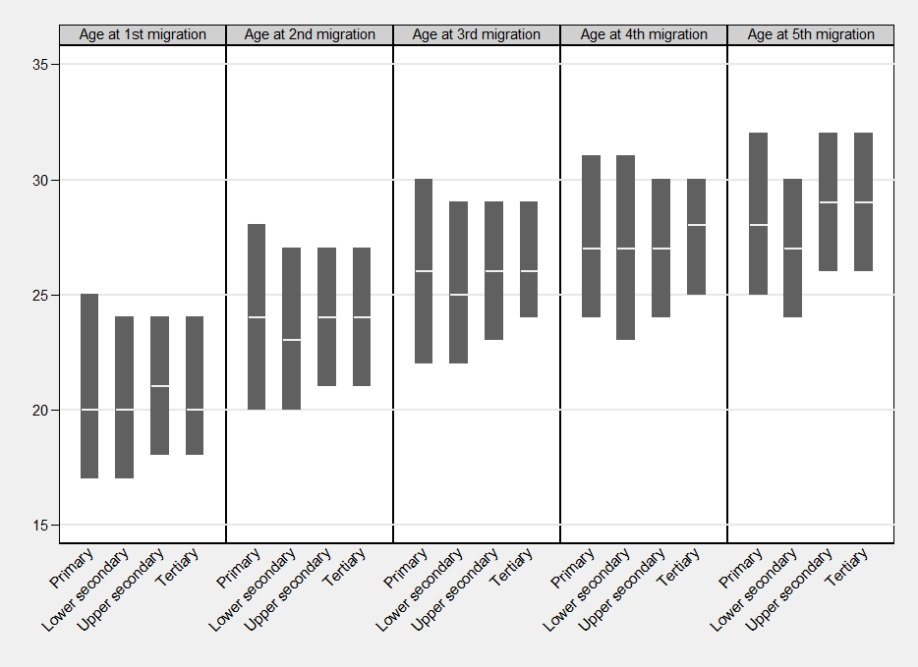

Figure 7.3 Age at migration during young adulthood by migration order and highest educational attainment

Source: Author's calculations

Shorter durations between migrations are linked to higher numbers of migrations (Bernard, 2017b). However, Table 7.4 shows that the groups with lower migration rates, i.e., the lower-educated groups, have slightly shorter intervals between the first and second migrations compared to the tertiary group. For the tertiary-educated group, particularly those who migrated for the first time around the age of completing upper secondary education (age of 18–19 years), the migration spacing between the first and second migrations of approximately four years is likely related to the duration of their tertiary study. Migration intervals across educational groups show a similar pattern, i.e., shorter spacing for higher-order migration. Moreover, the intervals between migrations among high-order migrations are commonly three years or lower. This situation indicates that repeat migration, particularly among frequent migrants, is missed in migration profiles that only consider spatial transition

across five-year time intervals. The long interval in the transition data could miss return and repeat migrations that occurred in-between intervals (Bell et al., 2020).

Table 7.4 Means of migration interval during young adulthood by migration order and highest educational attainment

Highest education level	Means of migration interval (year)			
	Migration 1–2	Migration 2–3	Migration 3–4	Migration 4–5
Primary/below	4.0	3.5	2.5	2.8
Lower secondary	4.1	3.5	2.8	2.2
Upper secondary	3.8	3.4	2.7	2.6
Tertiary	4.4	3.6	2.8	2.4

Source: Author's calculations

Figure 7.4 shows variations in interval to second migration by total number of migrations and education background. The tertiary-educated group stays longer in their initial destination before proceeding to live in another region. The median migration interval to second migration is generally higher for the highest education group. Regardless of their total number of migrations, the tertiary-educated migrants resided for three to four years in their initial destination before migrating to other places, while lower-educated individuals remained for two to three years after their first migration. This situation implies the limited effect of duration in initial migration destination in determining the number of young adult migrations across groups with different education backgrounds.

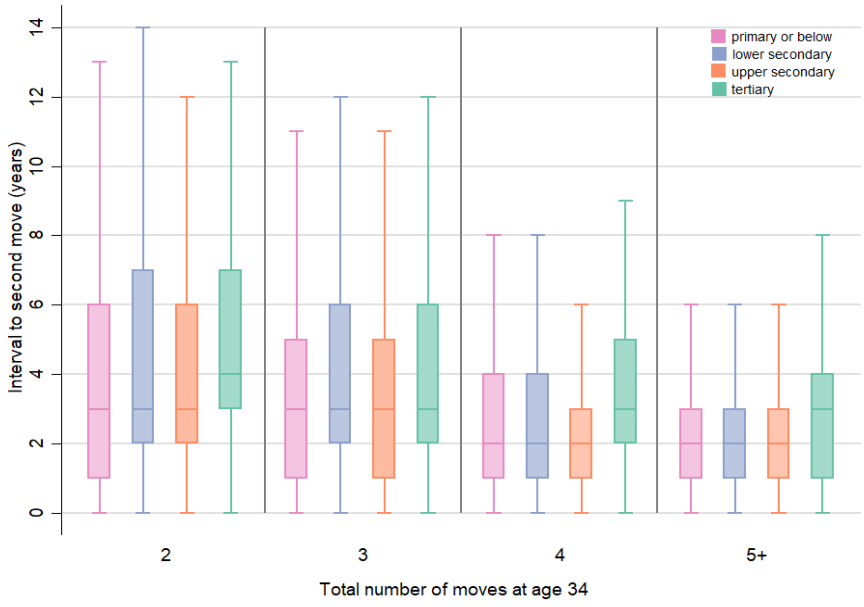

Figure 7.4 Interval to second migration by total number of migrations at age 34 and highest educational attainment
Source: Author's calculations

From the examination of various measures of migration progression, it is noticeable that stark differences between education groups can be found in the variations of proportion of repeat migrants across the groups. The majority of tertiary-educated migrants moved at least twice, but only 14% of primary-educated individuals conducted repeat migration. The patterns of age at migrations and interval between consecutive migrations show that low-educated migrants migrated at younger ages and remained there for a shorter period compared to their highly educated counterparts. Moreover, highly educated migrants who migrated more than once tend to reside a longer period in their first destination than their lower-educated peers.

7.5 Patterns of Migration Progression and Life-Course Transitions

Examining the patterns of migration progression in Indonesia and how these patterns differ across population sub-groups is critical in understanding migration dynamics over the life course. Table 7.5 presents the summary statistics of migration progression patterns among young adult migrants in Indonesia.

Table 7.5 Summary statistics of migration progression patterns at 34 years

	Patterns of migration progression		
	Primary migration	Return migration	Onward migration
N	4,012 (38.0%)	3,531 (33.4%)	3,026 (28.6%)
Mean age at first migration	23.4	20.5	19.8
Mean age at last migration		26.0	27.6
Mean migration interval (years)		3.69	4.41
Migrant characteristics	%		
Sex			
Female	51	41	41
Male	49	59	59
Birth cohort			
Before 1960	40	23	31
1960s	22	24	24
1970s	30	43	34
1980s	8	10	11
Hometown type			
Non-capital cities	70	74	73
Capital cities	30	26	27
Childhood migration			
No	77	85	80
Yes	23	15	20
Education trajectory	%		
Highest educational attainment			
Primary or below	46	35	25
Lower secondary	17	17	18
Upper secondary	25	29	33
Tertiary	12	19	24
First migration & continuation to higher education occurred simultaneously			
No	97	89	85
Yes	3	11	15

	Type of migration progression		
	Primary migration	Return migration	Onward migration
Employment trajectory	%		
First entry to labour force			
Never worked	14	5	8
Before first migration	47	36	26
After first migration	39	59	66
First migration & entry to labour force occurred simultaneously			
No	84	77	79
Yes	16	23	21
Marital trajectory	%		
Have been in a marital union before 1st migration			
No	63	80	87
Yes	37	20	13
Changes in marital status after 1s migration			
No	36	24	15
Yes	64	76	85
First migration & marital union/dissolution occurred simultaneously			
No	72	89	89
Yes	28	11	11

Source: Author's calculations

According to the information in Table 7.5, about 38% of young migrants only migrated once. Also, about a third of the migrants returned to their hometowns by age 34 years and around 29% conducted onward migration. On average, onward migrants started their migration trajectories at earlier ages, but they also concluded their migration careers later than other migrant groups. In addition, onward migrants took slightly longer times to move again than return migrants.

More females stay permanently in their initial migration destination, while repeat migration, both toward hometowns and new regions, was mainly conducted by males. The proportion distribution across cohorts shows that primary migration was dominated by the oldest cohort, and higher shares of younger cohorts are repeat migrants. Nearly half of primary migrants belong to the least-educated group. Almost a quarter of onward migrants are tertiary-educated individuals, while the proportion is lower for primary and return migrations, 12% and 19%, respectively. Most migrants completed or terminated their education trajectories before their first migration. However, the share of those attending higher education after first migration is considerably higher for return and onward migration groups than for primary migration. Nearly a half of return migrants had worked before their first migration, while most return and onward migrants started their employment trajectory after migrating. Moreover, there is a higher share of migrants who married before their first migration in the primary migration group. Also, the proportion of primary migrants who experienced marital transition

events within the same year as their first migration is more than twice of their repeat migrant counterparts.

A multinomial regression model was run to analyse the factors associated with types of migration progression. Return migration was chosen as the base category to investigate the differences between one-time and repeat migrations. The results of the model estimates are presented in Table 7.6.

Table 7.6 Results of multinomial logistic estimates

Variables	Type of migration progression (%)					
	Primary migration			Onward migration		
	Coef.	SE	RRR	Coef.	SE	RRR
Age at first migration	0.114***	0.007	1.121	-0.010	0.008	0.990
Female	0.291***	0.072	1.337	0.504	0.576	1.052
Birth cohort (ref.: born before 1960)						
1960s	-0.554***	0.040	0.575	-0.334***	0.051	0.714
1970s	-0.779***	0.030	0.459	-0.665***	0.035	0.522
1980s	-0.705***	0.048	0.494	-0.430***	0.063	0.665
Hometown in capital cities	-0.089	0.056	0.915	-0.141**	0.054	0.870
Migrated during childhood	0.747***	0.146	2.110	0.330***	0.099	1.388
Highest educational attainment (ref.: primary or below)						
Lower secondary	-0.025	0.071	0.976	0.433***	0.120	1.543
Upper secondary	-0.103	0.061	0.902	0.627***	0.134	1.872
Tertiary	-0.308***	0.066	0.735	0.630***	0.167	1.877
First migration & continuation to higher education occurred simultaneously	-0.667***	0.067	0.513	-0.013	0.090	0.987
First entry to labour force (ref.: never worked)						
Before first migration	-0.606***	0.057	0.545	-0.523***	0.069	0.593
After first migration	-0.421***	0.070	0.657	-0.283**	0.086	0.754
First migration & entry to labour force occurred simultaneously	-0.054	0.071	0.947	-0.156**	0.061	0.855
Have been in marital union before 1st migration	0.133	0.104	1.114	-0.115	0.095	0.891
Changes of marital status after 1st migration	-0.169*	0.074	0.845	0.314***	0.130	1.368
First migration & marital union/dissolution occurred simultaneously	1.090***	0.225	2.975	0.052	0.093	1.053
Constant	-1.675***	0.037	0.187	0.113	0.245	1.119
Number of observations = 10,569; base category is return migration * , **, *** indicate significance at the 90%, 95%, and 99% levels, respectively						

Source: Author's calculations

Females have higher propensities to be primary migrants compared to males, while there was no significant difference in the likelihood of being return or onward migrants. Cattaneo and Robinson (2020) argued that the distinctive patterns of repeat migration by sex indicate the different opportunities and decision-making processes between men and women. Moreover, those migrating at older ages are less likely to migrate more than once. As suggested

by Bernard (2017b), later ages at the onset of the migration trajectory are closely linked to low levels of migration intensity.

Older cohorts tended to migrate only once, while younger generations were more likely to be return migrants. Further, childhood migration experience significantly lower migrants' propensity to resettle in their areas of origin. The direction of subsequent migration indicates how previous migration experience shapes a process of learned behaviour, particularly regarding capabilities and attitudes to living in new places (Bernard & Perales, 2021). Childhood migration also reflects weak ties to hometowns and this situation influences location choice for subsequent migration (Faggian et al., 2015).

The diverse patterns of migration progression by education background are presented in Figure 7.5. It can be observed that primary-educated migrants are more likely to migrate only once. Permanent migration conducted by the least-educated group implies how lower levels of human capital constrain migrants from making additional migrations. As argued by Faggian et al. (2015), low-educated migrants have limited access to migration opportunities and social networks. This situation has a strong influence on settlement in the initial destination (Zufferey et al., 2020).

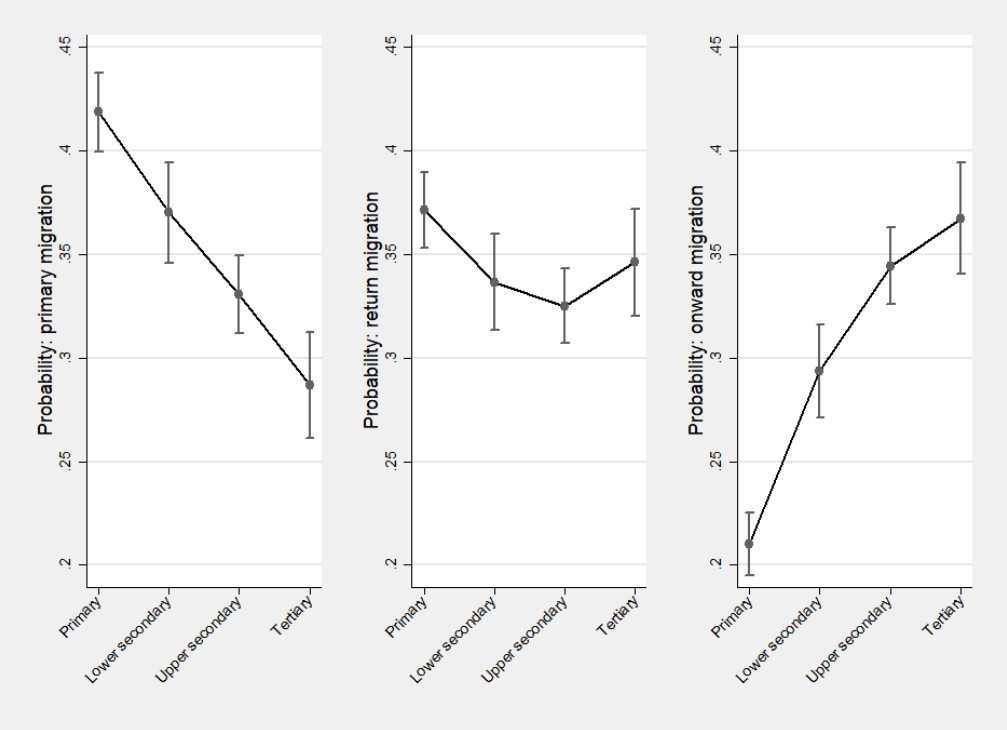

Figure 7.5 Predicted probabilities of migration typology at age 34 by highest educational attainment
Source: Author's calculations

Low-educated migrants who progress to subsequent migration are more likely to move back to their hometowns. Alternatively, migrating to a new location after first migration is the least preferred option for the primary-educated group. Due to familiarity with their hometowns, the choice of returning home can be considered a safe decision for subsequent migration, particularly if the migrants failed to meet their expectations from previous move (Coulter & Ham, 2013; DaVanzo, 1983). Moreover, living in new places, for less-educated individuals, could bring greater migration costs due to their limited capital and strong reliance on social networks in previous regions (Faggian et al., 2015).

Tertiary-educated migrants are more likely to make repeat migration. They are, particularly, more likely to conduct onward migration and live in cities beyond their hometowns and initial migration destinations at the age of 34 years. Figure 7.5. illustrates a strong positive education selectivity for onward migration. This type of migration trajectory can be influenced by various factors, such as career advancement, housing access, and provision of living amenities (Bernard, 2022d; Kogan et al., 2011; Rérat, 2014; Schittenhelm, 2011). The highly pronounced positive educational selectivity for onward migration in this study suggests how variations in educational trajectories play a critical role in the distinctive migration trajectories of the young population.

The distinctive patterns of migration progression between groups can be influenced by differences in life-course stages as well as variations in the education and employment opportunities they may have (Cattaneo & Robinson, 2020). The parameter estimations from the multinomial logistic model in Table 7.5 also show that life-course transitions after initial migration influence the migration progression pattern of young adult Indonesians. Initial migration for education significantly led to sequential migration, either toward the migrant's hometown or new regions. From a human development point of view, the manner in which highly educated migrants capitalise on their education investments determines the direction of their subsequent migration (Venhorst et al., 2010). For areas of origin, return migration marks the prospect of regaining human capital initially lost due to tertiary student outflows. Return migration is generally considered as a corrective move following failed initial migration (Coulter & Ham, 2013; DaVanzo, 1983), but this migration flow can also be a planned stragey following completion of the study (DaVanzo, 1983; Thomassen, 2021). Tertiary return migration indicates opportunities for former student migrants to reap higher returns to education by taking benefits from their location-specific capital and social networks (Crescenzi et al., 2017). On the other hand, a preference for living in new regions by former student

migrants indicates potential human capital loss in the migrants' hometowns and study cities, while the new destination regions gain additional human capital stock. This situation could widen interregional gaps in human capital development, particularly if the new destinations are more developed and urbanised regions with a high concentration of skilled migrants (Fu & Gabriel, 2012).

Transition in employment trajectory significantly influenced the typology of migration progression. Entry to the labour force after first migration had raised migrants' likelihood of becoming primary and onward migrants. For these migrants, the onset of the migration trajectory was driven by the unemployment factor, and the option of return migration was often associated with failure to gain benefit from an earlier migration. Thus, the decision to remain in an initial destination or move to new place can indicate successful human capital acquisition through labour market entry. Moreover, marital status before first migration had no significant influence on the type of migration progression. However, changing marital status after the first migration significantly increased the propensity to make a subsequent migration to a new region. This finding suggests the critical role of life-course transitions in shaping one's migration trajectories. Besides individual characteristics, ongoing events in people's lives significantly influence migration decisions (Coulter et al., 2013).

The variations in migration progression patterns in this study indicate the substantial effects of individual characteristics in the migration dynamics of young adults in Indonesia. Educational attainment, in particular, illustrates the critical role of human capital in supporting migration toward new regions. Also, changes in employment career are significant in dissuading migrants from returning to their areas of origin. Since education- and employment-related migration are closely related to skills and knowledge accumulation, as well as human capital redistribution, repeat migration can have crucial implications for human capital development in regions across Indonesia.

7.6 Conclusion

Repeat migration contributes substantially to the dynamics of internal migration in Indonesia. Taking advantage of the information on migration trajectories from the IFLS longitudinal datasets, it was found that approximately 40% of Indonesians migrated between the ages of 15 and 34 years. Once they had migrated, the young adults tended to conduct an additional migration before settling down. This situation is shown by the average of 2.14 migrations per migrant. Males, younger generations, those from capital cities, those with childhood migration

experience, and highly educated groups are shown to have higher migration rates than their counterparts.

While educational attainment can be a strong predictor of individuals' migration probability, it can also explain variations in levels and patterns of migration progression. Findings in this study show that the high levels of migration for tertiary-educated Indonesians are attributed to the high proportions of migrants in this group who migrated more than once. Meanwhile, the patterns of age at migration by move order and time interval between migrations are found to be relatively similar across education groups. However, the higher educated group tended to start their migration trajectories in later ages and stay longer in initial destinations. These patterns resulted in older ages in high-order migrations by individuals in this group.

Post-migration education increased the likelihood of young people being repeat migrants. This situation indicates the dynamic nature of human capital redistribution across regions. For the migrants, their subsequent migrations imply their capability to access opportunities in various regions and improve their welfare. Further, other life-course transitions, such as employment and marital changes, also significantly influence migration dynamics over the young adult period. The findings reinforce the importance of life-course transitions in shaping and influencing young adults' spatial trajectories.

This study fills a knowledge gap in the understanding of migration dynamics in Indonesia through the lens of life-course perspectives. By looking at migration as a series of spatial movements over young adulthood, this study sheds new light on the human capital aspect of youth migration. At the regional level, the diversity of the levels and patterns of migration progression by educational attainment portrays the challenges of human capital development across regions. The low retention of highly educated migrants in their areas of origin or their hometowns, particularly, can have crucial implications for the regions' human capital accumulation. In the long run, this situation may result in wider human capital inequalities within the country. This study shows that the distinctive patterns of repeat migration by young Indonesians indicate various strategies for improving returns to human capital by the migrant group. Therefore, it is crucial for stakeholders to address the different nature of spatial trajectories between low- and high-skilled populations in their efforts to improve human capital development at national and regional levels.

Chapter 8 Conclusion

8.1 Summary of Research Findings

In the context of national development, migration is seen as a spatial transfer of population and human capital. Migration is also considered a means to acquire human capital that potentially increases individual economic returns. In Indonesia, variations in demographic conditions and economic developments, particularly educational opportunities, have shaped the dynamics of interregional migration flows.

Flows of young adults – which have been positively selected within the internal migration system – play a critical role in the distribution of human capital between regions. By using education as a proxy of human capital measures, this research answers three questions on the interrelationships between the migration dynamics and educational attainment to understand the importance of youth migration on human capital development in Indonesia. This study focuses on the examination of education-specific variations in three main aspects of the migration dynamics, namely spatial structure, initiation, and progression of migration trajectory. The results of this research emphasise how education acts as a strong predictor for migration. However, the varied effects of education on the dynamics of youth migration in Indonesia are also highlighted.

Tertiary-educated migrants have shown distinctive patterns in their migration dynamics. The spatial structure of their migration flows exhibits more dispersed patterns of origin–destination pairs compared to lower-educated groups. In addition, there were increasing interaction ratios of tertiary-educated migration from urban areas toward less developed regions. The spatial structure of tertiary-educated migration illustrates more diffuse economic opportunities for skilled workers as well as the extension of knowledge-based working opportunities in rural areas.

The examination of factors contributing to the education-specific migration structure shows that the regions' human development levels significantly affect the out-migration of tertiary-educated migrants. Regions with higher stock of educated people are also associated with academic cities and they have a crucial role in human capital formation for young populations (Benneworth & Herbst, 2015). In Indonesia, the three top sending regions of tertiary-educated migrants are home to a great number of reputable universities. In other words, these regions act as human capital redistributors within the country.

The importance of human capital formation within the life-course trajectories of highly educated migrants in Indonesia is also indicated in their age schedule of first migration, which peaks around the typical age of entering tertiary education. This pattern indicates that the continuation of education has been a major trigger for the initiation of youth migration trajectories, particularly educated ones. Migration for pursuing further education is found to be a major pattern in highly educated migration over time. This situation implies continual challenges in the equitable provision of reputable higher education institutions across regions (Crivello, 2011; Eacott & Sonn, 2006). However, student migrants are likely to be those who have attained a high level of human capital even before their spatial movement. Eacott and Sonn (2006) and Elder et al. (1996) argued that migration for educational purposes would be more likely done by those with remarkable achievements in previous education efforts, better economic backgrounds, and extended social networks. Thus, their out-migration can signal significant loss of human capital stock in the areas of origin.

The distinctive migration dynamics by the tertiary-educated group is also shown with this group having the highest likelihood of conducting repeat migration, particularly toward new regions. In addition, post-migration education raised the likelihood to do subsequent migration during young adulthood. This finding confirms how human capital acquisition through migration can lead to sequential migration (Faggian et al., 2007a; Plane et al., 2005). The initial student migration has enabled highly educated migrants to improve their skills and knowledge, resulting in a greater ability to access opportunities in various locations. This situation also has an effect on the choice of a new migration destination to maximise returns to their human capital (Knapp et al., 2013). The pattern of migration progression by highly educated individuals emphasises the redistribution of human capital through repeat migration. This situation indicates potential challenges in local development and interregional brain drain (Benneworth & Herbst, 2015).

The spatial structure of education-specific youth migration flows indicates that employment opportunities in destination areas have been the prominent underlying factor shaping low-educated migration dynamics. Migration structure at lower education levels also involves less urbanised origin areas and more industrialised destination regions. For primary-educated migrants, particularly, their outflows from rural areas appear to be a response to labour demands of informal sectors in metropolitan regions (Jones et al., 2016). While limitations in their human capital might act as intervening obstacles in migration decisions,

social networks and cultural ties can enhance their capabilities to migrate (Ryan, 2011). Thus, social capital has a crucial role within the migration system of low-educated individuals.

This study found that initiation of a migration trajectory by primary- and secondary-educated groups is preconditioned by education termination. The age at first migration at a very young age by these groups is likely to indicate early initiation to other domains in life-course cycles, such as career and family-related trajectories, that subsequently triggers the first migration. Moreover, the increasing propensity for low-educated migration at younger ages over time implies ongoing challenges to the continuation to secondary and tertiary education in Indonesia. The findings of this study also indicate the stronger negative selection of education on the flows of youth migration in recent years. This situation can be attributed to the high opportunity cost of continuing education for many young people (Semela & Cochrane, 2019).

Low-educated migrants tend to conduct permanent residential change. They are likely to migrate only once during their young adulthood. Their permanent migration implies how limited human capital restrains migrants from having additional migration. Among the low-educated migrants who progress to subsequent migration, they are more likely to migrate back to their hometowns. Due to their familiarity with their native region, returning home is considered a safe option after unmet expectations of their previous migration (Coulter & Ham, 2013). Less-educated groups are also associated with shorter intervals between consecutive migrations. This pattern indicates how subsequent migration may be considered a corrective move after failure during the first migration (DaVanzo, 1983).

Examination of the spatial structure, as well as the initiation and progression of youth migration, indicates the significance of migration in human capital development in Indonesia. Metropolitan areas, such as Jakarta and its surrounding areas, have been melting pot of human capital in-flows within the country due to their prominent role in accumulating and redistributing migrants with various educational backgrounds. Moreover, urban regions with extensive higher education opportunities have shown their prominent role in human capital formulation and circulation within a country. At the individual level, migration acts as an important mechanism for human capital acquisition since it broadens access to education and working opportunities for young people. For highly educated individuals, migration is mainly seen as a complement to their human capital investment in education. Meanwhile, for low-educated people, migration works as an alternative to human capital investment through access to working opportunities and living experience elsewhere. Variations in patterns of migration

progression are linked to efforts in improving return on investment in human capital. Those with a low level of educational attainment tend to stay permanently in the initial area of destination or return to areas of origin, while tertiary graduate migrants prefer to explore new places during their young adulthood.

8.2 Theoretical Contributions

The key findings from the analytical chapters in this thesis show that the education-migration nexus has been varied within the youth migration dynamics in Indonesia. The results of this study indicate that education drives and is driven by migration. The focus on the education-specific migration dynamics in this study emphasises the importance of understanding youth migration within the context of human capital development.

The findings of Chapter 5 enrich existing knowledge on the push and pull factors of migration by highlighting the convergence and divergence patterns of origin–destination interactions by education background. Previous studies mainly pointed out economic inequality between origin and destination areas as the prominent factor influencing internal migration (Massey et al., 1993; Todaro, 1976). In the Indonesian context, particularly, the wage gap and relative work opportunities have been critical factors in explaining the spatial structure of migration (Bryan & Morten, 2019; Wajdi, Adioetomo, et al., 2017). By analysing education-specific migration flows, this study highlights the various selectivity of origin and destination regions by educational attainment. The capital city and its surrounding region were still the prominent regions in the migration system within the country. However, several urban and rural regions have shown increasing importance for education-specific migration flows. Several underlying factors, such as regional connectedness, social networks, and regional development level, have been evidenced to work in a similar direction in affecting the education-specific migration structure. However, the level of significance of such factors is highly varied. These findings call attention to the spatial redistribution of human capital across regions through internal migration.

The results of Chapter 6 provide further explanation of the interrelationships between education and migration pathways. Age at first migration can be viewed as a reflection of the youth's socio-economic background and local contexts that contribute to the initiation of the migration pathway. The first migration during young adulthood peaks at a relatively young age in Indonesia, i.e., around 18 to 19 years. Moreover, the peak age at first migration by educational attainment is highly varied. Differences in intensity at the peak of first migration

by highest educational attainment reflect the various ways in which young adults negotiate their migration and education trajectories. Therefore, variations in age at first migration provide a basis for more nuanced understanding of the education-migration nexus within the context of internal migration. Although educational attainment is generally understood to have a positive influence on migration propensity (Bernard & Bell, 2018; Gamlen et al., 2017; Gould, 1982), the findings on the initiation of migration trajectories provide evidence of the varied contexts of the interrelationships between migration trajectories and educational outcomes. Not only highlighting migration as a crucial means for human capital investment, the results of this study also emphasise the critical role of migration as an alternative to human capital investment in the context of the interregional inequality of access to education opportunities.

The findings of Chapter 7 highlight the variation in education-specific migration progression. Taking advantage of the information of migration histories in IFLS, this study broadens the understanding of sequential migration and its variation by educational attainment. Low-educated individuals are more likely to conclude their youth migration trajectories at their initial areas of destination, while tertiary-educated migrants have the highest propensity to conduct subsequent migration to a new region. The results reported in this chapter provide further evidence of the fluidity of highly educated migrants (Engbersen, 2012; Engbersen & Snel, 2013). This study has also pointed out the importance of repeat migration in improving returns to human capital investment.

8.3 Policy Implications

This research presents the dynamics of education-specific youth migration in Indonesia. This work has demonstrated the persistent challenges in human capital development across regions in this country. The inequality of human capital outcomes has been a continual issue that hinders the acceleration of regional development. Migration, as a critical instrument for the redistribution of population and human capital, can lead to a convergence of regional development (Faggian et al., 2017). However, it also potentially results in wider gaps in interregional inequalities (Faggian et al., 2017; Fu & Gabriel, 2012).

The selectivity of the migration dynamics by educational attainment shown in this study has several implications for policies related to population dynamics and human capital development. First, the high intensity of the onset of migration trajectories at earlier ages in young adulthood calls for equal access to educational opportunities across regions. The Indonesian government has implemented several education-related policies in order to improve

the education outcomes of its population. The compulsory education policy changed from six years in 1980s to nine years in 1993, and extended to 12 years in 2013. Also, school participation rates have increased significantly over time (Suharti, 2013a). However, the increasing migration propensity at younger ages by low-educated individuals indicates the high opportunity cost of continuing education for them. Moreover, the high intensity of migration at the typical age of entering tertiary education by highly educated migrants also signals limitation in higher educational opportunities. Faggian and Franklin (2014) suggested that the quality of tertiary institutions has been a critical pull factor for university-bound migration. The findings indicate that improvement in educational opportunities not only should ensure continuation of schooling to the secondary level, but provision of good quality tertiary institutions across regions should also be encouraged.

Another implication is the issue of retention of human capital. The spatial structure of tertiary-educated migration shows an increasing intensity towards less developed regions. Sukamdi and Mujahid (2015) argued that the increasing highly educated migration toward regions in eastern Indonesia can be a solution to overcome gaps in human capital development in the country. The increasing number of highly educated migrants to less developed regions in Indonesia has been influenced by several contextual factors. For example, the regional decentralisation policy that was initiated in 1999 and followed by the proliferation of many new districts across the country. This situation provided wide working opportunities for tertiary-educated individuals to work as local civil staff in newly established administrative regions (World Bank, 2003). Also, Indonesian governments have launched higher incentives for certain skilled workers, such as teachers, in less developed regions in recent years (World Bank, 2008b). This policy encourages urban–rural migration by tertiary-educated groups, particularly new graduates. As suggested by Corcoran et al. (2010), some tertiary graduates are willing to take job opportunities in peripheral or remote areas for their early career entry. Therefore, this situation can support more equitable human capital redistribution across regions. However, the most educated group has the highest tendency to conduct repeat migration. While regional decentralisation and additional incentives for working in less developed areas might act as a great attractor for tertiary-educated migration to rural regions, low retention of the human capital in-flows might bear potential challenges for human capital stock and the advancement of regional development in less developed regions. Social policies that address the low retention of highly educated migrants during young adulthood should be formulated to mitigate the potential loss of human capital, particularly in rural areas.

The findings of this study can be beneficial in anticipating migration alongside the relocation of Indonesia's capital to a newly built district in Kalimantan Island. The relocation – planned to begin in 2024 – includes the state-intervened migration of about 1.5 million government employees and their families (Jati, 2022). This migration scheme could be seen as a practical way to transfer human capital from densely populated and developed regions, such as Jakarta and its surrounding areas, to the less populated new capital. The clustering of the highly educated population through the initial civil servant migration could also work as a strong attractor to more in-migration flows by individuals from various educational backgrounds. This situation may accelerate human capital accumulation in the new capital and its surrounding region. However, the distinctive nature of education-specific migration dynamics may hinder the advancement of human capital development in this region. Therefore, the findings of this study provide a basis for managing education-specific migration flows toward the new capital.

8.4 Future Directions

Based on the analysis and findings of this study, several recommendations can be suggested for future research directions. Firstly, future analysis with the most recent datasets is needed to better understand the dynamics of youth migration in Indonesia. The current study limits its coverage to respondents born up to the early 1980s to ensure their similar exposure to young adulthood. In recent years, there have been remarkable changes in the higher educational system, regional connectivity, information and communication technology, and economic development within the country, which could greatly influence the changing dynamics of youth migration dynamics. Also, limited amount of migration-related information in national-level datasets in the country calls for further consideration of the data collection process. This study has shown that migration spacing between consecutive migrations, particularly the higher-order migrations, is generally around four years and below. This situation indicates that repeat migration is likely to be missed in population profiles in Indonesia that generally only recorded migration across a 5-year interval. Moreover, since young migrants are highly subject to sample attrition and undercounting in large-scale statistical data collection, it is critical to develop a dedicated migration survey that can capture the mobility dynamics of the young population.

Secondly, more research should investigate the influence of various domains of life course trajectories on migration dynamics. This study put more emphasis on educational attainment, while other life-course domains have also been suggested to shape individuals'

migration dynamics (Clark, 2016; Coulter & Ham, 2013; Horowitz & Entwisle, 2021; Kõu et al., 2015). Additionally, expansion of predictor variables focused on the migration histories of respondents and their extended networks is also suggested. In some communities in Indonesia, where migration culture has been an integral part of social norms and cultural values (Auwalin, 2020; Tirtosudarmo, 2009), migrants' characteristics and regional development should not be the sole explanations for the dynamics in internal youth migration. Moreover, since IFLS has specifically collected extensive information on the lives of respondents and their family members, future studies on the characteristics of the family of youth migrants are highly encouraged. Such studies can provide additional contexts to some theories on migration and life-course trajectories.

Thirdly, this study heavily relied on descriptive statistics and regression analysis with the treatment of educational attainment as a time-invariant variable. Additional studies should consider alternative methodological approaches that include time-varying measures and life-course transitions in order to have a better comprehension of migration trajectories as an integral part of life-course pathways. For example, entry and exit from secondary and tertiary education can give a more thorough illustration on the link between migration and education trajectories. Sequence analysis, age-period-cohort modelling, and multistate modelling are several methods that can be applied to extend the data analysis (Bernard & Kalemba, 2022; Klabunde et al., 2017; Mulder, 1993). Also, the multifaceted nature of migration dynamics calls for multidisciplinary frameworks in understanding the broader implication of this population phenomenon (Brettell & Hollifield, 2015). Thus, future studies on the issue of migration trajectories should also be attempted through qualitative and mixed method approaches. These approaches are useful in providing complementary insights into the significance of migration within the national system.

Lastly, future studies on migration at later ages are encouraged to obtain a more nuanced understanding of the implication of migration for human capital development. Although migration around the mid- to late-thirties is more likely to be permanent residential mobility (Plane et al., 2005), it is still important to explore the migration dynamics of the older population, particularly around retirement ages. This type of migration can have critical implications for the population structure, human capital composition, and local amenities provision (Ní Laoire & Stockdale, 2016). This study also provides a basis for other potential research related to the issue of migration and human capital development, that is, brain circulation through social connectedness and cultural ties to origin communities. Out-migration

of highly educated individuals can also generate human capital accumulation in areas of origin through knowledge diffusion and investment in economic activities initiated by the migrants in their areas of origin (Kone & Özden, 2017). Therefore, this topic can enrich the comprehension of the implications of migration on human capital development.

8.5 Conclusion

This thesis contributes to the understanding of education-specific migration dynamics among young people and their influences on human capital development in Indonesia. The study provides a more nuanced understanding in discussions of youth migration dynamics, and human capital development, particularly in a developing countries context. Also, the significance of this study lies in the utilisation of both cross-sectional and longitudinal datasets to be able to provide a basis for complete insights into variations in the education-migration nexus in Indonesia.

Within the context of human capital development, this study has captured the continual challenges of equitable educational opportunities in the Indonesian context. The increasing intensity of negative educational selectivity toward migration can signal the high opportunity cost of continuing education amidst the government's efforts to improve educational outcomes in the country. The results of the study also underline the importance of tertiary student flows within the highly educated migration system in Indonesia. Migration for education is still considered to be a minor part within the overall migration system in Indonesia due to its lower rate compared to labour and family-related migration. However, this study points out that this type of migration has been a prominent feature of interregional human capital flows in the country.

The results reported in this thesis provide further evidence for repeat migration as an integral part of youth migration dynamics, particularly for highly educated individuals. The findings emphasise the importance of understanding migration beyond the macro-level perspective. Migration is influenced by ongoing life-course transitions in people's lives, and this situation can also have critical impacts on human capital redistribution across regions. Lastly, the results of the study add substantially to our understanding of the importance of contextual factors in shaping the dynamics of youth migration. Thus, efforts to improve human capital outcomes should put more consideration into sub-national differences in population dynamics and regional development profiles.

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Appendices

Appendix 4.1 Distribution of samples in IFLS waves

Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Number of samples
✓	✓	✓	✓	✓	11,812
✓	✓	✓	✓		2,288
✓	✓	✓		✓	379
✓	✓	✓			1,807
✓	✓		✓	✓	264
✓	✓		✓		48
✓	✓			✓	137
✓	✓				562
✓		✓	✓	✓	1,131
✓		✓	✓		156
✓		✓		✓	93
✓		✓			121
✓			✓	✓	273
✓			✓		26
✓				✓	164
✓					591
	✓	✓	✓	✓	1,009
	✓	✓	✓		198
	✓	✓		✓	90
	✓	✓			164
	✓		✓	✓	72
	✓		✓		13
	✓			✓	63
	✓				97
		✓	✓	✓	1,406
		✓	✓		206
		✓		✓	175
		✓			196
			✓	✓	1,995
			✓		236
				✓	1,303

Source: Author's calculations

Appendix 5.1 Multiplicative component matrix of primary-educated migration, 2000

Destination / Origin	Jakarta	Outer Jakarta	Bandung	Semarang	Surabaya	Denpasar	Medan	Makassar	Urban west Java	Urban central Java	Urban east Java	Urban north Sumatera	Urban south Sumatera	Urban Kalimantan	Urban Sulawesi	Urban east Indonesia	Rural west Java	Rural central Java	Rural east Java	Rural north Sumatera	Rural south Sumatera	Rural Kalimantan	Rural Sulawesi	Rural east Indonesia	Total
Jakarta	-	3.761	0.615	0.821	0.161	0.363	0.402	0.154	1.070	1.145	0.234	0.510	0.444	0.217	0.146	0.180	1.155	1.688	0.424	0.471	0.328	0.176	0.121	0.204	0.067
Outer Jakarta	2.364	-	1.465	0.345	0.054	0.076	0.182	0.054	2.893	0.698	0.105	0.318	0.414	0.121	0.052	0.791	5.445	1.354	0.351	0.354	0.612	0.236	0.075	0.370	0.038
Bandung	0.867	1.913	-	0.394	0.127	0.254	0.253	0.137	2.469	0.633	0.224	0.368	0.464	0.166	0.113	0.101	5.001	1.141	0.446	0.492	0.541	0.396	0.126	0.455	0.031
Semarang	1.330	0.623	0.496	-	0.646	0.219	0.126	0.171	0.432	4.288	0.528	0.596	0.275	0.422	0.128	0.192	0.475	4.460	1.179	0.449	0.504	1.179	0.339	0.596	0.032
Surabaya	1.011	0.470	0.400	1.333	-	1.922	0.132	0.988	0.439	0.798	6.222	0.369	0.308	3.260	0.833	0.877	0.437	0.722	8.318	0.283	0.297	1.413	0.527	1.231	0.022
Denpasar	0.255	0.205	0.189	0.235	0.440	-	0.114	0.452	0.121	0.490	5.161	0.118	0.417	0.405	0.369	6.716	0.297	0.258	11.888	0.110	0.392	0.581	3.594	8.931	0.004
Medan	0.549	0.518	0.491	0.142	0.041	0.063	-	0.083	0.678	0.169	0.046	4.004	0.920	0.124	0.050	0.057	0.230	0.183	0.076	8.853	0.858	0.097	0.056	0.082	0.021
Makassar	0.240	0.021	0.129	0.225	0.152	0.173	0.098	-	0.016	0.162	0.127	0.251	0.174	2.520	7.318	2.578	0.003	0.340	0.201	0.099	0.078	0.878	21.702	2.644	0.010
Urban west Java	1.386	2.045	1.941	0.538	0.109	0.048	0.078	0.049	-	0.477	0.150	0.376	0.431	0.106	0.012	0.035	4.634	0.687	0.132	0.220	0.290	0.318	0.081	0.208	0.036
Urban central Java	2.310	1.138	0.795	3.646	0.318	0.365	0.130	0.147	1.005	-	0.337	0.257	0.271	0.271	0.117	0.139	0.694	3.195	1.057	0.432	0.479	0.613	0.164	0.438	0.094
Urban east Java	0.410	0.307	0.256	0.390	6.554	6.415	0.052	0.567	0.261	0.395	-	0.429	0.198	1.520	0.311	0.421	0.184	0.277	6.469	0.410	0.574	1.444	0.900	1.505	0.031
Urban north Sumatera	0.648	0.442	0.540	0.295	0.058	0.111	7.941	0.459	0.345	0.354	0.117	-	3.083	0.198	0.118	0.103	0.248	0.298	0.227	8.569	0.970	0.148	0.186	0.325	0.032
Urban south Sumatera	0.876	0.678	0.583	0.303	0.062	0.100	0.313	0.098	0.443	0.566	0.152	1.438	-	0.140	0.086	0.050	0.439	0.578	0.314	1.471	8.282	0.257	0.137	0.140	0.029
Urban Kalimantan	0.293	0.166	0.189	0.397	0.274	0.230	0.108	0.679	0.131	0.537	0.394	0.344	0.236	-	0.849	0.399	0.087	0.354	1.027	0.121	0.101	15.613	1.694	0.670	0.012
Urban Sulawesi	0.591	0.176	0.222	0.236	0.202	0.452	0.142	8.157	0.082	0.335	0.147	0.375	0.447	2.687	-	2.700	0.075	0.169	0.263	0.077	0.088	0.822	18.352	1.980	0.006
Urban east Indonesia	0.175	0.196	0.103	0.261	0.243	1.815	0.077	2.090	0.037	0.348	0.402	0.189	0.157	1.013	4.087	-	0.083	0.333	0.537	0.137	0.089	0.755	14.855	15.875	0.015
Rural west Java	1.551	1.871	4.070	0.419	0.050	0.084	0.043	0.047	4.132	0.495	0.100	0.298	0.352	0.098	0.027	0.049	-	0.732	0.330	0.290	0.510	0.448	0.131	0.890	0.105
Rural central Java	1.573	1.029	1.296	2.654	0.392	0.136	0.116	0.095	0.699	3.556	0.270	0.261	0.344	0.187	0.055	0.118	1.078	-	1.606	0.795	0.758	1.154	0.270	0.558	0.134
Rural east Java	0.584	0.377	0.341	0.407	6.598	5.756	0.059	0.191	0.263	0.611	6.785	0.388	0.151	1.249	0.123	0.317	0.353	0.725	-	0.649	0.599	2.160	0.645	1.502	0.096
Rural north Sumatera	0.111	0.157	0.190	0.100	0.018	0.058	9.307	0.426	0.073	0.174	0.051	8.310	0.493	0.048	0.014	0.086	0.512	0.442	0.213	-	4.608	0.187	0.471	0.413	0.068
Rural south Sumatera	0.507	0.724	0.293	0.288	0.034	0.054	0.148	0.068	0.291	0.440	0.107	0.586	17.346	0.063	0.016	0.019	0.529	0.831	0.678	3.737	-	0.519	0.303	0.175	0.035
Rural Kalimantan	0.287	0.106	0.082	0.227	0.459	0.148	0.057	0.146	0.118	0.315	0.255	0.282	0.072	24.418	0.115	0.394	0.311	0.613	0.716	0.279	0.186	-	0.650	1.623	0.018
Rural Sulawesi	0.090	0.044	0.076	0.532	0.047	0.153	0.034	21.223	0.024	0.394	0.080	0.268	0.120	3.522	21.893	1.000	0.292	0.762	0.287	0.313	0.291	1.811	-	2.965	0.033
Rural east Indonesia	0.140	0.137	0.379	0.164	0.245	1.602	0.045	1.213	0.070	0.353	0.795	0.634	0.111	0.794	1.248	25.428	0.706	0.712	0.443	0.150	0.103	1.804	5.124	-	0.028
Total	0.138	0.156	0.044	0.023	0.042	0.018	0.016	0.012	0.030	0.049	0.013	0.052	0.024	0.030	0.015	0.018	0.053	0.044	0.027	0.053	0.055	0.045	0.026	0.017	

Source: Author's calculations

Appendix 5.2 Multiplicative component matrix of primary-educated migration, 2010

Destination / Origin	Jakarta	Outer Jakarta	Bandung	Semarang	Surabaya	Denpasar	Medan	Makassar	Urban west Java	Urban central Java	Urban east Java	Urban north Sumatera	Urban south Sumatera	Urban Kalimantan	Urban Sulawesi	Urban east Indonesia	Rural west Java	Rural central Java	Rural east Java	Rural north Sumatera	Rural south Sumatera	Rural Kalimantan	Rural Sulawesi	Rural east Indonesia	Total
Jakarta	-	3.276	0.726	0.948	0.242	0.176	0.455	0.291	1.131	1.265	0.289	0.581	0.553	0.243	0.229	0.204	1.990	2.476	0.879	0.700	0.658	0.130	0.293	0.256	0.067
Outer Jakarta	2.876	-	1.240	0.673	0.141	0.099	0.274	0.153	2.430	1.097	0.269	0.404	0.620	0.150	0.093	0.126	4.847	2.170	0.791	0.735	1.062	0.162	0.174	0.251	0.039
Bandung	0.954	1.316	-	0.437	0.263	0.361	0.344	0.255	3.308	0.857	0.344	0.771	1.219	0.291	0.194	0.204	6.562	1.730	0.565	0.760	1.125	0.350	0.268	0.293	0.032
Semarang	1.148	0.781	0.344	-	0.480	0.230	0.240	0.418	0.466	3.162	0.455	0.858	0.436	0.852	0.341	0.348	0.449	4.046	1.305	0.448	1.085	1.336	0.897	1.002	0.027
Surabaya	0.716	0.571	0.551	0.858	-	1.225	0.201	0.985	0.612	0.801	4.806	0.375	0.405	2.611	0.773	1.280	0.469	0.734	8.017	0.232	0.412	1.073	0.654	1.521	0.028
Denpasar	0.198	0.199	0.375	0.439	1.207	-	0.229	0.608	0.274	0.856	7.194	0.235	0.249	0.417	0.522	1.934	0.394	0.618	13.090	0.249	0.372	0.330	1.716	4.505	0.003
Medan	0.281	0.423	0.405	0.137	0.073	0.056	-	0.056	0.281	0.152	0.086	4.023	0.623	0.111	0.091	0.080	0.301	0.177	0.204	9.521	1.040	0.126	0.076	0.103	0.023
Makassar	0.146	0.087	0.115	0.113	0.169	0.115	0.042	-	0.067	0.126	0.281	0.225	0.091	2.108	4.912	4.772	0.070	0.080	0.306	0.045	0.063	1.230	14.298	7.386	0.013
Urban west Java	1.575	1.988	2.418	0.703	0.167	0.143	0.143	0.166	-	0.762	0.235	0.458	0.836	0.176	0.123	0.111	3.875	1.070	0.495	0.377	0.716	0.297	0.269	0.218	0.034
Urban central Java	2.355	1.546	0.845	2.660	0.296	0.238	0.169	0.296	0.942	-	0.340	0.352	0.376	0.305	0.203	0.242	0.823	2.990	0.689	0.318	0.597	0.433	0.271	0.362	0.080
Urban east Java	0.171	0.177	0.176	0.290	5.470	8.715	0.071	0.564	0.164	0.305	-	0.310	0.179	1.509	0.264	0.741	0.124	0.336	6.948	0.256	0.591	1.331	0.907	2.011	0.022
Urban north Sumatera	0.327	0.357	0.425	0.358	0.073	0.092	5.703	0.101	0.291	0.304	0.219	-	1.303	0.144	0.075	0.132	0.392	0.488	0.651	10.377	1.424	0.121	0.242	0.564	0.032
Urban south Sumatera	0.807	0.646	0.481	0.327	0.080	0.089	0.587	0.122	0.504	0.502	0.379	1.842	-	0.160	0.063	0.068	0.621	0.554	0.546	1.130	8.941	0.156	0.236	0.100	0.028
Urban Kalimantan	0.213	0.155	0.185	0.343	0.420	0.130	0.087	1.224	0.159	0.396	0.811	0.243	0.117	-	0.893	0.302	0.193	0.419	1.858	0.118	0.136	9.132	4.231	0.818	0.020
Urban Sulawesi	0.089	0.073	0.083	0.096	0.122	0.155	0.053	5.637	0.072	0.175	0.320	0.187	0.095	1.896	-	3.214	0.121	0.075	0.316	0.038	0.093	0.812	21.762	4.412	0.013
Urban east Indonesia	0.135	0.124	0.173	0.412	0.503	2.356	0.137	2.224	0.084	0.334	0.623	0.305	0.906	0.553	2.756	-	0.131	0.193	0.666	0.123	0.340	0.832	3.797	20.171	0.011
Rural west Java	1.758	1.832	4.098	0.299	0.112	0.133	0.084	0.071	3.600	0.505	0.135	0.357	0.525	0.131	0.082	0.105	-	0.669	0.316	0.351	0.729	0.323	0.206	0.196	0.110
Rural central Java	1.552	1.191	1.203	3.202	0.385	0.123	0.148	0.171	0.824	3.355	0.290	0.400	0.454	0.254	0.089	0.162	0.759	-	0.858	0.517	0.986	1.585	0.249	0.312	0.146
Rural east Java	0.439	0.351	0.243	0.493	6.698	5.499	0.100	0.412	0.258	0.625	5.870	0.490	0.210	1.597	0.304	0.662	0.211	0.690	-	0.421	0.690	1.643	0.560	1.066	0.101
Rural north Sumatera	0.133	0.221	0.201	0.141	0.047	0.039	14.571	0.036	0.190	0.199	0.112	10.372	0.518	0.085	0.021	0.052	0.299	0.363	0.362	-	2.383	0.142	0.111	0.143	0.045
Rural south Sumatera	0.779	0.811	0.334	0.424	0.071	0.071	0.263	0.052	0.543	0.559	0.298	0.859	15.431	0.094	0.030	0.051	1.108	1.066	1.008	2.113	-	0.248	0.226	0.149	0.036
Rural Kalimantan	0.243	0.175	0.125	0.407	0.242	0.078	0.069	0.422	0.186	0.432	0.488	0.301	0.194	17.877	0.249	0.255	0.325	1.230	1.588	0.445	0.264	-	2.123	0.745	0.020
Rural Sulawesi	0.050	0.025	0.026	0.043	0.057	0.057	0.007	13.739	0.029	0.053	0.107	0.202	0.087	3.394	17.764	2.295	0.045	0.054	0.202	0.053	0.240	2.391	-	4.829	0.040
Rural east Indonesia	0.194	0.144	0.111	0.223	0.709	2.740	0.192	4.010	0.061	0.272	0.693	0.749	0.150	0.916	1.223	18.669	0.117	0.179	0.637	0.208	0.231	2.062	2.764	-	0.030
Total	0.143	0.158	0.038	0.017	0.034	0.025	0.013	0.011	0.028	0.044	0.019	0.053	0.026	0.036	0.019	0.022	0.028	0.035	0.027	0.056	0.052	0.067	0.025	0.025	

Source: Author's calculations

Appendix 5.3 Multiplicative component matrix of secondary-educated migration, 2000

Origin \ Destination	Jakarta	Outer Jakarta	Bandung	Semarang	Surabaya	Denpasar	Medan	Makassar	Urban west Java	Urban central Java	Urban east Java	Urban north Sumatera	Urban south Sumatera	Urban Kalimantan	Urban Sulawesi	Urban east Indonesia	Rural west Java	Rural central Java	Rural east Java	Rural north Sumatera	Rural south Sumatera	Rural Kalimantan	Rural Sulawesi	Rural east Indonesia	Total
Jakarta	-	3.374	0.793	0.561	0.198	0.477	0.359	0.112	1.155	0.629	0.289	0.325	0.471	0.277	0.205	0.225	1.120	1.128	0.387	0.490	0.416	0.182	0.242	0.398	0.120
Outer Jakarta	3.916	-	1.930	0.488	0.147	0.246	0.278	0.098	3.011	0.816	0.271	0.245	0.633	0.218	0.112	0.325	5.152	1.796	0.581	0.642	1.005	0.261	0.205	0.727	0.035
Bandung	1.521	1.428	-	0.562	0.262	0.514	0.413	0.220	3.616	0.752	0.500	0.588	0.686	0.443	0.219	0.272	5.669	1.346	0.784	0.515	0.767	0.447	0.273	0.552	0.029
Semarang	1.393	0.677	0.793	-	0.869	0.475	0.129	0.133	1.081	3.389	0.952	0.736	0.363	0.536	0.171	0.235	0.875	4.770	1.137	0.277	0.486	1.025	0.261	0.537	0.025
Surabaya	1.121	0.449	0.597	1.008	-	2.855	0.248	0.691	0.557	0.905	8.208	0.456	0.308	2.152	0.723	1.081	0.490	1.056	11.408	0.259	0.342	1.570	0.793	1.932	0.024
Denpasar	0.750	0.331	0.915	0.637	0.876	-	0.109	0.558	0.240	1.778	5.301	0.197	0.394	0.674	0.508	4.219	0.270	0.584	11.944	0.193	0.295	0.549	2.325	7.421	0.005
Medan	1.138	0.618	0.941	0.218	0.100	0.150	-	0.071	0.427	0.448	0.108	3.494	1.014	0.315	0.105	0.132	0.415	0.197	0.119	5.740	1.068	0.288	0.074	0.156	0.043
Makassar	0.705	0.067	0.541	0.341	0.352	0.499	0.133	-	0.049	0.657	0.443	0.378	0.184	2.394	7.190	2.388	0.036	0.419	0.510	0.110	0.161	1.193	24.042	4.581	0.011
Urban west Java	1.474	1.798	3.421	0.698	0.246	0.120	0.094	0.041	-	0.885	0.235	0.258	0.315	0.165	0.048	0.069	4.455	0.671	0.247	0.183	0.315	0.180	0.100	0.191	0.027
Urban central Java	1.949	1.233	0.879	4.398	0.483	0.447	0.087	0.123	1.491	-	0.515	0.877	0.308	0.490	0.116	0.239	1.062	4.193	0.921	0.296	0.537	0.750	0.195	0.456	0.076
Urban east Java	0.565	0.341	0.435	0.590	7.237	5.049	0.060	0.299	0.307	0.720	-	1.019	0.169	1.547	0.246	0.651	0.306	0.396	6.347	0.208	0.420	1.404	0.494	1.515	0.031
Urban north Sumatera	1.211	0.507	1.167	0.334	0.085	0.187	5.641	0.241	0.400	0.708	0.180	-	2.242	0.233	0.097	0.118	0.364	0.345	0.224	8.727	1.109	0.204	0.122	0.225	0.047
Urban south Sumatera	1.135	0.722	1.267	0.369	0.115	0.135	0.327	0.079	0.586	1.220	0.162	1.575	-	0.176	0.069	0.073	0.692	0.448	0.204	1.041	9.450	0.177	0.106	0.075	0.043
Urban Kalimantan	0.600	0.204	0.597	0.661	0.367	0.298	0.147	0.721	0.178	1.778	0.680	0.178	0.219	-	0.736	0.425	0.147	0.664	1.060	0.147	0.161	21.215	1.330	0.964	0.018
Urban Sulawesi	1.158	0.246	0.483	0.385	0.318	0.498	0.147	5.966	0.162	0.614	0.321	0.339	0.358	2.295	-	2.339	0.087	0.235	0.291	0.113	0.108	0.933	20.268	2.549	0.012
Urban east Indonesia	0.684	0.140	0.469	0.646	0.445	2.177	0.079	2.927	0.052	1.115	0.699	0.161	0.180	0.953	5.838	-	0.072	0.551	1.187	0.158	0.135	0.428	10.542	19.676	0.016
Rural west Java	1.572	1.514	4.544	0.304	0.086	0.111	0.048	0.046	4.622	0.708	0.128	0.183	0.287	0.131	0.044	0.078	-	0.832	0.450	0.160	0.409	0.280	0.143	0.537	0.058
Rural central Java	1.401	1.054	0.883	3.451	0.451	0.156	0.060	0.063	0.959	3.500	0.353	0.350	0.181	0.274	0.048	0.126	1.056	-	1.154	0.334	0.459	0.685	0.151	0.355	0.099
Rural east Java	0.674	0.480	0.455	0.469	7.568	6.288	0.057	0.156	0.365	0.823	7.083	0.437	0.137	1.234	0.120	0.427	0.481	0.867	-	0.333	0.456	1.827	0.441	1.419	0.074
Rural north Sumatera	0.292	0.192	0.249	0.087	0.037	0.074	7.969	0.073	0.128	0.197	0.053	5.916	0.528	0.121	0.023	0.052	0.304	0.236	0.125	-	2.479	0.205	0.190	0.227	0.076
Rural south Sumatera	0.637	0.745	0.669	0.231	0.081	0.081	0.153	0.021	0.386	0.811	0.145	0.755	16.065	0.069	0.017	0.029	0.847	0.550	0.338	1.717	-	0.187	0.139	0.096	0.037
Rural Kalimantan	0.339	0.096	0.185	0.292	0.095	0.209	0.091	0.161	0.083	0.684	0.246	0.098	0.048	22.580	0.099	0.178	0.211	0.534	0.555	0.192	0.079	-	0.466	0.985	0.020
Rural Sulawesi	0.142	0.040	0.107	0.154	0.057	0.197	0.029	15.889	0.025	0.241	0.103	0.130	0.076	1.871	15.058	0.695	0.109	0.357	0.161	0.142	0.106	1.427	-	1.953	0.045
Rural east Indonesia	0.470	0.259	0.313	0.324	0.419	2.037	0.050	1.459	0.082	0.888	0.448	0.267	0.062	0.683	1.030	22.143	0.277	0.627	0.857	0.144	0.104	1.007	3.002	-	0.031
Total	0.102	0.195	0.055	0.031	0.039	0.019	0.027	0.028	0.027	0.085	0.010	0.094	0.029	0.035	0.021	0.023	0.025	0.021	0.016	0.037	0.031	0.024	0.014	0.012	

Source: Author's calculations

Appendix 5.4 Multiplicative component matrix of secondary-educated migration, 2010

Origin \ Destination	Jakarta	Outer Jakarta	Bandung	Semarang	Surabaya	Denpasar	Medan	Makassar	Urban west Java	Urban central Java	Urban east Java	Urban north Sumatera	Urban south Sumatera	Urban Kalimantan	Urban Sulawesi	Urban east Indonesia	Rural west Java	Rural central Java	Rural east Java	Rural north Sumatera	Rural south Sumatera	Rural Kalimantan	Rural Sulawesi	Rural east Indonesia	Total
Jakarta	-	3.569	0.985	0.482	0.238	0.375	0.297	0.150	1.016	0.603	0.218	0.356	0.482	0.291	0.227	0.175	1.223	1.335	0.512	0.642	0.559	0.211	0.355	0.363	0.099
Outer Jakarta	4.358	-	2.477	0.644	0.236	0.272	0.241	0.076	2.964	1.182	0.298	0.289	0.621	0.220	0.127	0.142	3.749	3.035	0.868	0.866	1.496	0.236	0.317	0.399	0.039
Bandung	1.654	1.528	-	0.420	0.324	0.805	0.320	0.211	4.047	0.718	0.283	0.560	0.833	0.452	0.196	0.240	6.173	1.577	0.627	0.761	1.020	0.488	0.373	0.496	0.025
Semarang	1.616	0.944	0.667	-	0.768	0.571	0.172	0.176	0.917	3.164	0.404	0.591	0.379	0.626	0.223	0.288	0.876	5.077	1.071	0.375	0.829	1.530	0.541	1.087	0.019
Surabaya	0.819	0.455	0.525	0.677	-	2.190	0.162	0.494	0.389	0.705	6.520	0.339	0.251	1.633	0.644	0.979	0.430	0.942	10.052	0.223	0.322	1.417	0.818	1.871	0.025
Denpasar	0.625	0.264	0.874	0.624	1.847	-	0.111	0.405	0.223	1.686	3.146	0.185	0.192	0.408	0.598	1.496	0.360	0.621	13.443	0.217	0.344	0.313	1.421	4.618	0.005
Medan	0.814	0.567	0.978	0.200	0.123	0.192	-	0.055	0.533	0.296	0.119	3.618	0.797	0.305	0.102	0.122	0.744	0.174	0.208	6.059	1.323	0.448	0.138	0.216	0.038
Makassar	0.555	0.199	0.608	0.214	0.524	0.385	0.079	-	0.146	0.340	0.320	0.304	0.119	1.910	4.843	2.494	0.173	0.199	0.436	0.075	0.087	1.607	16.631	6.250	0.011
Urban west Java	1.778	1.841	4.231	0.592	0.220	0.204	0.071	0.068	-	1.051	0.192	0.267	0.381	0.167	0.076	0.090	4.963	1.143	0.426	0.281	0.545	0.254	0.209	0.207	0.025
Urban central Java	2.078	1.553	0.814	4.941	0.474	0.421	0.077	0.132	1.823	-	0.318	0.618	0.301	0.391	0.138	0.186	1.040	4.882	0.766	0.260	0.595	0.752	0.272	0.512	0.062
Urban east Java	0.316	0.242	0.315	0.324	8.003	7.914	0.042	0.196	0.214	0.527	-	0.276	0.133	1.202	0.205	0.455	0.195	0.420	10.019	0.178	0.376	1.455	0.586	1.376	0.021
Urban north Sumatera	0.832	0.431	1.188	0.310	0.137	0.166	4.896	0.085	0.359	0.653	0.193	-	1.211	0.210	0.075	0.096	0.451	0.593	0.554	10.307	1.584	0.239	0.216	0.369	0.045
Urban south Sumatera	1.204	0.740	1.222	0.418	0.126	0.152	0.363	0.069	0.547	1.048	0.238	1.662	-	0.205	0.069	0.048	1.130	0.483	0.367	0.838	11.592	0.216	0.128	0.123	0.035
Urban Kalimantan	0.521	0.186	0.580	0.515	0.787	0.214	0.085	0.858	0.157	1.343	1.589	0.146	0.145	-	0.597	0.193	0.189	0.481	1.744	0.154	0.133	17.274	2.432	0.625	0.020
Urban Sulawesi	0.494	0.136	0.323	0.200	0.294	0.360	0.030	6.746	0.085	0.315	0.260	0.180	0.067	1.334	-	1.987	0.100	0.136	0.303	0.053	0.068	1.033	23.554	3.538	0.017
Urban east Indonesia	0.459	0.178	0.473	0.721	0.793	1.631	0.079	3.010	0.107	1.089	1.270	0.142	0.149	0.380	1.874	-	0.124	0.410	0.925	0.075	0.114	0.464	2.593	23.570	0.014
Rural west Java	1.921	1.849	4.637	0.242	0.127	0.201	0.049	0.045	4.612	0.615	0.116	0.190	0.290	0.146	0.065	0.059	-	0.657	0.352	0.214	0.515	0.280	0.152	0.185	0.058
Rural central Java	1.528	1.369	0.757	3.845	0.403	0.206	0.063	0.060	1.298	3.703	0.197	0.378	0.203	0.254	0.064	0.123	0.905	-	0.737	0.253	0.580	0.929	0.202	0.366	0.103
Rural east Java	0.584	0.441	0.315	0.428	6.930	5.725	0.048	0.153	0.334	0.855	6.220	0.457	0.139	1.080	0.169	0.372	0.322	0.780	-	0.248	0.494	1.591	0.463	1.053	0.085
Rural north Sumatera	0.283	0.212	0.345	0.103	0.059	0.067	7.994	0.022	0.183	0.255	0.073	6.224	0.307	0.112	0.024	0.034	0.355	0.215	0.179	-	1.231	0.180	0.097	0.120	0.084
Rural south Sumatera	0.720	0.796	0.493	0.269	0.074	0.098	0.153	0.023	0.433	0.820	0.166	0.692	15.802	0.075	0.021	0.030	2.155	0.602	0.431	0.891	-	0.198	0.093	0.094	0.044
Rural Kalimantan	0.530	0.133	0.196	0.489	0.174	0.106	0.043	0.257	0.086	0.890	0.802	0.083	0.054	20.159	0.119	0.065	0.207	0.431	0.685	0.189	0.134	-	0.695	0.319	0.027
Rural Sulawesi	0.108	0.038	0.107	0.081	0.084	0.094	0.006	12.425	0.029	0.147	0.076	0.123	0.016	1.165	15.599	0.784	0.057	0.056	0.171	0.030	0.051	1.502	-	2.368	0.049
Rural east Indonesia	0.361	0.142	0.226	0.458	0.555	1.631	0.044	2.601	0.064	0.873	1.567	0.162	0.052	0.322	0.830	15.394	0.105	0.248	0.715	0.074	0.079	0.733	1.436	-	0.048
Total	0.083	0.180	0.047	0.028	0.036	0.020	0.027	0.027	0.029	0.071	0.029	0.096	0.032	0.036	0.028	0.036	0.018	0.018	0.020	0.043	0.028	0.030	0.018	0.019	

Source: Author's calculations

Appendix 5.5 Multiplicative component matrix of tertiary-educated migration, 2000

Origin \ Destination	Jakarta	Outer Jakarta	Bandung	Semarang	Surabaya	Denpasar	Medan	Makassar	Urban west Java	Urban central Java	Urban east Java	Urban north Sumatera	Urban south Sumatera	Urban Kalimantan	Urban Sulawesi	Urban east Indonesia	Rural west Java	Rural central Java	Rural east Java	Rural north Sumatera	Rural south Sumatera	Rural Kalimantan	Rural Sulawesi	Rural east Indonesia	Total
Jakarta	-	2.868	0.751	0.560	0.362	0.683	0.571	0.286	0.833	0.581	0.277	0.651	0.690	0.640	0.420	0.410	0.672	0.356	0.223	0.295	0.324	0.230	0.171	0.268	0.214
Outer Jakarta	4.298	-	2.134	0.611	0.337	0.343	0.537	0.224	2.351	0.790	0.260	0.499	0.833	0.553	0.439	0.535	4.205	0.615	0.427	0.425	0.527	0.323	0.187	0.458	0.038
Bandung	1.792	1.011	-	0.533	0.421	0.590	0.783	0.419	3.686	0.681	0.468	0.912	1.221	0.836	0.568	0.553	5.127	0.550	0.428	0.389	0.650	0.420	0.261	0.527	0.059
Semarang	1.209	0.536	1.015	-	0.863	0.790	0.306	0.255	0.940	4.426	0.759	0.704	0.714	0.861	0.363	0.431	0.405	4.901	0.792	0.209	0.576	0.732	0.230	0.334	0.033
Surabaya	1.152	0.461	0.755	1.068	-	2.769	0.310	0.836	0.585	0.996	5.661	0.774	0.374	1.783	0.661	1.389	0.311	0.790	7.668	0.183	0.341	0.963	0.539	1.393	0.041
Denpasar	1.119	0.395	0.912	0.728	1.626	-	0.310	0.614	0.234	1.325	2.982	0.585	0.572	0.805	0.682	4.872	0.221	0.430	7.167	0.163	0.182	0.500	0.903	4.748	0.008
Medan	1.549	0.505	0.937	0.216	0.181	0.261	-	0.158	0.457	0.367	0.134	4.003	1.375	0.620	0.165	0.346	0.263	0.168	0.116	6.079	1.075	0.426	0.094	0.164	0.042
Makassar	0.709	0.049	0.330	0.276	0.446	0.533	0.108	-	0.041	0.437	0.254	0.465	0.136	2.161	7.421	2.321	0.013	0.191	0.218	0.074	0.108	0.947	18.443	2.811	0.026
Urban west Java	1.315	1.549	3.785	0.803	0.432	0.343	0.201	0.098	-	0.795	0.234	0.307	0.363	0.447	0.172	0.196	5.049	0.585	0.161	0.146	0.212	0.257	0.099	0.171	0.021
Urban central Java	1.575	0.707	0.851	3.877	0.660	0.656	0.387	0.264	1.027	-	0.719	0.769	1.020	1.068	0.358	0.709	0.801	5.246	0.922	0.323	0.871	1.064	0.214	0.795	0.088
Urban east Java	0.630	0.311	0.549	0.702	6.399	3.226	0.156	0.447	0.372	0.858	-	0.697	0.367	1.618	0.522	1.389	0.318	0.549	7.376	0.280	0.457	0.926	0.329	2.030	0.034
Urban north Sumatera	1.320	0.448	1.071	0.306	0.147	0.179	5.097	0.383	0.379	0.492	0.181	-	2.442	0.393	0.129	0.225	0.295	0.262	0.116	8.897	1.357	0.265	0.063	0.108	0.055
Urban south Sumatera	1.286	0.488	1.246	0.431	0.178	0.199	0.523	0.195	0.601	0.786	0.264	1.613	-	0.404	0.138	0.166	0.556	0.381	0.163	0.708	11.493	0.198	0.041	0.123	0.039
Urban Kalimantan	0.646	0.249	0.737	0.541	0.607	0.375	0.225	0.670	0.197	1.012	0.910	0.290	0.402	-	0.557	0.407	0.242	0.575	0.595	0.115	0.144	19.658	0.315	0.210	0.024
Urban Sulawesi	1.324	0.256	0.707	0.299	0.389	0.700	0.180	5.662	0.197	0.616	0.388	0.441	0.468	1.331	-	1.801	0.108	0.248	0.209	0.124	0.125	0.577	16.054	1.216	0.015
Urban east Indonesia	0.813	0.105	0.561	0.672	0.735	1.960	0.351	2.841	0.082	1.063	0.840	0.224	0.369	0.934	3.528	-	0.087	0.445	0.978	0.159	0.079	0.304	2.838	21.996	0.017
Rural west Java	1.263	1.098	6.104	0.387	0.211	0.207	0.104	0.131	5.811	0.745	0.129	0.263	0.450	0.293	0.213	0.192	-	0.633	0.335	0.181	0.403	0.280	0.131	0.369	0.032
Rural central Java	1.061	0.614	0.927	4.642	0.685	0.397	0.216	0.216	0.845	5.327	0.377	0.343	0.414	0.568	0.191	0.375	1.132	-	1.384	0.245	0.587	0.759	0.160	0.335	0.052
Rural east Java	0.615	0.312	0.465	0.643	7.229	5.305	0.182	0.341	0.480	1.030	7.207	0.434	0.278	1.138	0.263	0.734	0.402	0.851	-	0.243	0.525	1.106	0.445	1.309	0.059
Rural north Sumatera	0.579	0.201	0.412	0.153	0.082	0.144	10.870	0.153	0.229	0.345	0.101	8.246	0.791	0.274	0.063	0.139	0.483	0.189	0.136	-	2.330	0.343	0.178	0.227	0.035
Rural south Sumatera	0.913	0.408	1.059	0.309	0.152	0.181	0.437	0.054	0.473	0.919	0.158	0.977	17.843	0.175	0.046	0.069	0.569	0.394	0.295	1.464	-	0.288	0.190	0.133	0.016
Rural Kalimantan	0.597	0.155	0.399	0.336	0.342	0.448	0.390	0.212	0.183	0.889	0.552	0.212	0.194	19.758	0.187	0.299	0.377	0.539	0.521	0.275	0.187	-	0.287	0.656	0.010
Rural Sulawesi	0.343	0.044	0.208	0.156	0.125	0.328	0.075	21.523	0.085	0.423	0.198	0.246	0.109	1.538	16.311	1.156	0.099	0.367	0.208	0.161	0.134	1.241	-	1.558	0.026
Rural east Indonesia	0.584	0.162	0.437	0.482	0.614	2.203	0.235	1.778	0.158	1.161	0.856	0.218	0.163	0.498	1.145	24.692	0.418	0.697	1.115	0.145	0.174	0.683	1.925	-	0.016
Total	0.108	0.238	0.043	0.029	0.039	0.018	0.020	0.019	0.026	0.058	0.019	0.055	0.027	0.034	0.019	0.020	0.025	0.030	0.023	0.042	0.036	0.030	0.024	0.018	

Source: Author's calculations

Appendix 5.6 Multiplicative component matrix of tertiary-educated migration, 2010

Origin \ Destination	Jakarta	Outer Jakarta	Bandung	Semarang	Surabaya	Denpasar	Medan	Makassar	Urban west Java	Urban central Java	Urban east Java	Urban north Sumatera	Urban south Sumatera	Urban Kalimantan	Urban Sulawesi	Urban east Indonesia	Rural west Java	Rural central Java	Rural east Java	Rural north Sumatera	Rural south Sumatera	Rural Kalimantan	Rural Sulawesi	Rural east Indonesia	Total
Jakarta	-	3.258	0.928	0.554	0.405	0.727	0.694	0.564	0.753	0.522	0.258	0.704	0.858	0.642	0.523	0.506	0.782	0.359	0.277	0.307	0.350	0.273	0.225	0.356	0.179
Outer Jakarta	4.913	-	2.172	0.784	0.445	0.656	0.582	0.398	2.401	0.984	0.400	0.717	0.979	0.621	0.437	0.521	2.611	0.877	0.608	0.450	0.663	0.338	0.244	0.376	0.045
Bandung	2.187	1.083	-	0.541	0.426	0.764	0.683	0.532	4.188	0.609	0.324	0.938	1.366	0.866	0.541	0.545	5.197	0.496	0.335	0.397	0.636	0.392	0.309	0.458	0.057
Semarang	1.398	0.652	0.819	-	0.919	0.782	0.381	0.466	0.852	4.006	0.510	0.665	0.668	0.909	0.474	0.709	0.629	5.191	0.830	0.232	0.479	0.825	0.281	0.593	0.035
Surabaya	1.166	0.542	0.605	1.029	-	2.273	0.344	0.965	0.425	0.849	5.182	0.623	0.402	1.750	0.968	1.626	0.395	0.597	7.347	0.163	0.210	0.834	0.407	1.315	0.043
Denpasar	1.005	0.427	0.923	0.916	1.876	-	0.504	0.877	0.195	1.347	2.786	0.355	0.417	0.823	1.293	3.926	0.273	0.327	6.451	0.103	0.277	0.423	0.688	3.309	0.008
Medan	0.948	0.397	0.660	0.180	0.166	0.252	-	0.190	0.245	0.249	0.104	4.249	0.879	0.443	0.193	0.302	0.217	0.069	0.126	6.031	0.671	0.517	0.067	0.173	0.048
Makassar	0.408	0.153	0.343	0.153	0.347	0.249	0.122	-	0.080	0.277	0.180	0.246	0.127	1.210	7.062	2.536	0.058	0.086	0.139	0.045	0.051	0.830	11.338	2.448	0.034
Urban west Java	1.560	1.312	5.259	0.657	0.456	0.322	0.292	0.354	-	0.998	0.350	0.381	0.731	0.441	0.197	0.300	8.568	0.837	0.582	0.204	0.417	0.288	0.132	0.170	0.017
Urban central Java	1.480	0.733	0.856	3.828	0.702	0.784	0.360	0.411	1.093	-	0.661	0.750	1.126	1.276	0.501	0.970	0.990	5.662	1.208	0.315	0.979	0.930	0.341	0.932	0.088
Urban east Java	0.472	0.285	0.524	0.578	7.228	4.646	0.112	0.431	0.374	0.687	-	0.293	0.274	1.525	0.458	1.251	0.281	0.439	10.700	0.103	0.270	0.844	0.292	1.191	0.020
Urban north Sumatera	0.824	0.386	0.905	0.258	0.172	0.203	4.116	0.221	0.260	0.441	0.175	-	1.420	0.332	0.122	0.181	0.241	0.166	0.211	8.433	1.225	0.199	0.069	0.094	0.057
Urban south Sumatera	1.081	0.484	1.062	0.428	0.238	0.198	0.900	0.187	0.512	0.694	0.174	1.142	-	0.388	0.189	0.182	0.489	0.240	0.239	0.537	12.455	0.232	0.081	0.093	0.041
Urban Kalimantan	0.480	0.247	0.597	0.524	0.810	0.252	0.256	1.001	0.170	0.874	0.729	0.241	0.281	-	0.626	0.301	0.175	0.218	0.565	0.112	0.120	14.874	0.542	0.165	0.030
Urban Sulawesi	0.449	0.145	0.332	0.237	0.315	0.359	0.070	5.217	0.121	0.443	0.254	0.167	0.137	0.670	-	1.591	0.075	0.091	0.188	0.061	0.044	0.417	15.067	1.552	0.025
Urban east Indonesia	0.295	0.143	0.425	0.382	0.514	0.934	0.107	1.853	0.133	0.740	0.675	0.183	0.153	0.312	0.956	-	0.118	0.188	0.489	0.045	0.046	0.226	0.470	17.647	0.021
Rural west Java	1.401	1.309	6.590	0.365	0.238	0.256	0.181	0.224	6.952	0.670	0.145	0.293	0.427	0.307	0.183	0.194	-	0.580	0.325	0.160	0.435	0.385	0.101	0.185	0.029
Rural central Java	1.071	0.759	0.814	4.778	0.728	0.433	0.173	0.178	0.961	6.013	0.432	0.412	0.477	0.688	0.259	0.433	0.884	-	1.076	0.241	0.570	0.848	0.185	0.384	0.053
Rural east Java	0.649	0.374	0.440	0.671	7.191	5.380	0.148	0.384	0.386	1.012	7.141	0.464	0.318	1.314	0.407	1.049	0.433	0.874	-	0.185	0.368	1.105	0.275	1.087	0.064
Rural north Sumatera	0.569	0.301	0.651	0.185	0.143	0.151	11.975	0.114	0.229	0.403	0.098	8.479	0.652	0.264	0.077	0.179	0.289	0.175	0.157	-	1.314	0.479	0.076	0.190	0.034
Rural south Sumatera	0.769	0.496	0.833	0.412	0.172	0.240	0.423	0.127	0.529	0.910	0.225	0.863	16.601	0.219	0.118	0.158	0.722	0.419	0.359	0.902	-	0.285	0.097	0.111	0.020
Rural Kalimantan	0.617	0.260	0.617	0.761	0.428	0.299	0.277	0.769	0.200	1.052	0.645	0.243	0.261	17.678	0.298	0.271	0.363	0.429	0.593	0.294	0.288	-	0.473	0.242	0.014
Rural Sulawesi	0.240	0.095	0.236	0.210	0.208	0.179	0.057	19.021	0.088	0.389	0.127	0.225	0.092	1.402	17.108	1.589	0.063	0.120	0.195	0.048	0.096	2.093	-	2.648	0.021
Rural east Indonesia	0.608	0.261	0.596	0.767	0.946	2.244	0.174	3.306	0.195	1.521	1.155	0.230	0.176	0.514	1.095	19.275	0.209	0.379	1.227	0.118	0.121	0.666	0.745	-	0.016
Total	0.089	0.197	0.033	0.021	0.029	0.018	0.015	0.013	0.029	0.056	0.025	0.059	0.032	0.035	0.020	0.023	0.018	0.029	0.025	0.066	0.041	0.044	0.042	0.040	

Source: Author's calculations

Appendix 6.1 Summary statistics of observable and unobservable respondents

Characteristics		Observable		Unobservable (%)
		Stayers (%)	Migrant (%)	
Sex	- Female	54.3	45.5	46.8
	- Male	45.7	54.5	53.2
Highest educational attainment	- Primary or below	65.0	36.5	28.9
	- Lower secondary	13.2	17.7	18.9
	- Upper secondary	16.1	28.4	34.0
	- Tertiary	5.7	17.4	18.2
Birth cohort	- Born before 1960	47.1	32.3	-
	- Born in the 1960s	22.4	23.3	12.2
	- Born in the 1970s	25.0	35.0	64.8
	- Born in the 1980s	5.5	9.4	23.0
Hometown in province's capital	- No	81.0	72.3	69.9
	- Yes	19.0	27.7	30.1
Migrated during childhood	- No	91.9	80.7	79.0
	- Yes	8.1	19.3	21.0
		N = 16,182	N = 10,893	N = 3,291

Source: Author's calculations

Appendix 7.1 Summary statistics of included and excluded observations in multinomial regression model

Characteristics		Included (%)	Excluded (%)
Migration progression pattern	- Primary migrant	38.0	42.9
	- Return migrant	33.4	33.3
	- Onward migrant	28.6	23.8
Sex	- Female	44.8	68.8
	- Male	55.2	31.2
Highest educational attainment	- Primary and below	36.5	36.1
	- Lower secondary	17.5	24.7
	- Upper secondary	28.5	26.9
	- Tertiary	17.5	12.3
Birth cohort	- Born before 1960	31.9	44.1
	- Born in the 1960s	23.4	21.3
	- Born in the 1970s	35.2	27.8
	- Born in the 1980s	9.5	6.8
Marital status	- Never married	5.6	5.6
	- Married	91.4	67.6
	- Divorced/separated	3.0	26.8
Working experience	- Never worked	9.1	15.4
	- Have worked	90.9	84.6
		N=10,569	N=324

Source: Author's calculations