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Internal migration in Indonesia: new insights from longitudinal data

Elda Luciana Pardede [a,b], Philip McCann [c] and Viktor A. Venhorst [d]

[a]Population Research Centre, Faculty of Spatial Sciences, University of Groningen, Groningen, The Netherlands; [b]Master's Programme in Population and Labour Economics, Department of Economics, Faculty of Economics and Business, Universitas Indonesia, Depok, Indonesia; [c]Management School, University of Sheffield, Sheffield, UK; [d]Department of Economic Geography, Faculty of Spatial Sciences, University of Groningen, Groningen, The Netherlands

ABSTRACT

This study examines the roles of individual and household characteristics in internal migration in Indonesia for the first time using the five waves of Indonesia Family Life Survey. Our analysis extends previous research by using a longer period to capture mobility behaviour, by comparing changing of residence across three spatial scales, by incorporating the interaction of relation to household head and gender, and by differentiating migration involving the interaction of Sumatra, Java, other regions and rural-urban areas.

The multinomial logistic regression results are consistent with international observations relating to age, education, marital status, previous migration, dependents, family size, and income. Some unique features from this study are the results which show that the probability of migrating by gender varies according to one's relation to the household head, which highlights the importance of gender and family structure in migration decision-making. Residents of Java have lower probabilities of migrating, compared to non-Java residents for smaller spatial scale migrations, but are relatively likely to engage in inter-provincial migration. Urban-originating moves are more likely than rural-originating moves for all spatial scales except for Sumatra where its rural residents have a higher probability of migrating inter-provincially than its urban residents.

KEYWORDS

Migration; internal migration; Indonesia; Indonesia family life survey

Introduction

This study aims to answer one of the basic research questions in migration studies 'Who moves?' by examining how individual characteristics, household structure and composition, and economic status affect internal migration in the context of Indonesia. While many studies across a range of countries have already revealed the effects on migration

CONTACT Elda Luciana Pardede e.l.pardede@rug.nl Population Research Centre, Faculty of Spatial Sciences, University of Groningen, Groningen, Postbus 800, 9700 AV, The Netherlands, and Master's Programme in Population and Labour Economics, d/a Lembaga Demografi Fakultas Ekonomi dan Bisnis, Universitas Indonesia, Gd. Nathanael Iskandar, Lt. 3, Depok, 16424, Jawa Barat, Indonesia

of particular individual and household characteristics, this study aims to assess whether the migration patterns observed in other (mainly advanced) countries are also valid for the Indonesian case, and to what extent they deviate from the usual findings. Identifying such similarities and differences could feed into future work enriching theory and policies related to internal migration in developing economies.

We extend previous Indonesian research, firstly by employing the longitudinal micro-level data of 1993, 1997, 2000, 2007, and 2014 Indonesia Family Life Survey (IFLS) to arrive at more stable measures of the individual and household drivers of migration. Referring to the idea that migration behaviour follows business cycles (Lee, 1966; Saks & Wozniak, 2007), the advantage of using these longer period data is that it allows us to examine migration behaviour whilst better controlling for period-specific shocks. In the decades we cover, Indonesia experienced periods of high economic growth as well as the effects of the severe financial crisis in 1997–1998. Furthermore, this period also covers Indonesia while it underwent massive structural transformation such as the downfall of Suharto in 1998, the beginning of regional autonomy and fiscal decentralisation in 1999 (Firman, 2004), and the urbanisation process which resulted in the share of the population living in rural areas dropping to about 50 per cent (Firman, 2017). Except for Susanti and Damayanti (2015) who used three waves of IFLS[1], other migration studies using the IFLS only employed two waves of data or comparison between two points in time (Czaika & Vothknecht, 2014; Liu & Yamauchi, 2014; Nabila & Pardede, 2014). Our application of five waves serves to better average out the period specific-shocks discussed above.

Secondly, unlike previous research (Hugo et al., 1981; Muhidin, 2002; Wajdi et al., 2017), we now have the possibility to assess the effects on migration of individual and household variables measured prior to migration, and take on board changes therein. Furthermore, in so doing, selectivity is not measured post- but pre-migration (Bell et al., 2015a).

Third, the application of the IFLS allows us to measure the likelihood of migration across shorter distances. Censuses and intercensal surveys can reveal spatial patterns and trends much better, but studies with Indonesian censuses and intercensal surveys were only able to capture the likelihood of migration across *kabupaten*s as the lowest level. Specifically, we distinguish migration between provinces, from migration between smaller *kabupaten*s or *kota*s (municipality or district level) within a province, and between even smaller *kecamatan*s (sub-district level) within a *kabupaten*. IFLS is not representative at *specific* smaller spatial units, and thus we do not attempt to draw conclusions at that level. Assessing the likelihood of migration by different spatial scales will however, provide a more fine-grained measure of distance covered, noting that even the inter-*kecamatan* level can involve substantial distances in some parts of Indonesia. It will also provide a more precise understanding of migration characteristics and behaviour, as some variables may affect the shorter distance migration and the longer distance migration in different ways. This study is thus complementary to studies using larger coverage data.

Fourth, this study includes the interaction of gender and one's position within a household that is not usually covered by other migration studies. Some studies using the IFLS did not include household structure and composition as their explanatory variables (Liu & Yamauchi, 2014; Lu, 2008; Susanti & Damayanti, 2015). Furthermore, although some studies with IFLS did include these variables (Czaika & Vothknecht, 2014; Deb & Seck, 2009; Rammohan & Magnani, 2012), they did not capture the importance of assessing the effect of gender in combination with whether someone is the head of the household,

a spouse or a child, or other household members. Gender and relationship to household head are often critical factors determining the division of labour and power within a household that may affect the propensity of its member to engage in migration (Chant, 1998). Thus, the question remains whether the effect on migration of the relationship to household head is in any way mediated by the gender of the household members or that the household position drives gender differences in migration. Its importance lies in the fact that the resultant changes in household structure by migration could also change the way the household manages their livelihood strategy, thus affecting their well-being (Singh, 2019).

As a final contribution, we note that this study is one of the few that look at the effect of the interaction of regions, differentiated between Sumatra, Java, and other provinces, and urban-rural residence of origin on migration across three different scales for the case of Indonesia. While Java and non-Java context is unique and important for Indonesia, its specification by rural-urban areas will add some nuances in the explanation of migration behaviour in Indonesia regarding its geographical features.

The importance of these lines of enquiry is that while detailed micro-level research on these topics proliferates for advanced economies, for reasons mainly of data availability, there is still a paucity of similar research examining developing economies. As a result, the extent to which the insights are more generally applicable is somewhat still unknown.

The rest of the paper is organised as follows: Section 2 provides a review of some of the key influences on migration that we will need to consider in our research, and section 3 discusses the data we employ and our empirical approach. Section 4 presents our results and section 5 provides a discussion of specific points which need further elaboration. Section 6 provides some brief conclusions.

Background

In this section, we elaborate a broad synthesis of theories explaining migration behaviour that are depicted by the patterns of migration by individual and household characteristics. We highlight what are likely to be the most salient individual, household, and geographical features influencing interregional migration patterns within Indonesia.

Migrants self-select according to individual characteristics because people with different characteristics tend to respond differently to the push and pull factors of migration and have different abilities to overcome obstacles. Age influences migration because it is related to the life-cycle stage that influences the way one evaluates push and pull factors that affect migration (Lee, 1966). Within the framework of human capital investment theory (Sjaastad, 1962), the young have a higher present value of migration gain because the young have a longer life span to accrue migration benefit than the older ones (Greenwood, 1975; Lucas, 1997). Therefore, migration rates are usually the highest for young adults, which is typically seen from the peak at age twenties in the non-linear age-migration schedule (Rogers & Castro, 1981). We expect this pattern to occur for the Indonesian case because such a relationship between age and migration has also been shown by various censuses and intercensal surveys (Muhidin, 2002; Wajdi et al., 2017).

Gender selectivity of migration has been long established (Ravenstein, 1885), although the male-to-female ratio of migration may vary by the type of migration (e.g. rural-to-urban), by country or region, by migration motivation, or by sub-group of people

(Chant, 1998; Czaika & Vothknecht, 2014; Faggian et al., 2007; Wajdi et al., 2017). One explanation of gender differentials in migration can be inferred to economic opportunity structure. Labour markets are usually stratified by gender. Men and women are different in terms of labour market participation, unemployment, earnings, working hours, type of occupation, and job status (Jacobsen, 1998), all of which may influence the migration decision. For instance, rural-to-urban migration is male-dominated in Africa while it is female-dominated in Latin America. This difference can be attributed to the disincentives of women in Africa to migrate because they are usually entitled to land and thus more involved in farming while having fewer opportunities than men in urban areas. This situation is somewhat reversed for the women in Latin America (Chant, 1998).

The effect of gender can be elaborated in connection with the roles of family in migration decision-making because the consideration of household organisation and strategies is crucial in explaining gender-selective migration (Chant, 1998). The roles of family can be assessed from family structure, which does not directly cause migration, but may shift the evaluation of the availability, expectancy, incentives or motives by the individual regarding the decision to migrate (Harbison, 1981). Gender is relevant in relation to family structure because there are gender differences in household and family decision-making and in dependency roles between men and women (DaVanzo, 1981; Harbison, 1981; Mincer, 1978). Especially in developing countries, the head of the family, usually male, is often the one who makes migration decisions for family members (Hugo et al., 1987; Rhoda, 1983). Women's migration behaviour may be more influenced by familial considerations than that of men because daughters are usually subject to tighter parental control than sons (Chant, 1998; Lauby & Stark, 1988). For the case of Indonesia, some existing evidence suggests that males are more likely to migrate than females (Susanti & Damayanti, 2015; Liu & Yamauchi, 2014; Lu, 2008; Muhidin, 2002). Based on the discussion above, we expect however that these patterns might be varied by the relative position of females in their households, whether they are household heads, other nuclear family members, or other relatives/non-relatives.

Other family factors that influence migration are the age structure and the family life-cycle of a household because they may reflect different ties to the community (Harbison, 1981). The family life-cycle refers to the stages a family faces marked by the presence and absence of children in a household and the ages of the primary couple (Rossi, 1980). In particular, the young and single individuals and those without children tend to be more migratory because they are less tied to the community while the presence of children creates ties to the community (e.g. because of schooling), which inhibits migration (Mincer, 1978). Family size (Hugo et al., 1987; Root & De Jong, 1991) and the presence of children may also influence individual migration behaviour (Deb & Seck, 2009), but for a developing country context, the presence of elderly members also needs to be incorporated. Family life-cycles in developing countries involving the care of the elderly are sometimes multi-generational (Rammohan & Magnani, 2012), in ways which are not nearly so evident in richer countries, and their effects on mobility must be considered.

Concerning the socio-economic status, migration can also be self-selected by income and education. Education is generally regarded as being positively related to migration because as education improves, the awareness increases of other areas and the area searched is larger. The better educated also tend to have less degree of ties to family, tradition, and present locality (Greenwood, 1975; Long, 1973; Lucas, 1997; Schwartz, 1976).

On the other hand, the evidence on the relationship between income and migration is mixed (Lucas, 1997).

This mixed evidence may be attributed to the proposed non-linear relationship between migration and socioeconomic status (Rhoda, 1983), or in a broader sense, development (De Haas, 2010), which operates with a somewhat complex mechanism. As postulated by De Haas (2010), (human) development leads to generally higher levels of migration and overall mobility. At the individual-level, migration is a function of migration aspiration and migration capability. Because at a certain point migration aspiration will decline due to the lesser gaps between origin and destination areas (e.g. gaps between urban and rural areas), De Haas hypothesises an inverted-U shaped relationship between migration and development.

Following this argument, the relationship between income and migration can be assumed as non-linear. Income determines one's capability to migrate because higher income enables people to migrate. Income also influences aspiration (Czaika & Vothknecht, 2014) because people with the better economic situation may have a higher aspiration of success that would drive migration and determines migration's economic outcome (Waddington & Sabates-Wheeler, 2003). However, for the Indonesian case, a positive relationship between migration and per capita expenditure decile was found (Deb & Seck, 2009) and that the poor were less likely to migrate than the non-poor, except for the case of urban-to-urban migration (Nabila & Pardede, 2014). Therefore, we follow the findings of these Indonesian studies and expect income to be positively related to migration.

Another variable to take into account is previous migration, which is usually linked to future migration. Individuals with a previous migration history tend to have higher migration rates (Greenwood, 1975; Root & De Jong, 1991), particularly the distance of migration or an act of moving may be linked to a subsequent local move (Goodman, 1982). Thus, we expect that the likelihood of migration is higher for people with previous migration.

It is also necessary to highlight Indonesian geographical context – the distinction between Java Island and non-Java islands, characterised by unequal development. Internal migration patterns in Indonesia have been shaped by the dominant role of Java Island, which has been established since the Dutch colonisation period due to the concentration of colonial activity in Java (Tirtosudarmo, 2009). Around 60 per cent of the population of Indonesia live in Java since the 1960s (Hugo, 1997) while it only covers 6.8 per cent of Indonesia's land area (Wajdi et al., 2015). Java Island, where the capital city Jakarta Special Region lies, has the role as the economic core region in Indonesia (Van Lottum & Marks, 2012). Economic activity since the 1970s that has been concentrated in Jakarta, its surrounding provinces, and the northern coastal areas in Java (Douglass, 1997), has created mega urban regions in Java (Firman, 2017). This concentration has accentuated regional disparities in Indonesia. Consequently, Java is the primary migration destination, which can be seen both from the relatively high intra-island migration rate in Java and high inter-island migration rate to Java (Wajdi et al., 2015).

The non-Java regions need to be distinguished between Sumatra and the rest of the provinces because the level of development in the western part of Indonesia, including Sumatra, is higher than the rest of Indonesia outside Java. Sumatra is the second most densely-populated island in Indonesia, and it also has around a one-fifth share of Indonesian Gross Domestic Product (calculated from Badan Pusat Statistik [BPS], 2012, 2014).

Regarding urban-rural differentials, people living in rural areas may appear to be more migratory than people living in urban areas because migration from rural areas is considered to dominate urban population growth (Douglass, 1997). However, the domination of migration from rural areas is expected to decline as society progresses (De Haas, 2010; Zelinsky, 1971). The evidence from advanced economies is that as cities expand in the face of increasing development, the volume of intra-urban or inter-urban mobility will increase (Skeldon, 1986), and this may be relevant in a country with an expanding urban economy such as Indonesia (Firman, 2004). We assess migration from urban and rural areas, incorporating whether they are located in Java or not as we expect different effects on migration behaviour. The nature of the IFLS with its changing lengths of intervals between the waves does not facilitate a direct analysis of these trends.

Data and method

The sample

To assess the extent to which these various individual, household, and geographical features influence inter-regional migration in Indonesia, we employed micro-data from the Indonesia Family Life Survey (IFLS).[2] The IFLS was first conducted in 1993 using the subsample of the 1993 National Socioeconomic Survey. The sample was selected from 13 out of the 27 provinces in Indonesia in 1993 (Figure 1). It covered the areas which are mostly located in the western part of Indonesia and some areas in the middle part of Indonesia. While the respondents were selected to represent 83 per cent of the population of Indonesia – comprising around 33,000 individuals in about 7,200 households – the population from most of the middle part of Indonesia, and particularly the eastern part of Indonesia were excluded. These respondents were then followed in 1997, 2000, 2007, and 2014. The follow-up survey waves included the new entrants, such as the newly born members and the people who joined the existing or splitting households. Consequently, a portion of the sample consists of the same individuals

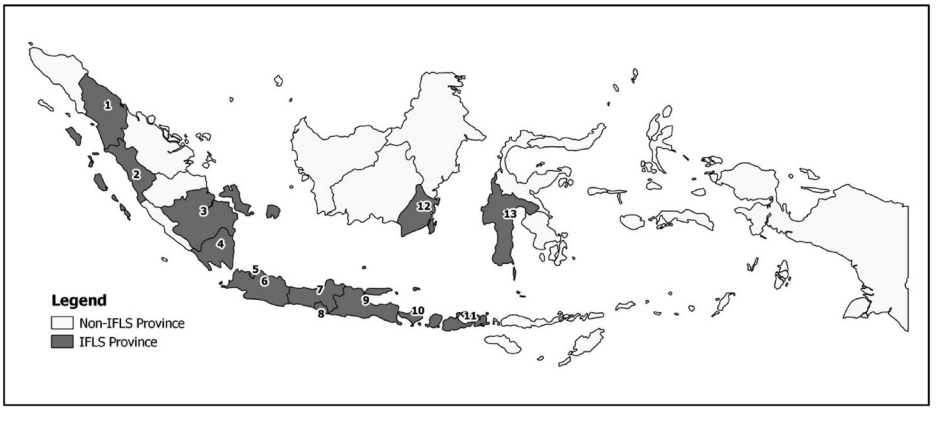

Figure 1. Map of Indonesia: Selected Indonesia Family Life Survey (IFLS) Provinces in 1993. Source: Prepared by authors. Note: 1. North Sumatra, 2. West Sumatra, 3. South Sumatra, 4. Lampung, 5. Jakarta Special Region (DKI Jakarta), 6. West Java, 7. Central Java, 8. Yogyakarta Special Region (DI Yogyakarta), 9. East Java, 10. Bali, 11. West Nusa Tenggara, 12. South Kalimantan, 13. South Sulawesi.

observed through time who were getting older and probably had achieved higher education in the next period.

The sample size is 128,577 individuals consists of all matching respondents between two consecutive survey waves, for example, 27,029 observations for 1993 and 1997, 30,151 for 1997 and 2000, and so on. The response rates calculated on the basis of the raw data, which are the number of observations at wave *w*-1 minus the number of attritions and deaths occurred between wave *w* and *w*-1 divided by the number of observations at wave *w*-1, are 82.32 per cent, 89.73 per cent, 77.67 per cent and 76.59 per cent for 1997, 2000, 2007, and 2014, respectively.

Dependent variable and the model

The dependent variable for this study is the change of residence between two survey waves. Because individuals were only recorded as household members if they stayed for a minimum of six months or intended to stay for at least six months in an IFLS household, the change of residence as described is valid to be defined as permanent migration. As the dependent variable consists of four categories, a multinomial regression model was used. These four categories are coded in order to arrive at the most precise measure of distance covered. The first three categories are three types of migration, defined as the change of residence: (1) across *kecamatan*s (sub-districts) within a *kabupaten* or *kota*[3] (district or municipality, so, the shortest distance[4]) or inter-*kecamatan* migration; (2) across *kabupaten*s or *kota*s within a province or inter-*kabupaten* migration; and (3) across provinces (the longest distance). The reference category is no migration across these three spatial scales. Respondents who lived in *kota* Bandung, West Java province in 1993, but then resided in *kabupaten* Sukabumi, West Java province in 1997 were defined as inter-*kabupaten* migrants; if in 1997 they instead lived in *kota* Semarang, Central Java province, they were accounted as inter-province migrants, but *not* inter-*kabupaten* migrants.

Independent variables

The independent variables used in this study are divided into individual characteristics, household structure and composition, the quintile of the household per capita expenditure, previous migration, regions, and urban-rural areas. The distribution of respondents by characteristics can be seen in Appendix 1. They are time-varying, if and when applicable. These characteristics were measured before migration; for example, marital status was measured in 1993 for migration that occurred between 1993 and 1997. The education variable captures the highest level of education completed at the time of the survey, which is categorised as less than primary school (so did not complete), completed primary school (6 years of schooling), junior high school (9 years of schooling), and high school and higher (at least 12 years of schooling). The rural-urban distribution of the respondents has been quite balanced through the survey years while the percentage of urban population in 1990 is 30.9 per cent (Firman, 1997) and it reached 53.1 per cent in 2015 according to the intercensal survey (calculated from BPS, 2016).

We used three variables to represent the family structure and compositions, which are the relation to the household head, household size, and the presence of dependents. We included the interaction between gender and the relation to the household head because

gender differentials in migration are assumed to be the result of gender roles according to one's relative position within a household. The presence of children and/or elderly was included to capture the effect of household dependents and family life-cycle stages. A household with elderly and no children is assumed to be at a later stage of the family life-cycle compared to the rest. We also incorporated a variable measuring previous migration, which consists of five categories: migrated in any of the previous periods (1) across *kecamatan* within *kabupaten* (inter-*kecamatan*), (2) across *kabupaten* within province (inter-*kabupaten*), or (3) across province (inter-province); (4) did not migrate at any of the previous periods; and (5) observed only once, which means that the individuals were matched only for one period (two waves), or unknown in wave *w*-1 because they started to be recorded at wave *w*, or not applicable due to not yet born at wave *w*-1. The interaction between the region and the area of residence was also included to assess migration differentials between residents of Java, Sumatra, and the rest of the provinces, given the urban or rural status of the area. The categorical variable 'survey period' was included to control *both* the time of the survey and the different intervals between each of the two consecutive survey years (3, 4, 7, and 7 years).[5]

Descriptive analysis of migration rates

The descriptive analysis is based on the migration rates, as shown in Appendix 2. In what follows, we briefly discuss the main patterns. The annual number of migrants per thousand in Appendix 2 is the prevalence of migration across different spatial scales, calculated as the number of individuals who changed residence between survey waves *w* and *w*+1 divided by the number of respondents who matched between *w* and *w*+1 multiplied by a thousand for each characteristic. Across spatial scales, the figures in Appendix 2 suggest that migration is subject to period-specific shocks, thus underlining the necessity of studying migration over a longer time frame. The prevalence of inter-*kecamatan*, inter-*kabupaten*, and inter-province migration has increased since the period of 1993–1997 and even doubled in 1997–2000, and then declined in 2000–2007 and 2007–2014. One possible explanation regarding this sudden increase in the period of 1997–2000 is that it was due to the severe impact of the financial crisis in 1997–1998 in Indonesia, which may have encouraged greater migration for work (Firman, 1999; Hugo, 2000).

Nevertheless, when we calculated the annual number of migrants in 1993–2000, the jump was not identified. The annual numbers of people who changed residence between 1993 and 2000 are 6.4, 7.1, and 5.8 per thousand for inter-*kecamatan*, inter-*kabupaten*, and inter-provincial migration respectively (table not displayed); these numbers are only slightly different than the annual numbers in 2000–2007 (7.7, 7.6, and 5.0 per thousand). In other words, some of the effects could be the result of measuring migration movements between shorter survey intervals in 1993–1997 and 1997–2000, which also suggests that measuring migration between longer survey intervals may have resulted in many migrations being left out.

From Appendix 2, it can be gathered that, for women, migration rates at longer distances are slightly lower than those for the men, but we find migration rates are slightly higher for women moving the shortest distances. Young adults have the highest migration rates, as do those with the highest education levels, those that are never married (in particular in the post-crisis period of 1997–2000) and those in smaller households with little or

no dependents. Non-nuclear family members ('others') are among the most mobile household members, except for inter-provincial migration. Mobility increases with expenditure, but the wealthiest group is not necessarily the most mobile.

Multinomial logistic regression results

The statistical model employed is a multinomial logistic regression with clustered standard errors to correct the calculation of the standard errors for the same individuals over time. The multinomial logistic regression results for inter-*kecamatan* migration within a *kabupaten*, inter-*kabupaten* migration within a province, and inter-province migration are presented in Table 1. The results of the interaction effect of gender and the relation to the household head show that among the household heads, the odds ratios of the females migrating across the three spatial scales rather than staying are 1.48, 1.32, and 1.46 respectively, in comparison to males. To depict the results more clearly, Figure 2 shows the predicted probabilities for gender and the relation to the household head. Females have higher probabilities of migrating than males for all spatial scales except for the case of migration inter-province of 'others' (1.98 per cent vs 1.89 per cent). However, further testing indicates that the migration probabilities are not statistically significantly different between genders for the case of inter-provincial migration of 'spouse or child' and migration of 'others' for all spatial scales. These results do not confirm our expectation of higher tendency of males than females to migrate but are somewhat consistent with several findings on female migration (Faggian et al., 2007; Ravenstein, 1885; Wajdi et al., 2017), with added nuances that migration probabilities by gender vary according to the position in the household.

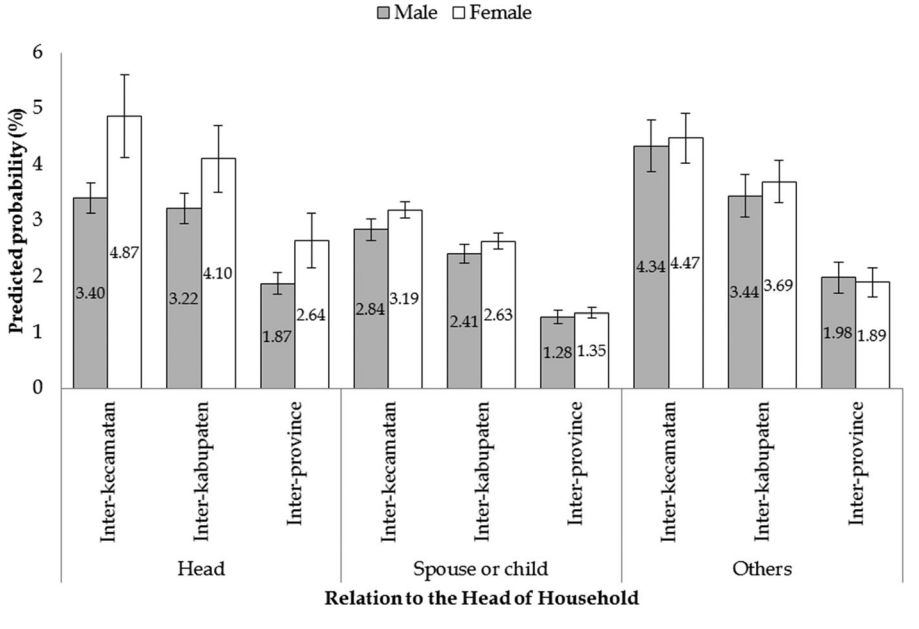

Figure 2. Predicted probability of migrating inter-*kecamatan* within a *kabupaten*, inter-*kabupaten* within a province, and inter-province by gender and relation to the head of household. Source: 1993, 1997, 2000, 2007, and 2014 IFLS. Note: Predicted probabilities were calculated by holding other variables at their means.

Table 1. Multinomial logistic regression odds ratios for the likelihood of migrating (i) inter-*kecamatan*[a] within a *kabupaten*, (ii) inter-*kabupaten* within a province, and (iii) inter-province.

	Reference: Stayers		
Variables	Inter-kecamatan	Inter-kabupaten	Inter-province
Gender			
Male (Ref.)	1.00	1.00	1.00
Female	1.48***	1.32***	1.46***
Relation to Household Head			
Head of household (Ref.)	1.00	1.00	1.00
Spouse or child	0.82***	0.73***	0.67***
Others	1.29***	1.08	1.07
Gender × Relation to Household Head			
Female × Spouse or child	0.76***	0.83*	0.73***
Female × Others	0.70***	0.82*	0.66***
Age Group			
<15 (Ref.)	1.00	1.00	1.00
15–24	1.27***	0.98	1.25***
25–44	0.91	0.58***	0.56***
45+	0.51***	0.35***	0.35***
Marital Status			
Never married (Ref.)	1.00	1.00	1.00
Married	0.63***	0.48***	0.47***
Separated/divorced/widowed	0.69***	0.60***	0.35***
Level of Education			
Under primary school (Ref.)	1.00	1.00	1.00
Primary school (6 years)	1.23***	1.88***	2.03***
Junior high school (9 years)	1.37***	2.27***	2.42***
High school and higher (≥12 years)	1.86***	2.75***	2.20***
Household Size			
1–4 (Ref.)	1.00	1.00	1.00
5–7	0.81***	0.86***	0.79***
8+	0.78***	0.86***	0.65***
Presence of Dependents			
No children, no elderly (Ref.)	1.00	1.00	1.00
With children, no elderly	0.95	0.92*	1.00
No children, with elderly	0.81***	0.94	0.77**
With children and elderly	0.88**	0.96	0.90
Quintile of Per Capita Expenditure			
Q1 (20% poorest households), Ref	1.00	1.00	1.00
Q2	0.92**	1.23***	1.16**
Q3	0.94	1.38***	1.28***
Q4	1.17***	1.49***	1.66***
Q5 (20% richest households)	1.09	1.63***	2.43***
Previously Migrated			
Inter-*kecamatan* within a *kabupaten*	5.97***	1.43***	1.07
Inter-*kabupaten* within a province	1.79***	7.73***	1.20*
Inter-province	1.63***	1.33**	8.36***
Did not migrate (Ref.)	1.00	1.00	1.00
Observed once, unknown, or not applicable[b]	1.31***	1.14***	0.94
Region of Origin			
Sumatra	1.43***	1.08	3.49***
Java	0.82***	0.60***	2.32***
Others (Ref.)	1.00	1.00	1.00
Area of Origin			
Urban	1.28***	1.15**	1.58***
Rural (Ref.)	1.00	1.00	1.00
Region × Area of Origin[c]			
Sumatra × Urban	0.79***	0.98	0.47***
Java × Urban	0.91	1.37***	0.92
Survey Period			
1993–1997 (Ref.)	1.00	1.00	1.00
1997–2000	1.39***	1.42***	1.38***

(*Continued*)

Table 1. Continued.

Variables	Reference: Stayers		
	Inter-kecamatan	Inter-kabupaten	Inter-province
2000–2007	2.25***	2.25***	2.35***
2007–2014	1.60***	1.79***	1.97***
Number of observations			128,577
Wald $chi^2(102)$			13,682
Prob > chi^2			0.0000
Pseudo R^2			0.1094
Log pseudolikelihood			−52,365.6080

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Source: 1993, 1997, 2000, 2007, and 2014 IFLS.

Note: As a robustness check, we performed multinomial logistic regression analysis with several interaction variables between area, region, and survey period. We found that the results for each model were mostly consistent with the overall results. (a) *Kecamatan* is sub-district. *Kabupaten* represents *kabupaten* (district) and *kota* (municipality). (b) Observed once means that the respondents are only available at one survey period, for example only observed in 1997 and 2000; unknown cases are the ones with no information regarding past migration although observed more than one period; not applicable are the cases where they were too young or not born yet to be included in the previous survey. (c) The reference categories for the interaction variable are not shown.

While Appendix 2 shows that for most of the periods the category 'others' has the highest numbers of annual migrants, the regression results show that among males, those who are 'spouse or child' were less likely to migrate for all types of migration than to stay, compared to the 'head of household'. Figure 2 shows that the household heads have higher probabilities of migrating than spouse or children for all spatial scales, and further testing indicates that these results hold for both genders. 'Others' has mixed results regarding the probability to migrate in comparison to 'head of household'. For example, the probability of migrating between *kecamatan*s of female household heads (4.87 per cent) is not statistically significantly different than females who are 'others' (4.47 per cent) while the probability to migrate between *kecamatan*s of male household heads is significantly lower than the probability of males who are 'others' (3.40 per cent vs 4.34 per cent).

The results in Table 1 also confirm the expectations regarding age and marital status variables. The 15–24 age group was more likely to migrate than non-migrating compared to the other age groups except for inter-*kabupaten* migration. The never-married individuals prior to migration were consistently the most likely to move than not, compared with the ever-married individuals. The differences between the odds ratios of married and divorced individuals are only significant for the case of inter-*kabupaten* and inter-province. The results also show that the likelihood of migrating increases with education for all types of migration. For the case of inter-provincial migration, although the odds ratio to migrate for the junior high educated (2.42) is higher than the odds ratio for the highest educated (2.20) compared to the reference category, these two categories are not statistically significantly different from each other. As presented in Appendix 2, the number of migrants among those who at least graduated from high school is lower than the number of migrants among those with junior high school education in 1997–2000 and for inter-provincial migration in 2000–2007. These inverted U-shaped patterns between migration and education which occur in the descriptive results disappear after analysing the whole observations and controlling for other variables.

We find that individuals in households consisting of five and more people are more likely to stay than those in households sized 1–4 people. Although the odds ratios of at

least eight members are lower than the odds ratios of five to seven members, the difference in the odds ratios between these two categories is significant only for the case of inter-provincial migration. These results seem to suggest that people who live in smaller size households are more migratory than people who live in larger size households, which is similar to the findings of family migration patterns in the Philippines (Root & De Jong, 1991).

The regression results also show that the presence of dependents limits migration, but only for the cases of the presence of elderly with and without children for inter-*kecamatan* and only for the case of the presence of elderly without children for inter-provincial migration. The effect of the presence of children without elderly is significant but weak only for the case of inter-*kabupaten* migration. These results suggest that elderly dependents are a greater inhibiting factor on migration than *only* young dependents. Although household structure may change between two waves prior to migration because household configuration may change several times in a year (Chant, 1998), we think that overall, we capture the variety of household structures from the data well.

According to the quintile of per capita expenditure variable, the overall results confirm that the likelihood to migrate increases by the quintile for inter-*kabupaten* and inter-provincial migration. On the other hand, there seems to be a slightly J-shaped pattern for inter-*kecamatan* migration, with the lowest point, at the second quintile reaching the peak at the fourth quintile, then declining. The positive relationship between per capita expenditure and migration confirms the findings of Deb and Seck (2009), but not for the case of inter-*kecamatan* migration.

Regarding the effect of previous migration, previously migrating is positively related to current migration except for the case of inter-*kecamatan* migration. We observed that having previously migrated in the past has a strong effect on migration across the same spatial scale. For example, people who previously migrated inter-provincially were 8.36 more likely to migrate inter-provincially than non-migrating compared to the ones who did not migrate. Goodman (1982), on the other hand, found that in the United States (US), long-distance migration tends to be followed by subsequent local mobility that might be due to finding better housing. Our finding may be in contrast with this US case, while it could also be that we captured the change of residence at a longer interval.

In terms of the geographical context of migration in Indonesia, from Figure 3, we see that individuals living in Java have lower probabilities of migrating between *kecamatans* and between *kabupatens* than those living outside Java. On the other hand, people living in urban Java have a higher probability of migrating between provinces than those living in urban outside Java. People living in Sumatra consistently have the highest probabilities to migrate except for the case of inter-provincial migration from urban Sumatra. Further testing shows that living in Sumatra or 'others' are not significantly different in terms of inter-*kabupaten* migration probabilities, but both probabilities are significantly different with probabilities of those living in Java. As such, residents of Java were only more migratory than residents of non-Java for the longer distance inter-provincial movements from urban areas, but not for the shorter distance movements. These results may in part be because Java is better connected both intra-provincially and inter-provincially than other parts of Indonesia. The higher probability of migrating of people living in rural Sumatra (2.25 per cent) compared to the probability of migrating of people living in rural of 'others' (0.67 per cent) for the case of inter-provincial migration may

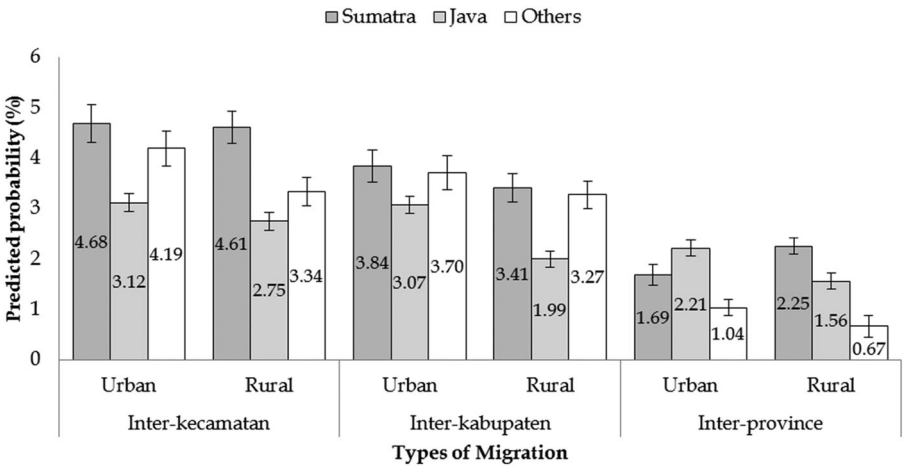

Figure 3. Predicted probability of migrating inter-*kecamatan* within a *kabupaten*, inter-*kabupaten* within a province, and inter-province by region and urban-rural area of origin. Source: 1993, 1997, 2000, 2007, and 2014 IFLS. Note: Predicted probabilities were calculated by holding other variables at their means.

also reflect the better-connected Sumatra inter-provincially compared to other areas outside Java. Yet this finding may reflect differing degrees of urbanisation, and more Java residents are urban dwellers than on other parts of Indonesia (Firman, 2017).

Appendix 1 shows that the annual numbers of migrants from urban areas are consistently higher than the annual numbers of migrants from rural areas. The regression results and further testing also show that migration probabilities in Figure 3 are consistently higher for urban people than for rural people, except for the case of inter-*kecamatan* migration for Sumatra where the probabilities for rural and urban Sumatra are not different and for the case of inter-provincial migration for Sumatra where rural probability (2.25 per cent) is higher than urban probability (1.69 per cent). Overall, these results suggest that the most densely populated Java and the second densely populated Sumatra exhibit quite different mobility features than other parts of Indonesia.

Regarding the last variable, the estimates for survey period show that the highest likelihood of migrating after controlling for other variables occurs in 2000–2007, although the jump in the number of annual migrants in Appendix 2 appears for the change of residence in 1997–2000. Because the survey period variable portrays both the survey period and survey intervals, it is difficult to draw a straightforward conclusion regarding the effect of this variable. Furthermore, this variable may have captured numerous underlying factors, such as economic changes and the decentralisation in Indonesia which began in 1999 (Firman, 2004) and may effectively have brought changes in 2000, which are difficult to disentangle from the other effects.

Discussion

To have a clearer picture of how our results using the IFLS data compared to the results using larger coverage data, we compare the numbers of migrants in Appendix 2 with the results from Indonesian censuses (Bell & Charles-Edwards, 2013). The five-year interval

crude migration intensities (CMI) for inter-provincial migration in 1990, 2000, and 2010 are 2.9 per cent, 2.2 per cent, and 2.4 per cent, respectively, or on average 2.5 per cent. The prevalence of inter-provincial migration in Appendix 2 on average 1993–2014 is 5.0 per thousand per year or 2.5 per cent per five years [$(5.0/10) \times 5$]. The number from the IFLS for inter-*kabupaten* migration, 6.4 per cent [$((7.8 + 5.0)/10) \times 5$], is slightly higher than the CMIs from censuses for *kabupaten* level which are 4.0 per cent in 2000 and 4.4 per cent in 2010. Whilst noting that comparing rates across studies is notoriously difficult, our estimates are indeed well within the range of these publications.

To be able to compare migration numbers globally, we refer to the five-year interval Aggregate Crude Migration Intensities (ACMIs) of 61 countries computed by Bell et al. (2015b) by controlling the problems of different spatial scales and lack of intra-area migration counts. The ACMI of Indonesia was found to be around twelve per cent, which is quite low, ranked 43rd. It is higher than India (the lowest, 5 per cent), the Philippines, and Thailand, but very close to Vietnam (rank 42) and China (rank 41) and lower than Malaysia and Cambodia (17–18 per cent). The one country in Asia that is the top ten on this list is South Korea, which ranks the second below New Zealand (55 per cent) while Japan ranks 15 (below 30 per cent). Among the highest intensities are the new world countries, which are New Zealand, the US, Australia, and Canada. Because the numbers from the IFLS are somewhat similar to the numbers from censuses used to calculate ACMI, we are confident to use this comparison using ACMIs to mirror the comparison of our numbers in Appendix 2 with other countries. To conclude, the Indonesian migration level is quite low globally but not so different from the countries with similar stages of development around the region.

Referring to the econometric results in Table 1, the findings relating to age, education, marital status, previous migration, dependents and family size are all broadly consistent with the international literature. However, the issues of gender, economic status, and geography all need some further consideration.

The regression results show that female heads of household are more likely to engage in all types of migration and in some cases, also for 'spouse or child'. While the migration decision-making process within a household cannot be directly assessed from the data, we can further investigate migration gender differentials of household heads and between female household heads and other females using the information on the reason to migrate.

Using the adult sample with recorded migration history from the IFLS, we examined the main reasons to migrate (Appendix 3). The results reveal that for the migrants who were the household heads: (1) Around one-third of the males moved for their work while only one-fifth of the females moved for their work; and (2) More than half of the females moved for family-related reasons (17.6 per cent for 'marriage or pregnancy' and 36.7 per cent for 'other family reasons') while only 28 per cent of the males moved for family-related reasons. Comparing the female household heads with other females ('spouse or child' or 'others') who were migrants, it was found that: (1) Female household heads cited the reason 'own work' (18.1 per cent) slightly more often than other females (15.6 per cent and 17.0 per cent); and (2) Conversely, female spouses or children have the highest percentage of moving because of the work of other people (6.9 per cent vs 2.0 per cent for the female household heads).

The results in Appendix 3 suggest that the mobility of female household heads tends to be related to family-related reasons much more than for work-related reasons. It may

indicate that although a woman's position is the head of her household, the domination of family-related reasons seems to be in line with the notion that women's primary function tends to be confined in the domestic arena (Chant, 1998). On the other hand, female migrants who were spouses or children appear to have a higher tendency to be tied migrants, as they followed others who moved for work more than female migrants who were household heads. It needs to be further examined whether this indicates that female migration tends to be determined or controlled by the male household heads to some degree, such as suggested (Hugo et al., 1987).

Another issue to discuss is the positive relationship between expenditure quintile and the probability of migrating. While it confirms the study of Deb and Seck (2009), it does not confirm the suggested inverted U-shaped between migration and human development, as suggested by De Haas (2010). One may reason that it is because of the measurement issue (expenditure vs development). However, De Haas also tested and confirmed the non-linear relationship between two measures of development, Human Development Index (HDI) and Gross Domestic Product (national income), and emigration. He also argues that the non-linear relationship between migration and development is applicable for internal migration as well. On the other hand, Charles-Edwards et al. (2019) show that some countries in Asia with a higher level of HDIs tend to have a higher level of migration intensities, which suggests the possibility of a positive and linear relationship between migration and development. As Indonesia is a middle-income country, it has not yet reached the level of development that could lead to a decline in migration aspiration. It is then interesting to discover whether in the future this turning point in aspiration will occur and that the non-linear inverted U-shaped pattern of income and migration will be found for the case of Indonesia or perhaps the relationship between income and migration will remain linear and positive.

To be accounted as household members, the respondents should stay or intend to stay for at least six months in an IFLS household. Consequently, our measure of permanent migration misses out temporary migration that involves staying at the destination for less than six months, while studies have pointed out the importance of non-permanent mobility in Indonesia (e.g. Hugo, 1982). This study is about relatively permanent changes of residence that may have excluded non-permanent mobility; in this sense movement which involves staying at the destination for less than six months. The lower economic status may have involved more in non-permanent mobility than this data allows to capture.

In terms of geographical features, some of the differences in migration behaviour between Java and non-Java residents may be attributed to the fact that the growth of smaller and intermediate-sized cities outside Java has been higher than those in Java islands (Firman, 1997, 2004, 2017; Hugo et al., 1987). Greater infrastructure provision means that both the rural and urban populations of Java are more directly connected to big cities and metropolitan areas than in other parts of Indonesia, where connections to larger cities are mediated more via small or intermediate cities. This connection via intermediate cities may be indicated by the results that relative to Java, we find higher migration probabilities for the regions outside Java for most of the cases of migration across smaller spatial scales. Only for the largest spatial scale, inter-provincial migration, we find higher migration probability for Java, for migration from urban areas. As Java is the most urbanised, the different migration patterns may partly reflect the different urban hierarchies in different parts of the same country.

We have also seen that the probabilities of migrating from urban areas are consistently higher than the probabilities to migrate from rural areas except for the case of Sumatra. For Sumatra, the difference is not significant between urban and rural for inter-*kecamatan* migration and the probability to migrate inter-provincially from urban areas (1.69 per cent) is lower than the probability to migrate from rural areas (2.25 per cent). These results raise an interesting discussion regarding the phase of mobility transition in Indonesia. From previous study using the IFLS (Nabila & Pardede, 2014), we calculated that between 2000 and 2007, the percentage of migrants from urban areas is 21.38 per cent (18.05 per cent to urban areas + 3.33 per cent to rural areas) while the percentage of migrants from rural areas is only 18.34 per cent (13.68 per cent to rural areas + 4.66 per cent to urban areas). Rural-to-urban migration was accounted for only 13 per cent out of all migrations. Given the fact that the distribution of observations of IFLS has been quite balanced between urban and rural since the first wave (see Appendix 1), we can safely conclude for this study that within 1993–2014, Indonesian migration originating from urban areas has been more important than migration from rural areas in most of the regions. Higher migration rates from urban areas than from rural areas also suggests that Indonesia may have reached the later stage of development, given the notion that earlier stages of development tend to be dominated by rural-to-urban migration (De Haas, 2010; Zelinsky, 1971), particularly as a study concludes that Indonesia is currently in a phase of over-urbanisation (Wajdi et al., 2015). The higher importance of migration from urban than from rural areas may add an element to the discussion regarding internal migration in Asia as an attempt to revisit the mobility transition hypothesis (Zelinsky, 1971) as proposed by Zhu (2018).

Conclusions

This study has broken new ground regarding our understanding of internal migration within Indonesia by examining migration at smaller distances and over longer periods than previous research. Our results find that many features of internal Indonesian migration are consistent with the international evidence, particularly the effect of age, education, marital status, income, dependents, and family size on migration behaviour. Still, some findings are especially noteworthy. When conditioning for both geography and household composition, the observed greater mobility of women – given they are heads of the household – is a result which concurs with other recent and longstanding findings regarding mobility behaviour by gender. It sheds a new light regarding the linkage to the household structure.

Furthermore, the finding of differences in migration behaviour across different spatial scales and the observation that migration processes in Java are somewhat different to other parts of the country are also both consistent with many economic geography arguments. These results lend new insights regarding gender and household structure and the Sumatra, Java, and other provinces and urban-rural combination from analysing five waves of data, for comparing migration behaviour across three spatial scales, and by capturing the effects on migration of individual and household characteristics that were measured pre- instead of post-migration, have never been observed before in the context of Indonesia. However, to further examine these issues in more detail, it will be necessary to use the five IFLS waves to consider stepwise sequential migration patterns and to determine whether differences in life-cycle behaviour are also evident across Indonesia's urban hierarchy. This topic is the next step in our research.

Notes

1. To date, there is a migration study by Auwalin (2019) using the first four waves of IFLS.
2. The raw data is freely accessible from https://www.rand.org/well-being/social-and-behavioral-policy/data/FLS/IFLS.html.
3. A *kota* is more urbanised than a *kabupaten* but they are at the same level of administrative areas. We use the term *kabupaten* to refer to *kota* or *kabupaten* from this point onward.
4. The *kecamatan* area in South Jakarta District is on average 14.14 km^2 while in Kotabaru District in South Kalimantan, its average is 448.7 km^2 (calculated based on the 2013 data, from BPS, 2017, n.d.). The size of these districts thus varies substantially, and therefore shorter distance should be taken in a relative sense.
5. A dummy variable of survey period '1993–1997' indicates that the respondents were recorded in both years and any changes of residence occurred between these two years. The dummy variables controlled both the survey period (if the observations were the matched respondents between 1993 and 1997, 1997 and 2000, and so on) and the different intervals between the survey (3, 4, 7, and 7 years) because the dummy variables for survey interval would be perfectly correlated with the dummy variables of the survey period.

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ORCID

Elda Luciana Pardede http://orcid.org/0000-0002-7746-5442
Philip McCann http://orcid.org/0000-0003-0389-0654
Viktor A. Venhorst http://orcid.org/0000-0002-8138-2105

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Appendices

Appendix 1. Distribution of observations by individual and household characteristics prior to migration.

	Year of observation				
Characteristics prior to migration	1993 (%)	1997 (%)	2000 (%)	2007 (%)	Total (%)
Gender					
Male	48.3	48.2	48.3	48.3	48.3
Female	51.7	51.8	51.7	51.7	51.7
Age Group					
<15	37.6	33.5	31.9	31.6	33.4
15–24	14.3	17.2	19.0	15.5	16.6
25–44	28.4	28.4	30.3	33.0	30.3
45+	19.7	20.8	18.7	19.9	19.8
Marital Status					
Never married	49.9	49.9	48.3	45.6	48.2
Married	44.2	43.5	46.0	48.7	45.8
Separated/divorced/widowed	5.9	6.5	5.7	5.7	5.9
Level of Education					
Under primary school	61.5	53.8	49.1	45.2	51.6
Primary school (6 years)	20.1	22.4	21.6	20.1	21.0
Junior high school (9 years)	8.1	10.3	12.4	13.2	11.2
Senior high school and higher (≥12 years)	10.4	13.4	17.0	21.6	16.1
Relation to Household Head					
Head	23.2	22.9	24.0	26.7	24.4
Spouse	19.5	18.5	20.0	21.1	19.9
Child	45.5	44.9	43.1	40.1	43.1
Others	11.8	13.7	13.0	12.2	12.7
Household Size					
1–4	34.6	36.6	42.1	53.2	42.5
5–7	48.1	48.6	45.0	38.9	44.7
8+	17.3	14.8	12.9	7.9	12.8
Presence of Dependents					
No children (0–17), no elderly (60+)	41.7	19.9	23.4	26.0	27.2
With children, no elderly	39.4	60.7	59.5	57.8	55.0
No children, with elderly	12.0	7.6	6.7	7.0	8.1
With children, with elderly	7.0	11.7	10.4	9.3	9.7
Quintile of Per Capita Expenditure					
Q1 (20% poorest households)	23.4	23.6	24.8	25.2	24.3
Q2	21.3	21.1	22.5	22.5	21.9
Q3	20.5	20.1	20.3	20.8	20.4
Q4	18.7	18.8	18.2	18.4	18.5
Q5 (20% richest households)	16.0	16.4	14.3	13.2	14.8
Region of Origin					
Sumatera	22.3	21.5	21.3	22.4	21.9
Java	56.8	57.7	57.5	55.0	56.7
Others	20.9	20.9	21.2	22.6	21.5
Area of Origin					
Urban	47.5	46.7	47.0	51.2	48.3
Rural	52.5	53.3	53.0	48.8	51.8
Total (%)	100.0	100.0	100.0	100.0	100.0
Observations	27,029	30,151	33,355	38,042	128,577

Source: 1993, 1997, 2000, 2007, and 2014 IFLS.

Note: The respondents for each year of observation are only the matching respondents between two consecutive survey waves.

Appendix 2. Annual number of migrants per thousand [a)] for migration inter-*kecamatan* within a *kabupaten* (Kec), inter-*kabupaten* within a province (Kab), and inter-province (Prov), by survey period.

	1993–1997			1997–2000			2000–2007			2007–2014			Average 1993–2014		
Characteristics (measured prior to migration[b)])	Kec	Kab	Prov	Kec	Kab	Prov	Kec	Kab	Prov	Kec	Kab	Prov	Kec	Kab	Prov
Total	6.4	5.7	3.2	10.7	11.0	7.0	7.7	7.6	5.0	6.5	7.1	4.7	7.8	7.8	5.0
Gender															
Male	6.3	5.8	3.2	10.8	11.0	7.7	7.6	7.8	5.2	6.3	7.3	5.2	7.8	8.0	5.3
Female	6.5	5.6	3.2	10.5	11.1	6.3	7.7	7.4	4.8	6.6	6.9	4.2	7.8	7.7	4.6
Age Group															
<15	6.4	6.2	3.1	10.4	10.6	5.7	8.3	8.2	5.2	6.6	7.7	4.8	7.9	8.2	4.7
15–24	6.7	7.8	5.2	16.8	23.0	16.6	11.1	14.6	11.4	11.6	13.7	11.1	11.5	14.8	11.1
25–44	7.6	5.9	3.2	10.9	9.6	5.6	7.6	5.1	3.0	6.2	6.2	3.6	8.1	6.7	3.8
45+	4.4	3.0	1.9	5.7	3.7	2.9	3.2	3.5	1.5	2.7	2.2	1.4	4.0	3.1	1.9
Marital Status															
Never married	6.6	7.0	3.6	12.7	14.9	9.5	9.3	10.8	7.7	8.1	10.1	7.0	9.2	10.7	6.9
Married	6.2	4.4	3.0	8.6	7.3	4.8	6.2	4.6	2.6	5.3	4.7	2.9	6.6	5.2	3.3
Separated/divorced/widowed	5.3	4.7	1.9	9.2	6.1	2.5	5.6	4.4	1.9	3.5	3.5	1.4	5.9	4.7	1.9
Level of Education															
Under primary school	5.1	4.2	2.4	8.7	7.1	3.9	6.8	5.2	2.8	5.0	4.8	2.9	6.4	5.3	3.0
Primary school	7.2	5.8	3.3	11.9	10.5	7.8	6.6	7.7	5.6	5.2	7.1	4.9	7.7	7.8	5.4
Junior high school	7.7	8.8	5.2	12.3	21.2	16.1	9.6	10.7	8.8	7.5	8.3	6.1	9.3	12.3	9.0
Senior high school and higher	11.7	11.7	6.2	15.4	19.4	10.8	10.3	12.0	7.9	10.0	11.2	7.2	11.8	13.6	8.0
Relation to Household Head															
Household head	6.1	4.9	3.3	8.6	7.6	5.1	6.4	6.4	4.1	6.0	7.0	5.4	6.8	6.5	4.5
Spouse	5.4	4.1	2.9	6.9	6.5	3.9	5.7	4.2	2.3	4.9	4.1	2.6	5.7	4.7	2.9
Child	6.4	5.9	3.0	12.0	13.8	9.0	8.7	9.2	6.2	7.2	8.3	5.2	8.6	9.3	5.9
Others	8.8	9.0	4.2	15.2	13.6	7.6	9.5	9.8	6.7	7.6	8.4	4.9	10.3	10.2	5.8
Household Size															
1–4	8.1	6.2	4.3	10.2	10.7	7.5	8.0	8.0	5.9	7.0	7.8	5.7	8.3	8.2	5.8
5–7	5.6	5.0	2.8	10.8	11.5	6.9	7.3	7.2	4.5	5.7	6.0	3.6	7.4	7.4	4.5
8+	5.1	6.7	2.2	11.4	10.3	6.1	7.9	7.6	3.7	6.5	7.2	3.1	7.7	8.0	3.8
Presence of Dependents															
No children (0–17), no elderly (60+)	6.9	5.0	3.4	10.9	12.5	7.8	7.5	8.2	5.8	7.7	8.8	6.4	8.3	8.6	5.9
With children, no elderly	6.4	6.5	3.4	11.0	11.7	7.5	8.3	7.8	5.3	6.6	6.9	4.5	8.1	8.2	5.1
No children, with elderly	4.2	4.3	2.3	9.4	4.9	3.3	4.4	5.2	2.4	3.0	4.0	1.6	5.2	4.6	2.4
With children, with elderly	7.2	7.3	2.4	9.4	8.8	5.2	6.7	6.8	3.4	4.5	5.7	3.4	7.0	7.2	3.6
Quintile of Per Capita Expenditure															
Q1 (20% poorest households)	5.0	4.2	0.9	10.2	6.6	3.1	7.8	5.2	3.1	4.7	3.8	2.7	6.9	5.0	2.4

(*Continued*)

Appendix 2. Continued.

Characteristics (measured prior to migration[b)])	1993–1997			1997–2000			2000–2007			2007–2014			Average 1993–2014		
	Kec	Kab	Prov	Kec	Kab	Prov	Kec	Kab	Prov	Kec	Kab	Prov	Kec	Kab	Prov
Q2	5.8	3.3	2.2	10.2	9.1	4.8	6.3	6.9	3.5	5.5	6.1	3.4	7.0	6.4	3.5
Q3	5.8	6.8	2.0	10.6	10.5	5.9	7.5	7.8	4.8	6.0	7.2	4.0	7.5	8.1	4.2
Q4	7.6	6.8	4.6	13.2	15.4	10.5	8.7	8.8	5.5	8.4	8.5	5.3	9.5	9.9	6.5
Q5 (20% richest households)	8.4	8.4	7.9	9.1	15.4	12.5	8.5	11.1	10.2	9.4	12.7	10.8	8.9	11.9	10.4
Region of Origin															
Sumatra	10.0	7.7	2.3	11.1	12.6	8.4	11.3	10.1	5.4	8.1	7.8	5.0	10.1	9.5	5.3
Java	5.0	5.3	4.2	8.8	10.3	8.3	6.2	6.3	5.9	6.0	6.2	5.5	6.5	7.0	6.0
Others	6.3	4.6	1.3	15.3	11.4	1.9	8.0	8.5	2.0	5.9	8.5	2.4	8.9	8.3	1.9
Area of Origin															
Urban	7.1	7.6	5.0	11.3	14.0	9.3	7.9	9.1	6.5	7.7	9.0	5.7	8.5	9.9	6.6
Rural	5.8	4.0	1.6	10.2	8.4	4.9	7.4	6.2	3.7	5.2	5.1	3.6	7.1	5.9	3.4
Observations		27,029			30,151			33,355			38,042			128,577	

Source: 1993, 1997, 2000, 2007, and 2014 IFLS.

Note: (a) The number of migrants = [(the number of people who changed their residence between wave *w* and *w*+1)/(the number of people at wave *w*)] × 1,000. The provincial and area codes are constant over time, which are the 2000 BPS (Statistics Indonesia) codes. The results of chi^2-test show that the association between the dependent and the explanatory variables are all statistically significant at 95 per cent confidence interval except for the gender variable over time (*p*-values of 0.979, 0.089, and 0.441) and household size group in the period of 1997–2000 (*p*-value of 0.433); (b) Characteristics were measured at wave *w* for migration between wave *w* and *w*+1.

Appendix 3. Reason to migrate by gender[a)] and relation to the household head.

Reason to migrate	All		Head		Spouse or child		Others	
	M(%)	F(%)	M(%)	F(%)	M(%)	F(%)	M(%)	F(%)
Own work	34.7	16.0	31.9	18.1	37.5	15.6	32.1	17.0
Work of spouse/others	1.9	6.0	2.6	2.0	1.5	6.9	1.4	3.8
Education/training	11.9	12.0	2.4	8.4	19.9	12.5	8.8	11.7
Marriage/pregnancy	10.5	15.5	5.7	17.6	14.3	15.1	10.5	16.8
Other family reasons[b)]	20.3	30.1	22.2	36.7	17.5	28.4	24.9	35.3
Other reasons	15.0	14.2	23.4	13.3	8.1	14.5	16.8	12.8
Housing	5.8	6.1	11.9	3.9	1.2	7.0	5.5	2.7
Total (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Observations	7,314	7,667	2,728	761	3,578	5,887	1,008	1,019

Source: 1993, 1997, 2000, 2007, and 2014 IFLS.

Note: Calculated using the migration history since age 12 of adult respondents who were at least 15 years at the time of the survey. Migration in this table is the first migration after the time of the survey; (a) M = male, F = female; (b) About 79 per cent (male) and 92 per cent (female) of other family reasons are dominated by three reasons: 'migration with family', 'to be closer to family', and 'live with family members'.