UNIVERSITY OF SOUTHAMPTON

Faculty of Social Sciences

School of Economic, Social and Political Sciences

Essays on the Labour Market and Migration in Indonesia

by

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Thesis for the degree of Doctor of Philosophy

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<u>ABSTRACT</u>

FACULTY OF SOCIAL, HUMAN AND MATHEMATICAL SCIENCES

<u>School of Social Science</u>

Thesis for the degree of Doctor of Philosophy

ESSAYS ON THE LABOUR MARKET AND MIGRATION IN INDONESIA

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This thesis studies several important aspects of the Indonesian labour market, namely internal migration, child labour and self-employment. Using the Indonesian Family Life Survey (IFLS) panel data, the thesis examines the determinants of internal migration, the impact of migration on children's employment and schooling, and the potential indirect impact of government's financial assistantship in promoting self-employment and entrepreneurship.

The first part of this thesis aims to analyse the relationship between household assets and migration decision. Unlike the previous literature that has tended to focus on the role of income as a major determinant of migration, this part shows the importance of household assets in determining the migration decision. This part shows empirically that household assets have significant effect on migration decision and compares it to the impact of household income on migration decision. Controlling for the potential endogeneity problem between assets and migration using instrumental variable techniques, we find a negative relationship between household assets and the migration decision contrary to the effect of household income on the migration decision. This highlights the importance of controlling for assets as opposed to income in the context of internal migration.

The second part contributes to the literature on the relationship between migration, schooling, and child employment by examining the hazard rate and the duration to falling into employment in migrant households. This part exploits the duration of schooling and the duration before children's first employment. Using time-to-event approach, this part shows empirically that migration has significant effect on the duration of schooling (and dropping-out of schooling) and on the time of children's first employment. This part sets-up two initial independent environments to analyse the impact of migration to child schooling and the impact of migration to child labour separately. The first set-up finds that children in migrant households stay longer in education than children in

migrant households. In the other setting, children in migrant households are sent to work faster than their counterparts. Additionally, in another set-up where conditional in child working, children in the migrant household stay longer in school.

While the third part of this thesis utilises the *Bantuan Langsung Tunai* (BLT) program as a natural experiment to examine the effect of a windfall on self-employment. BLT was an unconditional cash transfer program to assist poor households during the reductions in domestic fuel subsidy in 2005. The part examines where BLT receipts promote self-employment and entrepreneurship as a result of the additional income. This thesis uses instrumental variable techniques to address the potential endogeneity problems in analysing the effect of BLT on self-employment and entrepreneurship. We find that individuals in BLT-receiving households have higher probability to start self-employment and entrepreneurial activities or stay-in in their business. This highlights an important indirect effect of such cash transfers in poor households.

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Academic Thesis: Declaration of Authorship

I, Muhammad Hanri, declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

Essays on the Labour Market and Migration in Indonesia

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. None of this work has been published before submission.

Signed: ....

Date: 15 October 2018

Acknowledgements

I would like to extend thanks to the many people, who so generously contributed to the work presented in this thesis.

Special mention goes to my enthusiastic supervisors, Prof. Jackline Wahba and Prof. Corrado Giulietti. My PhD has been an amazing experience, and I thank them wholeheartedly, not only for their tremendous academic support but also for giving me so many wonderful opportunities. Not many PhD lives involve a short Arabic language course in front of the Petronas Twin Tower.

Similar, profound gratitude goes to Chiara Binelli, Hector Calvo Pardo, Brendon McConnel, Thomas Gall, and Michael Vlassopoulos not only for their insightful comments and encouragement, but also for the hard questions which incented me to widen my research from various perspectives.

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Chapter 1   Introduction

1.1 Background

Having various disparities in job opportunities and public facilities, internal migration is among several interesting phenomena in the labour market studies in Indonesia. Child labour and school attainment is also another recently exploited issue where, although restrictions on child labour have been regulated by the government, a significant number of children still fall into employment. Another interesting issue to be explored is the significant number of informal workers who work as self-employed workers and entrepreneurs, accounting for over 80% of total workers. Over time, this number has been affected by several economic shocks.

These phenomena in the Indonesian labour market motivate this thesis to answer three main research questions: (1) How do household assets affect migration? (2) Does migration affect child labour and schooling? (3) and how does an unconditional cash transfer programme affect self-employment and entrepreneurship?

This thesis consists of three independent topics that discuss important features of the Indonesian labour market. The first two topics deal with internal migration, an important phenomenon in Indonesia involving 16.3% of individuals, or 18.7% households. The first topic shows the importance of household assets in determining the migration decision and shows empirically that household assets have a significant effect on migration decision. It also controls for the potential endogeneity problem between assets and migration using instrumental variable techniques.

Studies found several threats in using income as a determinant of socio-economic phenomenon. One of the threats happens particularly in developing countries where there a significant proportion of informal workers. In responding the interview, respondents who are informal workers may not have a good documentation of income that they have made. They may also be paid not in a fixed rate or even in in-kind payment. This condition may deteriorate the reliability of the income-response in the survey.

Subsequent studies suggest household assets as an alternative to income. Not only does it represent stock data which provide a good measurement of long-term condition, it is also tangible so that the households' possession status can be easily confirmed. In this chapter, we analyse all kind of household assets available in the data and construct different household assets measurements (i.e. index number, ration, etc). Next, we will analyse those measurements in affecting job-related migration decision.

The second topic analyses the relationship between migration, schooling and child employment by examining the hazard rate and the duration of falling into employment in migrant households. It explores the duration of schooling and the duration before children's first employment. The time-to-event approach allows us to empirically show that migration has a significant effect on the duration of schooling (and dropping out of schooling) and on the time of children's first employment.

Although the government has regulated children employment in Indonesia, the law enforcement could still be better. We may still encounter child labour in sectors in which they are regulated not work. There are several conditions that influence parents to send their children to work. Poverty may force children to support their parents in their household businesses, such as helping parents in the farm, being a store keeper, or serving foods in households' restaurant. Even in non-poor households, parents may still want to introduce those kinds of working activities to their children to prepare them for the future. Another example is when parents ask their children to help them with household chores. To some extent, high number of hours spent in household chores may also be classified as child labour. Being exposed to working state too early may interfere children's school attainment. Migration plays important role in accelerating or delaying the time for children to be sent to work. An absence of migration family member may force children to cover the position of the migrating member in working on household business or household chores. However, we may also expect that remittances received from the migrating family member may lift the household from poverty, hence delay parents' decision to send their children to work.

Similar to child labour above, the government of Indonesia has also regulated the compulsory education. However, we may still encounter children who are dropped-out from school. The importance of duration of schooling is straight forward. The longer children staying in school, the more knowledge and higher certificate obtained. Migration may also play important role in delaying school drop-out. Through remittances from the migrants, parents could cover the educational costs, hence allows children to stay in school longer.

The third topic discusses self-employment and entrepreneurship among the natural experiment environment. We analyse individuals' decision in terms of self-employment and entrepreneurship in the event of economic shock and government's financial assistantship. We explore the case of the *Bantuan Langsung Tunai* (BLT) programme, which was an unconditional cash transfer programme introduced by the government in 2005. This programme was an anticipation of the rise of global oil price, whereby the government lifted the domestic fuel price subsidy. This contracting fiscal policy eventually increased inflation and unemployment. In this programme, each poor household received IDR100,000 (approx. USD12) per month. On average,

this amount was equal to 15% of regular expenditure and was intended to allow households to readjust their spending pattern in the aftermath of high inflation due to the fuel price increase.

Since the target of BLT is poor households, we may anticipate that the self-employment or entrepreneurial activities to be in smaller scale. Some activities may include cooking and selling food in less-permanent establishment, purchasing goods and resell it in stalls, creating art crafts to be sold, or other small scale agricultural activities. These households may have positive effects from the BLT money. Using the money, they may have some extra money as a capital to start the self-employment activities. In addition, the money allows them to cope with the economic shock, hence they are able to continue working on their current self-employment activities.

Nowadays, the cash transfer programme is still popular. One of the programmes of the newly-elected Governor of Jakarta is disbursing cash transfer to a community group to promote entrepreneurship in that community. They believe that entrepreneurship will create a snowball effect in reducing unemployment and eventually increase the welfare of the people of Jakarta. Since the programme is relatively similar to that discussed in one of the chapters in this thesis, it will be interesting to expand our analysis when the data is available, and, therefore, confirm or challenge the findings in this chapter.

1.1.1 Contribution of this Essay to Migration Literature

This thesis contributes to the migration literature through examining both the determinants and impacts. It begins with a brief elaboration of Indonesian labour market in the first chapter. While the second chapter covers the determinant aspect. Using household assets as an alternative determinant as opposed to income, this chapter contributes to the literature by filling the gap wherein previous studies have tended to emphasise the importance of income as a major migration determinant. This chapter also adopts the instrumental variable method to control the potential endogeneity problem between assets and migration decision.

The third chapter of this thesis covers the impact aspect of migration. This chapter contributes to the literature by implementing the time-to-event approach method. This method allows us to take into account the duration for children to fall into employment and the duration for children to drop out from school in different households' migration status. Previous literature focused on the probability of school drop-out and the probability of child labour among children from migrant households. This thesis enriches the literature by being able to answer who falls into employment faster and who drops-out from school earlier.

1.1.2 Contribution of this Essay to Self-Employment and Entrepreneurship Literature

The fourth chapter of this thesis contributes to the self-employment literature straightforwardly. Previous literatures have shown the relationship between cash transfer programmes and self-employment and entrepreneurship. However, these programmes were tailored as an experimental programme whereby the researchers were able to randomly select the programme participants. Not only increasing our awareness regarding the indirect effects of unconditional cash transfer to entrepreneurship, this chapter also fills the research gap by using an unconditional cash transfer programme as a natural experiment wherein the programme was tailored as an immediate aid in the event of economic shock and the programme recipients were not randomly selected.

1.1.3 Organisation of this Thesis

The remaining of this thesis will be as follows. Chapter Two discusses the household assets as an alternative measurement of determinant of migration in Indonesia, while the impact of migration to child labour and child schooling using a time-to-event approach will be discussed in Chapter three. Chapter Four discusses the impact of the BLT programme as a form of unconditional cash transfer to self-employment and entrepreneurship, and Chapter Five provides a summary.

1.2 Indonesian Labour Market

This part continues the chapter by providing the background of the Indonesian labour market, giving some brief information about the distribution of the labour force based on employment type and employment sector, wage, child labour and migration.

Located in South-East Asia, Indonesia is a form of archipelagic country that comprises five big islands and over 17,000 smaller islands. Stretching over 5,000km from the westernmost point to the easternmost point, it is the seventh largest country in terms of land and sea area. It is also home for over 250 million people who belong to approximately 300 distinct ethnic groups. As the fourth most populous country in the world, Indonesia has the benefit of the absolute advantage in having an abundant potential labour force. This is one of the most important factors for economic activities. Although Indonesia has a massive number of both population and working-age population, the labour force participation rate is relatively lower than other countries in the South-East Asia region.[1] In addition, the total population and working-age population has grown at a

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[1] According to a World Bank report in 2014, Indonesia's Labour Force Participation Rate is 66.93%, ahead of Brunei Darussalam (65.59%) and the Philippines (64.62%), but it is behind Malaysia (67.49%), Thailand (70.70%), Singapore (74.53%) and Vietnam (77.74%).

decreasing rate,[2] while the labour force participation rate has decreased overtime. The decrease is a result of a percentage of the working-age population that exits the labour force, particularly for education reasons.
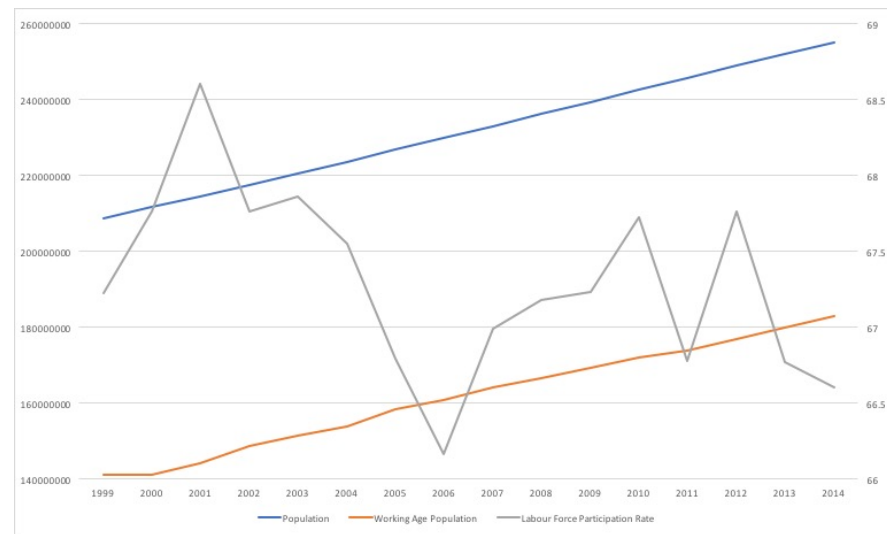
Figure 1.1 Distribution of Labour Force

Source: World Bank and National Statistics Agency

Figure 1.2 below shows that the primary sector leads the number of employment in Indonesia with the Agriculture, Forestry, Fishing and Hunting sector absorbing the most workers. Wholesale, Retail, Restaurants and Hotels, Social Services and Manufacturing follow as the sectors that absorb most workers, while the Electricity, Gas and Water sector employs the least number of workers.

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[2] According to the National Statistics Agency, the population growth rate for the period of 1980-1990 is 1.98%, 1990-2000 is 1.49%, 2000-1020 is 1.49% and 2010-2016 is 1.36%.
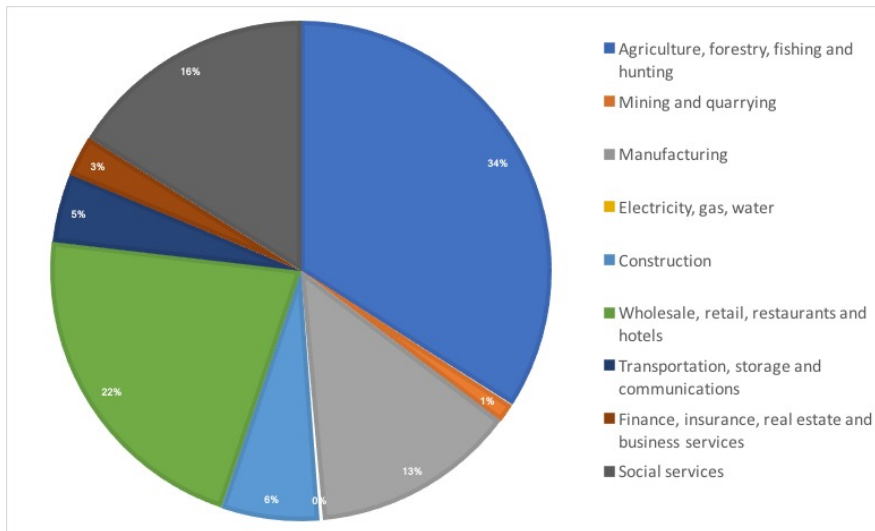
Figure 1.2 Distribution of Employment by Sector

Source: Indonesian Labour Force Survey 2014

Indonesia is abundant with natural resources. Its fertile land and tropical climate allows agricultural activities to grow rapidly. It is also the home of one of the biggest rain forests in the world after Brazil, Congo and Peru. It is also rich in oil reserves, which has made it 22nd on the list of global oil production.[3] Therefore, these primary sectors contribute approximately one-fourth of Indonesia's total Gross Domestic Product (GDP) wherein approximately 10% comes from the oil and gas production. However, structural transformation has been taking place recently and industrial-related sectors have begun taking a place. In 2014, the manufacturing sector accounted for 23% of the total GDP. Trade, the hotel and restaurants sector and services sector have also been growing rapidly and accounted for over 25% combined in the same year.

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[3] According to OPEC publication in 2016
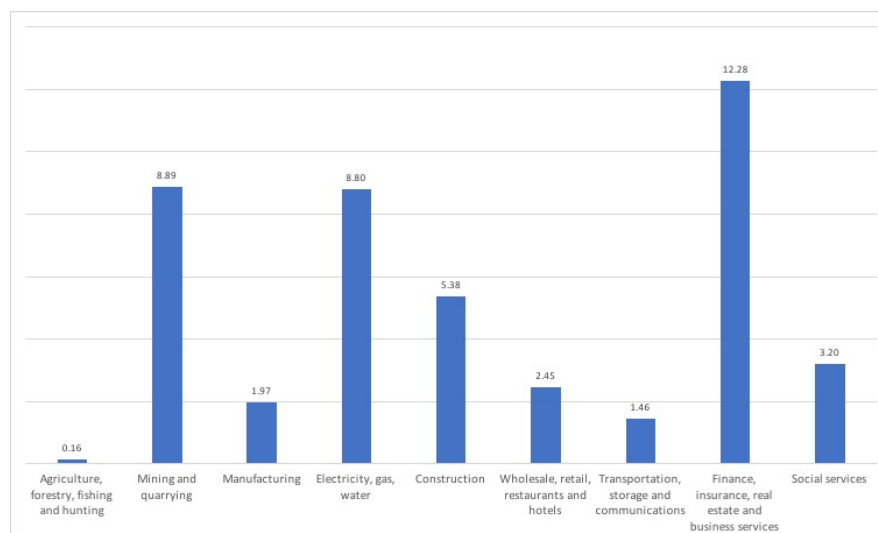
Figure 1.3 Growth of Employment by Sector

Source: Indonesian Labour Force Survey 1995 to 2014

The structural transformation has brought changes in the distribution of employment. Although having the biggest proportion of all employment, the average growth of employment in the Agriculture, Forestry, Fishing and Hunting sector is the least of all sectors. It even had a negative growth in several years. In contrast, the manufacturing and services-related sectors grew rapidly over the past 15 years. They also booked some negative growth in some years, e.g. in the year 2003 and 2004. This decline may be closely related to the increase of global oil price in that period. However, it picked up again in the following year and grew in a relatively stable manner.

The majority of people who work in the Agriculture, Forestry, Fishing and Hunting sector and the Mining and Quarrying sector have obtained only an elementary school certificate. This sector also has the highest proportion of those who never enrolled in school compared to other sectors. Conversely, the majority of those who work in service-related sectors obtained a university level certificate and a higher level of educational attainment compared to other sectors.

In other sectors, the distribution of elementary school to senior high school certificate attained is relatively even. However, those who work in the Electricity, Gas and Water sector tend to have higher educational attainment than other sectors. This sector also has the lowest proportion of those who never enrolled in school.

Table 1.1 Percentage of Educational Attainment by Sector

Educational Attainment	Sect. 1	Sect. 2	Sect. 3	Sect. 4	Sect. 5	Sect. 6	Sect. 7	Sect. 8	Sect. 9
Never Enrolled	9.62	2.89	2.18	0.08	1.52	2.27	1.26	0.60	1.66
Did not finish Elementary School	23.42	14.74	9.03	0.96	12.22	10.24	9.00	1.94	6.22
Elementary School	40.32	30.96	24.52	10.37	37.21	25.44	25.07	5.99	13.75
Junior-High School	15.56	17.77	22.72	12.05	23.73	20.51	22.14	9.69	12.40
Senior-High School	7.63	18.30	19.92	28.20	12.57	22.78	22.42	27.16	19.99
Vocational Senior-High School	2.62	9.51	16.69	29.99	8.38	12.67	11.70	16.13	10.24
Academy/Diploma	0.32	1.61	1.64	6.15	0.94	2.34	2.66	8.31	8.16
University	0.51	4.21	3.29	12.21	3.43	3.74	5.75	30.18	27.58

Source: Indonesian LFS 2014

Note:Sect. 1: Agriculture, forestry, fishing and hunting

Sect. 2: Mining and quarrying

Sect. 3: Manufacturing

Sect. 4: Electricity, gas, water

Sect. 5: Construction

Sect. 6: Wholesale, retail, restaurants and hotels

Sect. 7: Transportation, storage and communications

Sect. 8: Finance, insurance, real estate and business services

Sect. 9: Other service

As anticipated, the primary sectors occur in rural areas. Over 80% of the Agriculture, Forestry, Fishing and Hunting sector occurs in rural areas and over 60% for the Mining and Quarrying sector. By contrast, the biggest gap is shown in the service-related sector and Electricity, Gas and Water sector. These urban-rural gaps may create a difference in the availability of public service and, eventually, drive people's movement from rural to urban.
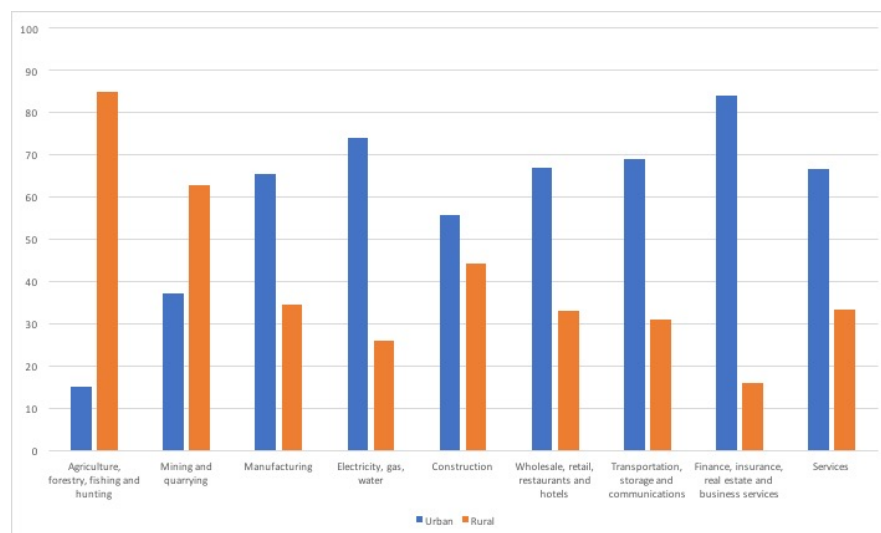
Figure 1.4 Urban-Rural Decomposition by Sector

Source: Indonesian Labour Force Survey 2014

1.2.1 Gender Gap

Construction and Mining, Quarrying, Transportation, Storage and Communication sector and Electricity, Gas, and Water are the sectors with the highest gender gap. Most females work in the Wholesale, Retail, Restaurants and Hotels sector where female workers outnumber male workers.
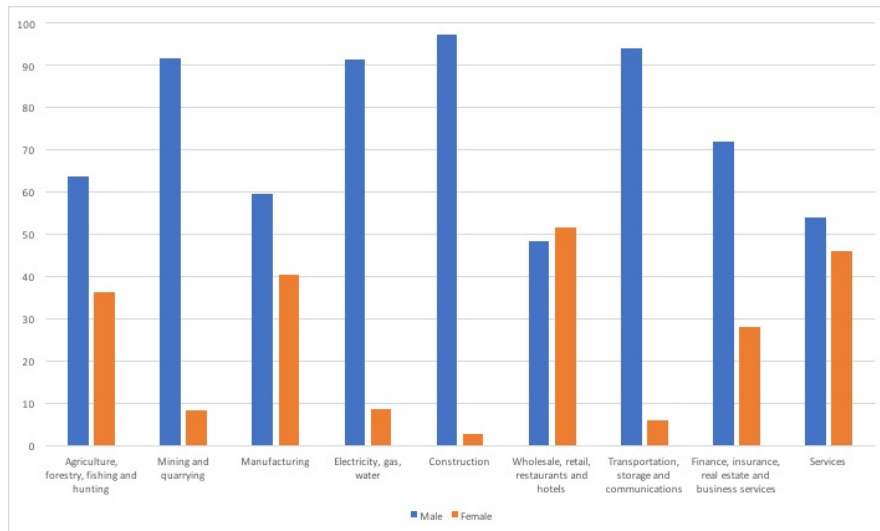
Figure 1.5 Gender Decomposition by Sector

Source: Indonesian Labour Force Survey 2014

Norms in many ethnic groups may play a role in these numbers. Females are not expected to work in more exposed and dangerous sectors, such as construction and mining. Household heads may forbid their female household members to work in these sectors. On the other hand, we also find a significant gender gap in the Finance, Insurance, Real Estate and Business Services sector. This sector is considerably different to and safer than, for instance, the Construction sector. This sector may have a higher skill and education requirement, hence, an educational discrimination between male and female may drive this gap. Later in this section, we will discuss the educational attainment between males and females.
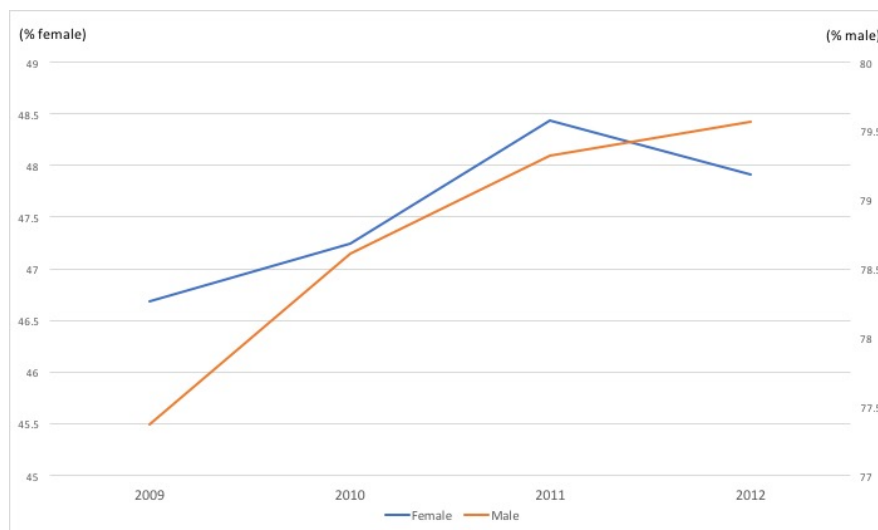
Figure 1.6 Labour Market Participation Rate by Gender

Source: Indonesian Labour Force Survey

The percentage of females who participate in the labour market is significantly lower than males. The percentage of males who work steadily has increased over the years, although the increase has tapered in recent years. In contrast, the percentage of working females decreased in the similar period, while the unemployment rate for both genders has constantly fallen over time.
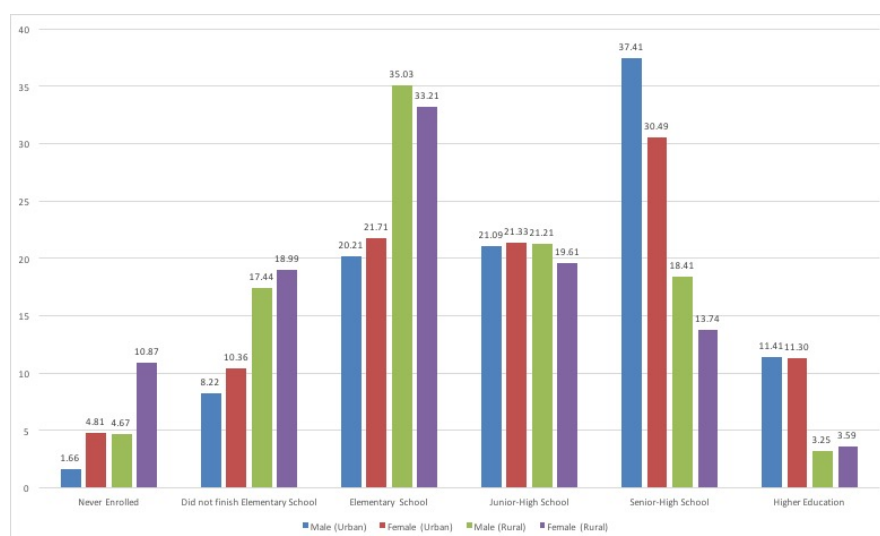
Figure 1.7 Educational Attainment by Gender and Location

Source: Indonesian Labour Force Survey 2014

Note: The figure above is measured in percentage

On average, the educational attainment of both males and females in the rural area is lower than those in urban areas. The vast majority of people in the rural area obtained only an elementary school certificate, while the vast majority of their counterparts obtained a senior-high school certificate. The gap between urban and rural can be significantly seen in the higher level, where the number of rural residents who obtained a senior-high school or university certificate was outnumbered by the urban residents.

Gender-wise, males obtained a higher level of education than females. The majority of males, particularly in urban areas, obtained a senior-high school certificate, while the majority of females obtained only a junior-high school certificate. It is also interesting to note that there is a quite negligible proportion gap of females in rural areas that never enrolled in school. In addition to poverty, there exists a belief whereby parents think that education for girls is not as important as it is for boys. Boys are expected to be the eventual breadwinner for their family, while girls are expected to be the dependent on their spouses. Therefore, if resource to cover the educational costs of their children is limited, parents will prioritise boys to go to school rather than girls.

1.2.2 Employment Type

The majority of workers are private workers or employees, particularly for those who work in the Mining and Quarrying, Manufacturing, Electricity, Gas and Water, Transportation, Storage and Communications and service-related sectors, whereas self-employment is more desirable for those who participate in the Wholesale, Retail, Restaurants and Hotels, Transportation, Storage and Communication and the Agriculture, Forestry, Fishing and Hunting sectors. Some self-employment activities that are quite common in the Retail and Restaurant sectors are people who open a stall or restaurant in their own residences as a micro and small-scale business, while an example for the Transportation sector is the private means of transportation, such as motorcycle taxi and private taxi.

Particularly for the Agriculture, Forestry, Fishing and Hunting sector, there are a good number where the self-employment activity involves unpaid family members. This can be seen through the relatively high percentage of self-employed with unpaid family workers and unpaid family worker types in this sector.

Table 1.2 Percentage of Employment Type by Sector

Employment Type	Sect. 1	Sect. 2	Sect. 3	Sect. 4	Sect. 5	Sect. 6	Sect. 7	Sect. 8	Sect. 9
Self-employed	13.91	14.32	10.11	3.84	3.25	34.16	41.61	8.66	11.92
Self-employed with unpaid family worker	33.06	3.99	7.18	1.79	1.22	18.55	1.76	1.87	2.13
Self-employed with permanent worker	3.21	4.54	4.40	1.06	4.53	4.79	2.99	4.20	2.11
Private worker/employee	8.62	56.38	66.17	89.30	39.41	26.52	44.53	82.16	74.04
Casual worker in agriculture	13.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Casual worker in non-agriculture	0.00	16.87	4.92	2.89	51.07	1.51	8.20	1.91	4.53
Unpaid family worker	28.13	3.89	7.22	1.12	0.51	14.47	0.90	1.20	5.27

Source: Indonesian LFS 2014

Note:
Sect. 1: Agriculture, forestry, fishing and hunting
Sect. 2: Mining and quarrying
Sect. 3: Manufacturing
Sect. 4: Electricity, gas, water
Sect. 5: Construction
Sect. 6: Wholesale, retail, restaurants and hotels
Sect. 7: Transportation, storage and communications
Sect. 8: Finance, insurance, real estate and business services
Sect. 9: Other service

The majority of people who participate in self-employed activities obtained an elementary school certificate or at least once enrolled in an elementary school. Similar educational attainment is obtained by those who work as unpaid family workers and casual workers, both in the agricultural and non-agricultural sector.

On the other hand, self-employed people who hire and pay other people have more diverse and better educational attainment, where over 30% of them obtained a senior-high school certificate. While those who work as private workers or employees have a relatively even educational attainment distribution over elementary school, junior-high school and university, the majority of them obtained only up to senior-high school certificate.

Table 1.3 Percentage of Educational Attainment by Employment Type

Educational Attainment	Self-employed	Self-employed with unpaid family worker	Self-employed with permanent worker	Private worker/ employee	Casual worker in agriculture	Casual worker in non-agriculture	Unpaid family worker
Never Enrolled	5.20	8.29	2.28	0.81	9.53	2.74	8.48
Did not finish Elementary School	17.27	22.38	10.63	5.34	27.49	15.13	17.18
Elementary School	33.50	38.43	24.82	15.74	44.50	42.11	35.76
Junior-High School	19.68	15.01	17.84	16.57	12.76	24.49	20.45
Senior-High School	14.80	9.88	20.81	23.47	4.07	9.85	11.83
Vocational Senior-High School	6.76	4.19	10.62	15.89	1.47	5.00	4.48
Academy/ Diploma	1.07	0.66	3.59	5.47	0.09	0.34	0.70
University	1.71	1.14	9.42	16.72	0.09	0.34	1.12

Source: Indonesian LFS 2014

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1.2.3 Wage Gap

Figure 1.8 below shows the distribution of average wage by sector. Although the Agriculture, Forestry, Fishing and Hunting sector absorbs the most workers, it has the lowest average wage among all other sectors. However, the Mining and Quarrying sector, which is in the same primary sector, pays the highest average wage among all other sectors. Figure 1.9 shows the average wage by educational attainment. As anticipated, the average wage increases proportionally with educational attainment; higher educational attainment yields higher wage. Interesting to note is that, in the same level of education, people with a regular senior-high school certificate have a slightly higher average wage than those with a vocational senior-high school certificate. This fact is not in line with recent government efforts to promote vocational senior-high school, wherein the government belief is that vocational senior-high school graduates have more specific skills that are useful for their jobs.
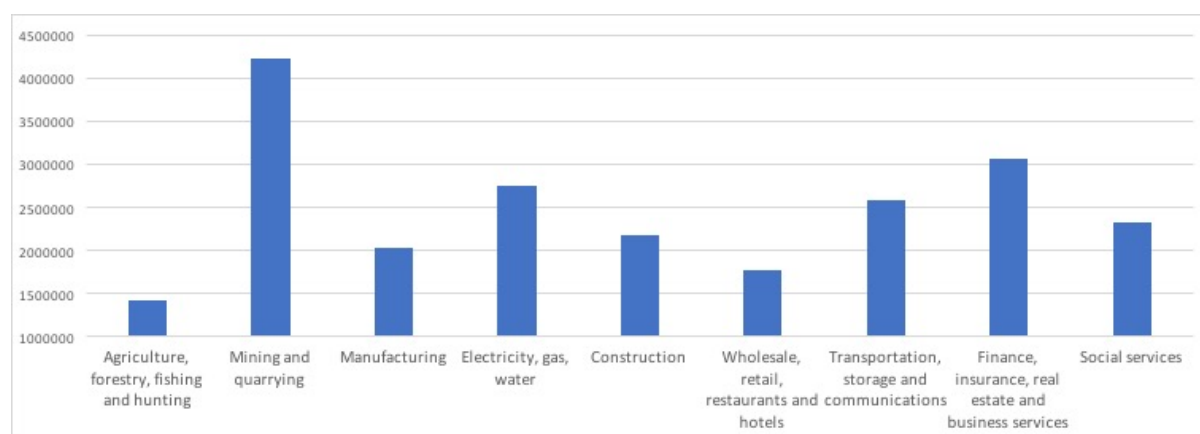
Figure 1.8 Average Wage by Sector (in IDR)

Source: National Statistics Agency
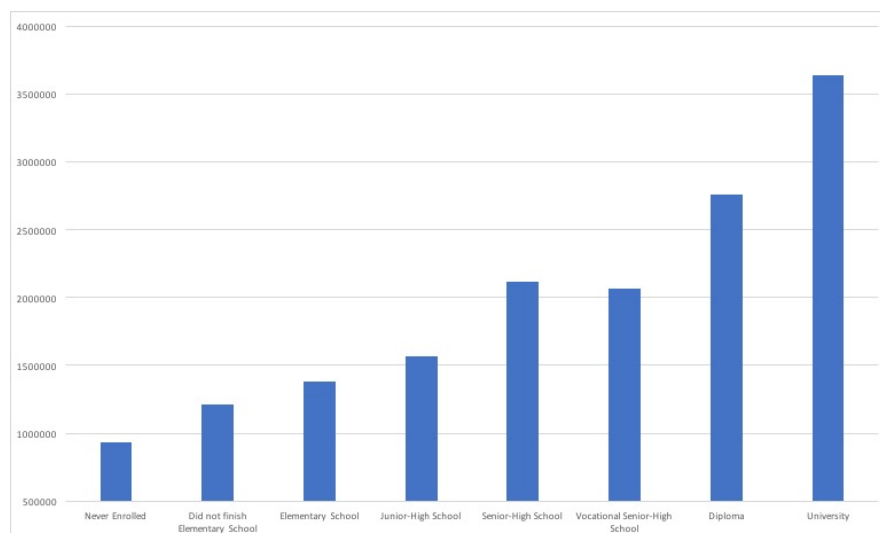
Figure 1.9 Average Wage by Education (in IDR)

Source: National Statistics Agency

Figure 1.10 shows the gender gap and urban-rural gap in average wage. As also anticipated, there is a significant average wage gap between males and females and between urban and rural areas. Male workers make a higher average wage than females. A factor that may drive this finding is that male workers have higher educational attainment than female workers, whereby higher educational attainment has a positive impact on wage. Moreover, as discussed previously, there is a higher proportion of male workers working in high paying sectors, e.g. mining and quarrying. This ultimately contributes to the gap in average wage between males and females.

Similarly, different educational attainment also affects the wage gap between workers in urban and rural areas. In addition, although the number of workers in rural areas who work in the Mining and Quarrying sector is greater than the number of workers in urban areas, the difference is not as considerable as the difference in service-related sectors. Note that the service-related sectors pay the second-highest wage. Therefore, the total wage received by the urban workers is still higher. These factors ultimately create a significant gap in the average wage between urban and rural areas.
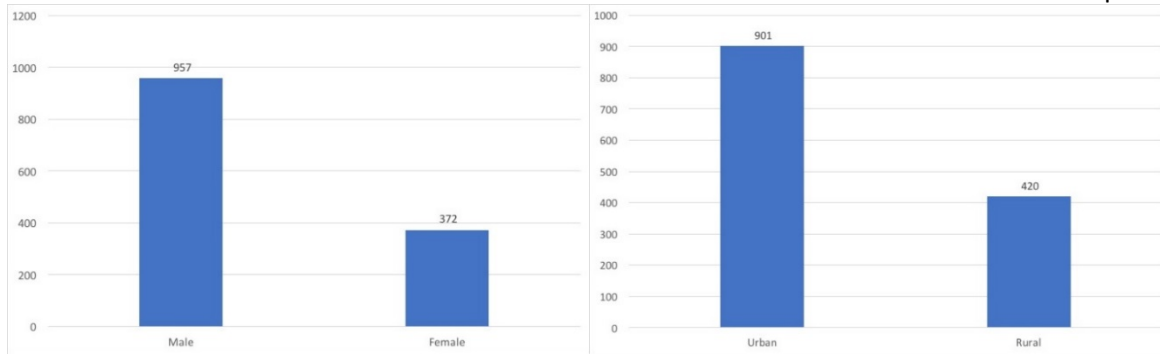
Figure 1.10 Average Wage (in IDR thousand) by Gender (left) and Area (right)

Source: Indonesian LFS 2014

Figure 1.11 shows the distribution of average wage in Indonesia. The figure shows some gaps between big cities and other areas. In particular, it shows that the average wage is relatively high in Jakarta and its surroundings, where this area is the capital city and the biggest centre of economic activities in Indonesia. High average wage is also found in many other big city areas, such as areas in North Sumatera, East Kalimantan and East Java. Those areas consequently become the main attraction for workers to move from their origins to find jobs. While the areas in Papua Island are not a main attraction for workers, they still have high average wage due to a relatively high cost of living. The high cost of living drives the local government to set a higher minimum wage rate in that region.[4]
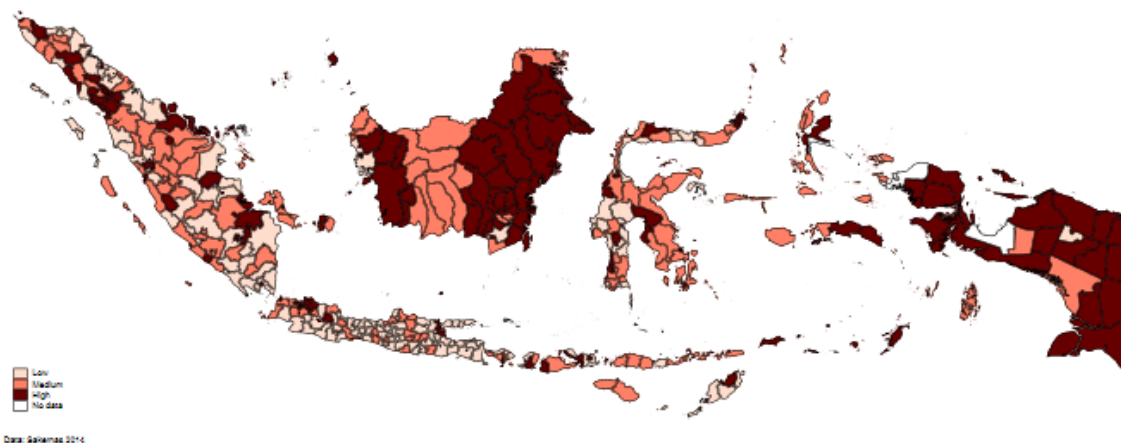
Figure 1.11 Distribution of Average Wage in Indonesia

Source: Author's calculation using Indonesian LFS 2014

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[4] The minimum wage rate for West Papua Province in 2017 was IDR 2,237,000 and IDR 2,435,000 for Papua Province, while the minimum wage rate for DKI Jakarta province was IDR 3,100,000.

1.2.4 Migration

Indonesia is a developing country that suffers from socioeconomic inequalities between its areas. There exists a gap of opportunities and infrastructures between more developed and less developed areas. Greater opportunities and better infrastructure can mostly be found in the western part of Indonesia, particularly in the bigger cities, while the eastern part of Indonesia, smaller cities, or rural areas may not enjoy an equal condition. Figure 1.12 shows the areas with positive and negative net migration in 2015. Provinces with higher average wage experience positive net migration, including Jakarta. This shows that expectation for wage in destination choice still plays an important role in attracting migrants.
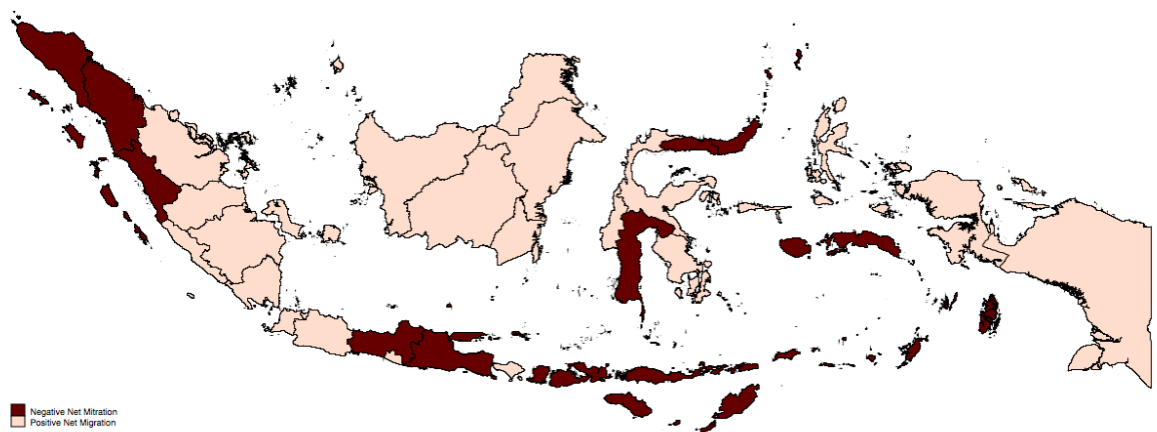
Figure 1.12 Net Migration in Indonesia

Source: Author's calculation using data from the National Statistics Agency

In addition, infrastructure and public facilities also play an important role as a pull factor. The public infrastructure and public facilities in Jakarta still dominate the public infrastructure and public facilities in any other region in Indonesia. Together with Surabaya, a city in the eastern part of the same island (Island of Java), massive economic activities and production mostly occur in this island. Despite Indonesia's Gini coefficient being considerably moderate, the Gross Domestic Regional Product (GDRP) in 2013 for all provinces in the Island of Java accounted for almost 58% of the total for Indonesia. Furthermore, the GDRP of Jakarta itself is 16% of all Indonesia, which is almost as high as the GDRP of all the other three biggest islands altogether.

In terms of public facilities, Jakarta has the most integrated transportation system in comparison to other central economic cities in Indonesia. It covers the biggest and busiest airport in the country, has a rapid railway system that connects Jakarta and its satellite cities, and is one of the busiest ports in the country.

Education and health facilities may also show a significant gap between Jakarta and the Island of Java in general. This area is the home of the four biggest universities in Indonesia. It is also home of almost 50% of the total number of primary school in Indonesia. In the same area, the number of *Puskesmas*[5] accounts for 34% of the total number of *Puskesmas* in Indonesia. It is followed by Sumatera Island, which accounts for 26% of the total for Indonesia.

The economic and facilities indicators above can be summarised by looking at the Human Development Index (HDI). The latest HDI for Jakarta is 78.39. This number is much higher than other areas in Indonesia, that range around the 60s, and the average of Indonesia, which is 68.90. In terms of collection of islands, Java Island has the highest HDI, followed by Sumatera Island, with 71.80 and 68.85, respectively.

Therefore, it attracts people outside Jakarta and/or the Island of Java and/or other central economies to find a job and increase their wellbeing. (Harris and Todaro, 1970), this is relevant to the motives of internal migration. In contrast to the economic and facility condition, the insufficiency of jobs availability and public facilities outside Jakarta and the Island of Java push people to come to this area. These pull and push factors ultimately create waves of migration in Indonesia.

From the latest population survey in Indonesia, which was conducted by the National Statistics Agency in 2010, the number of migrants who entered the Island of Java accounted for 29% of the total in-migrants to other islands. Almost 70% of those migrants mainly came from the Island of Sumatera. This figure is followed by the number of migrants that entered the Island of Sumatera and accounts for 26% of total in-migrants to other islands. More than 90% of them came from the Island of Java. This figure brings us to conclude that the Island of Java and the Island of Sumatera are the most popular migration destinations because the economic activity, as well as other public services and infrastructure (represented by the HDI), in these islands dominates other islands. Hence, people have a better expectation of wellbeing by migrating to these islands.

Looking further at the pattern of the migrants' origin, 91% of migrants in the Island of Sumatera came from the Island of Java. Migrants from Java Island accounted for 69.80%, 47.17%, and 64.70% of all migrants in the Island of Kalimantan, the Island of Sulawesi and other islands, respectively.

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[5] *Puskesmas* are the government-mandated community health clinics located across Indonesia

1.2.5 Child Labour

The government of Indonesia has been extensively encouraging the eradication of child employment. Several regulations have been implemented to control both the child labour demand and child labour supply. One of the most recent regulations is Regulation Number 13 Year 2003 about employment. In that regulation, the government prohibits children under the age of 13 to work. However, children between the age of 13 and 15 may participate in light work with several restrictions. Some clauses of the restrictions require permission from parents or guardian, the maximum working hours is three hours per day and the work has to be done after school time. They also regulate the minimum wage for children to avoid underpayment and sectors in which children may participate. Table 1.4 below shows the report by UNESCO which indicates the incidence of child labour in Indonesia in 2010.

Table 1.4 Child Labour and Education in Indonesia

Children	Age	Percent
Working	10-14 yrs.	3.7 (816,363)
Attending School	10-14 yrs.	92.4
Combining Work and School	Jul-14	2.1

Source: UNESCO 2013

Recent investigations have found cases where employers violate the regulation by exploiting children to work more than three hours per day, in a sector that may harm their health, and with underpayment. The cases were found in the tobacco industry in central Java and the eastern part of Indonesia (Manning, 2000) (Amigó, 2010). Child labour was completely absent in the larger tobacco industry. However, many small to medium-scale industries employ a significant proportion of child labour. Some cases found that only child labour was employed in some aspects of business in the industry, such as tying up tobacco leaves to poles, planting seeds in seedlings and watering and fertilising the tobacco corps.

Based on the latest available IFLS data, the majority of child labour in Indonesia participate in the extraction sector (e.g. agriculture, forestry, fishing and hunting), followed by the manufacturing and services sectors. While the report by UNESCO shows a similar proportion, as shown in Figure 1.13. Many of them work in their family-run business as unpaid family workers.
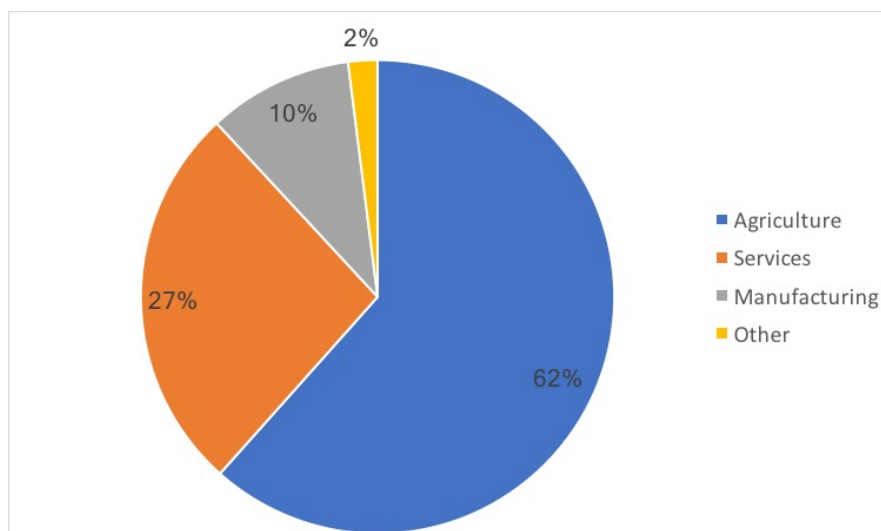
Figure 1.13 Distribution of Child Labour by Sector

Source: UNESCO, 2013

According to education attainment, the highest proportion of respondents who were child labour obtained an elementary school certificate only, while 35% of them managed to obtain a junior high school certificate and 25% obtained a senior high school certificate. This number contradicts the proportion of their counterparts, the non-child labour respondents. The majority of non-child labour respondents completed senior high school and continued to diploma and higher degree.

1.2.6 Informal Employment

There have been arguments about the definition of informal employment that may interfere with the term informality. Formal employment may commonly be characterised by the availability of legally-bound contract, benefits, pensions, etc. However, in the developing economy, such as Indonesia, even formal employees may not be provided pensions by the employer. On the employer side, formal employers should be registered and have corporate tax registration in the related institutions. This condition may not be met due to several administrative reasons. Therefore, we want to follow the definition that has been set by the National Statistics Agency, whereby the informal workers are defined as those who participate in the following activities: (1) self-employment; (2) self-employment, assisted by temporary jobs; (3) agriculture/farm labour; (4) non-agriculture labour; and (5) unpaid (family) labour.

Indonesia, as one of the developing economies, has approximately 80% informal workers. The proportion of informal workers slightly fell between the period of 2008 to 2014. Although Indonesia was not directly affected by the global economic crisis in 2008, the indirect effect from

lower aggregate demand hit the Indonesian economy, particularly the informal sector. Within this period, there were also other economic shocks, such as global oil price increase and high inflation, which subsequently reduced the competitiveness of informal workers in Indonesia.
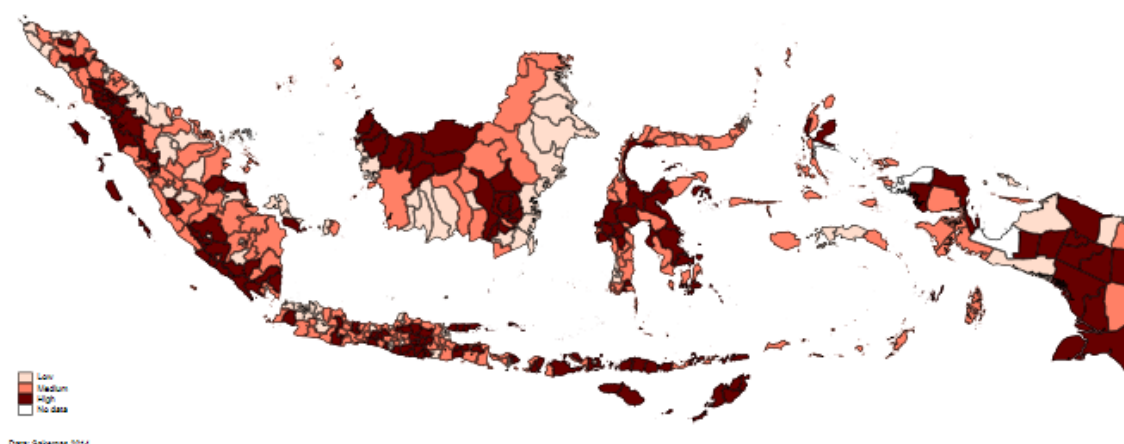
Figure 1.14 Distribution of Proportion of Informal Workers in Indonesia

Source: Author's calculation using Indonesian LFS 2014

From the Figure 1.14 above, we can see that non-centre economies tend to have a high proportion of informal workers. Not only that, the number of formal jobs available is relatively higher in bigger cities, but informal workers support the domestic growth of regions where the economic activities are not centrally located.

Later in this paper, we scrutinise the informal workers definition to self-employment only. Figure 1.15 below shows that the number of self-employed workers in Indonesia roughly triples the number of other workers. It is easier for those people to enter or exit self-employment compared to other workers entering or exiting their employment type. Therefore, the self-employed relatively more fluctuate than other workers. Self-employment reached the highest number during the early 2000s and dropped at the end of 2004. The number increased in a slow pace between 2004 and 2010 before it began to fluctuate again until the end of our observation window.

Figure 1.15 Number of Self-employment in Indonesia

Source: Author's calculation using IFLS

Chapter 2   Migration in Indonesia: Do Household Assets Matter?

2.1 Introduction

The purpose of this study is to propose an alternative measurement of household economic conditions and their effect on migration decisions. The analysis is based on the internal migration case in Indonesia and uses IFLS data to capture the socio-economic condition of Indonesians. This focus is motivated by concerns regarding income as a proxy of household economic condition.

Income has been widely used in many areas of study, including as a determinant of migration decisions. As concluded by (Stark et al., 1991) and some other studies, migration is costly; thus, income is believed to have a positive effect on migration decisions for those members of a population who are in the centre of income distribution. For those who make the least income, migration may not be feasible, as they may not be able to cover the costs incurred. On the contrary, the effect of income on migration decision becomes negative for those with the highest levels of income. Such people have less incentive to migrate, particularly in terms of work-related migration, which is the focus of this study.

Recent studies have included several limitations regarding the use of income as a proxy of one's economic condition. In terms of the survey, income-related survey responses have a higher probability of providing approximate rather than accurate data (McKenzie, 2005). This is particularly the case for informal workers, whose number is relatively high in middle-income countries such as Indonesia. Cyclical issues may also emerge for those who work in the agricultural sector in which income is highly related to the harvesting season. Together with some other critics that will be discussed in the next section, researchers are urged to find an alternative for income in explaining people's economic condition. Household assets are one such alternative measure that has been recently discussed. Assets are tangible and can be easily observed during a survey. Unlike flow data, household assets also capture the accumulated wealth of a household; hence, they are expected to have less cyclical bias than income.

Similar to studies on income, the primary challenge of this study is to tackle the potential endogeneity problem of using household assets as an estimator of migration decisions. Not only may a high reverse correlation occur between household assets and migration decisions, but there may also be omitted variable bias and unobservable problems. Hence, the instrumental variable can be a good solution to overcome those problems. This method has also been adopted by many

studies facing a similar problem and it is crucial that appropriate instruments are found to satisfy the related assumptions. Another challenge that has to be addressed is defining which assets need to be taken into account. As suggested by (Filmer and Pritchett, 2001), the indexing method will be used as our benchmark methodology with several tests of robustness to satisfy the internal validity assumption.

After using these instruments, we will empirically observe the relationship between the asset indices and the migration decision. The assets measurements for different households will be employed as robustness tests. As a consequence, different estimation methods will be employed, i.e. two-stages least square and categorical regression. We then focus on the above empirical findings and compare them to the relationship between household income and migration decision. If we follow the intuition of income as a determinant of migration, we would expect a positive relationship between household assets and migration decision or, in some studies, it produces an inverted U curve[6]. However, since the household assets indicator is believed to reflect a longer-term condition, e.g. to indicate a household's position in terms of wealth relative to its community, the result might differ.

As mentioned above, there have been ample studies regarding the relationship between income and migration decision as well as the asset indicator as an alternative measurement for income. However, few studies have been found about the relationship between the asset indicator and migration decision and, to the best of our knowledge, this is the first study that combines the construction of household assets and examines the effect of the constructed value on the migration decision in Indonesia.

Our contribution to the literature is clear; we will offer an alternative measurement to represent people's economic condition, which has a significant effect on the migration decision. Hence, the question that we aim to answer is: Do household assets affect the migration decision? We will also compare the above effect with that of income in terms of the migration decision. We hypothesise that household assets affect the migration decision in a different way compared to the effect of income, due to the difference in data characteristics between household assets and income.

The structure of this study is as follow. Part 2 discusses previous studies related to migration in Indonesia, household assets indexing, and household assets as alternative measurement in various sectors. Part 3 presents the data and the descriptive statistics. Part 4 elaborates the

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[6] Inverted U-curve means that people in the lowest group of income would not be able to finance their migration. In contrast, people in the highest group of income would find migration too costly. Hence, those who migrate are people in the middle of income distribution.

econometric specifications while part 5 shows the econometric results. Part 6 discusses the findings and part 7 concludes.

2.2 Literature Review

Migration decision determinants are extensively studied following the study that was conducted by (Todaro, 1980). In his study, he proposed that migrants are those who are more educated, healthier, younger, etc. (Chiquiar and Hanson, 2005) found that the peak of probability of migration happens in the age range of 30-40.

The push factor for migration on the family level covers the head of the household's education, race, religion, previous migration experiences, household size and dependency ratio. These factors have been discussed and concluded as being significant factors in migration decisions (Bartel, 1979; Barrientos and DeJong, 2006; Wolpert, 1965; Brown and Moore, 1970). The probability of migration is positively correlated with education, household size, dependency ratio, and migration experience. People with higher levels of education are expected to have a broader vision and better knowledge. Hence, when the head of a household is well educated, he/she would be more willing to allow his/her household members to migrate to get wider access to jobs in other places. Household size and dependency ratio are relatively self-explanatory, as a larger household and/or one with a higher dependency ratio would need greater financial support to run the household. Hence, household heads would be willing to send their household members to migrate, expecting financial support in return[7]. Meanwhile, there is presumably a mixed relationship between the migration decision and the race and religion of heads of households. In some races and religions, household members may be restricted from leaving the supervision of their household heads. For example, in the case of conventional Islam, a father must not allow his unmarried daughter to travel without supervision from himself or his son, brother or brother-in-law[8]. This therefore lowers the probability if migration. Similarly, gender inequality still applies in some races for whom it is taboo for household heads to let female household members travel alone or settle outside their domicile. In contrast, in some other races, it brings disgrace to the family for adult sons to stay with their parents, as they are expected to leave to find jobs. The probability of migration would be higher in this case.

some studies have exploited ethnic group as being a significant factor in the migration decision at the community level. As with the issue of race which was discussed above, some ethnic groups encourage their members to migrate. Migration has even been institutionalised in some

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[7] For the case of international migration, remittances are expected.

[8] This concept is called *Mahram* in Arabic

cultures. For example, in the Minangkabau[9] ethnic group, migration is a compulsory tradition for young male adults (Murad, 1980; Naim, 1979). The Bugis ethnic group is well known for producing good sailors and is also known for forcing its member to out-migrate from their community (Lineton, 1975). Meanwhile, the poverty level in a community may lead people to look for a better life in other places; hence, this has a positive correlation to migration decision. In terms of relative deprivation, people who are below a certain threshold of poverty distribution have a higher probability of migrating compared to people who are above that level. However, those who are too far from that threshold might not be able to finance their migration.

In addition to the factors that have been mentioned above, income (which can also be represented by expenditure) is also believed to be one of the most important determinants of migration decision (Stark et al., 1991; McKenzie and Rapoport, 2007; Giulietti et al., 2014; Kaluzny, 1975; Pedersen et al., 2008; Davis et al., 2002). Sufficient income is necessary to finance the costs of migration, which may include transportation cost, settlement cost, housing in the migration destination, etc. People who have a very low level of income would evidently be unable to finance these costs. On the other hand, although people who have very high income would be able to pay migration costs, they may find there is a high opportunity cost to migration. They may feel comfortably settled in their home community and economically sufficient in their conditions. This reduces the likelihood of job-related migration. Therefore, those who migrate are more likely those whose income are in the middle of income distribution (Stark et al., 1991; Chiquiar and Hanson, 2005; Stark, 2006; Zhao, 1999; Bartel, 1979).

The use of income as one of the push factors of migration has given rise to potential threats, about which there have been a growing number of recent studies. The potential threats include the lumpiness of income (particularly for informal sector workers), its ability to show people's socio-economic condition due to its flow-data characteristics, technical issues in collecting income data, etc. (Moore et al., 2000).

In terms of survey responses, participants may not accurately answer questions that are related to numbers or monetary values. An example of such a question is "How much was your income or expenditure last year?". The probability is that respondents will not be able to remember how much money they made in the previous year because they do not work in formal sectors and no valid payroll receipt is given each time they are paid. Another possibility is that respondents may be paid on an irregular basis, which is also often the case for those who work in informal sectors. For example, a fisherman may get paid depending on how much fish he catches and sells in the

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[9] Minangkabau is indigenous ethnic group in West Sumatra Province in Indonesia

market. Since the number of fish he can catch in a day may vary depending on weather, fluctuations in the price of fish in the market, and other circumstances, it is less likely that he would be able to precisely answer questions relating to income. In this case, respondents would approximate their answers to the best of their recollection. Since the enumerators could not confirm those answers, this might lead to inaccurate data. If we take the abovementioned issues into account, the use of monetary values of income or expenditure may be problematic. Formal-sector workers are no exception, especially those who have changed their jobs within the survey period. Different jobs might provide different payment schemes and rates. Hence, their income distribution may not be as smooth as expected. It should also be noted that respondents might have multiple sources of income, such as saving interest, bonuses, rents, or profit sharing from equity participation. Respondents may not precisely remember those other incomes, which will lead to even further biases in the analysis. Estimations would be undervalued if respondents did not provide information about these incomes in their answers.

Regarding the aforementioned potential threats, some studies have proposed assets as an alternative measurement of income and as an important aspect in understanding the distribution of well-being. In developing countries, assets that households have accumulated are a good indicator of their long-term economic status (Caner and Wolff, 2004; Sherraden, 1991). This method is also expected to produce less bias than might be the case with income or expenditure measurement (McKenzie, 2005). Therefore, rather than using approximation in income and expenditure, the use of dichotomous assets as ownership indicators may present less bias. Enumerators could easily confirm whether a household has a house, television, vehicle, or other tangible assets. If the monetary value of assets is required, it is relatively convenient for enumerators to verify the value of assets being listed by the respondents with the book value of that particular asset in the market. It is also time efficient for enumerators to collect information on asset ownership compared to requesting respondents to recall and approximate their previous incomes or expenditures (McKenzie, 2005).

2.3 Data and Descriptive Statistics

2.3.1 Data

The Family Life Survey (IFLS) is the main source of data for this study. It is a longitudinal survey in Indonesia that was collected by RAND. The sample is representative of about 83% of the Indonesian population and contains over 30,000 individuals living in 13 of the 27 provinces in the country.

To date, there have been four waves of IFLS. The first wave was conducted in 1993 and covered more than seven thousand households. A random sampling scheme was applied in this wave in order to push the cost. Hence, the interviews were conducted only with the heads of households and his/her spouses, two randomly selected children, one elder member of the family aged fifty or older, and another randomly selected remaining member aged between 15 and 49.

All members of the household were interviewed in the second, third, and fourth waves of IFLS. Household members who have moved from their previous household and who were interviewed in the previous wave, or were born in 1968 or earlier, will be tracked in the subsequent wave, as long as they move to an enumeration area.

In the last three waves, there will be cases in which a member of a household has moved from his/her initial household and generated a new household. In this case, all of his/her new household members will also be interviewed in the subsequent wave. For example, when a child, who was previously interviewed in Wave Two, gets married and moves out from his/her parents' house, he/she will be assigned a new household identification number in Wave Three. Hence, his/her spouse, together with their children, will be interviewed in Wave Three.

The latest IFLS data consist of two main levels of observation; household and community levels. The household level questionnaires are arranged into five books. Book One is addressed to the head of household and on the household level. This book covers the household's Expenditures, focusing on the quantities and purchase prices of several staple items, and Knowledge of Health Facilities, i.e. whether the respondent knows about the availability of various types of public and private health services in his/her community. The head of the household also answers Book Two, which contains the household's farm and non-farm business, non-business assets, and non-labour income. This information will then be confirmed by Book Three A, which contains similar questions and is answered by household members aged 15 or older. Household members' insurance coverage, health conditions, use of inpatient and outpatient care, and participation in community development activities are addressed in Book Three B, while Book Four covers histories on marriage, births, pregnancy outcomes and health-related behaviour during pregnancy and childbirth, infant feeding practice, and contraceptive use. This book is obviously addressed to women who have married and who are aged between 14 and 49 years. Book Five contains questions related to children's educational history, morbidities, self-treatment, and inpatient and outpatient visits. This book is addressed to children below 15 years of age. The last book is the control book, or Book K. This book contains information about household rosters, and household interview histories.

The community level questions are also organised into several books. These books focus on community socio-economic conditions such as poverty rate, norms, village budget, public participation, consumption goods prices at the market, etc. They also address the availability of health services such as community health centres, private practices, midwives, and educational institutions such as primary schools, secondary schools, etc. These books are mainly answered by the heads of related institutions. The questionnaire on socio-economics is completed by the head of the village; the community health centre questionnaire is completed by the head of the community health centre; the primary school questionnaire is completed by the headmaster of the school, etc.

There have been ample studies related to socio-economics utilising IFLS as the main source. Some recent studies in labour economics have been conducted by (Cameron and Cobb-Clark, 2002; Chen, 2009; Deb and Seck, 2009). However, studies on migration economics are still limited.

This study utilises Wave Three, which was conducted in 2000, and Wave Four, which was conducted in 2007. Following the work of (Giulietti et al., 2014) in constructing a panel dataset, all households with no migration experience were selected in Wave Three. Their identification numbers were then tracked in Wave Four to determine whether there has been at least one job-related migration. Households with job-related migrants will be classified as migrant households, while others will be classified as non-migrant households. It should be noted that there are permanent and seasonal migration classifications. However, since we will only select the first migration, different types of migration could be negligible. Other covariates are observed in Wave Three.

The household asset information that will be used in this study can be found in the HR section of Book Two in Wave Three. Other socio-economic conditions that will be used as control variables will be obtained from both household questionnaires and community questionnaires.

2.3.2 Descriptive Statistics

Between Wave Three and Wave Four, the majority of our observed household members remained in their place of origin. Only approximately twenty percent of households contained at least one first-time migrant (Table 2.1). The asset index for all measurements is higher among non-migrant households with relatively similar standard deviation. From this, we can preliminarily conclude that migrant households own fewer assets than non-migrant households, although the distance to financial institutions is likely to be further in communities of non-migrant households. *Siskamling*[10]

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[10] *Siskamling* is a neighbourhood-watch program in Indonesia. This program will be elaborated in the latter part.

is more often conducted in communities where non-migrant households reside, although communities of migrant households are relatively richer than those where non-migrant households reside.

Table 2.1 Descriptive Statistics by Migrant and Non-Migrant Household

	Non-Migrant Household				Migrant Household				t-test[a]
	Freq.	(%)	Mean	Std. Dev.	Freq.	(%)	Mean	Std. Dev.	
Number of Households	6,625	80.72			1,582	19.28			
Asset Index - Total Assets			0.053	1.340			0.031	1.333	0.5810
Asset Index - Fixed Assets			0.042	1.249			0.009	1.294	0.9223
Asset Index - Liquid Assets			0.034	1.052			-0.001	1.043	1.2083
Financial Inst. Available	1,661	25.07			351	22.19			2.3968**
Financial Inst. Distance			2.723	17.034			2.470	15.949	0.5387
Siskamling Available	4,441	67.03			922	58.28			6.5900***
Comm. Average Income per Capita			305,054	191,470			318,997	201,480	2.5759***
Household Heads' Education			6.842	4.705			7.245	4.849	2.9586***
Household Heads is Male	5,530	83.51			1,299	82.11			1.3377
Household Heads' Age									
Less than 20 yo.	182	2.75			61	3.86			2.3348**
20-29 yo.	966	14.59			268	16.94			2.3525**
30-39 yo.	1,793	27.08			321	20.29			5.5540***
40-49 yo.	1,624	24.52			409	25.85			1.1000
50-59 yo.	1,020	15.40			283	17.89			2.4306**
Number of Children in the HH			2.206	1.676			2.418	1.951	4.3712***
Households' Dependency Ratio			1.602	1.373			1.443	1.397	4.0218***

* *p*<0.1; ** *p*<0.05; *** *p*<0.01

Source: Author's calculation using IFLS

Note: [a] t-test to measure the difference between non-migrant and migrant household indicators, the values shown above are the t-value

The percentage of male household heads outnumbered that of female household heads in both groups. On the other hand, most of the heads of migrant households were aged 40 to 49, slightly older than those of non-migrant households, who were aged 30 to 39 years old. One reason for this may be that with a relatively young household head, the household members are more likely to be very young, hence reducing the probability of migration. Nevertheless, the number of children and the dependency ratio of migrant households are higher than those of non-migrant households. These figures are consistent with prior studies mentioned in the previous section.

2.4 Theoretical Foundation

The theoretical background of this chapter lies on two sets of theory. The first set of theory grows from the famous discussion of the impact of income to migration by (Stark et al., 1991; Chiquiar and Hanson, 2005), while the second set of theory is based on the recent literatures that discuss the potential threat of using income in explaining socio-economic conditions. They have shown in their study that migration is costly. Migrants need to cover many incurring costs to migrate from an origin country to another destination, such as the cost of travel, cost of settlement, cost to cover expenditures for those members left behind during the first days of migration, etc. Therefore, a proper level of income is required to cover these costs. In their studies, they found the impact of job-related migration is in an inverted-U curve[11]. This curve shows that lower income people will not be able to cover those costs of migration, therefore their migration probability is low. This condition is rather straightforward. On the other hand, higher income people have also a low probability to migrate. For this type of person, their current jobs are already sufficient, which lowers their intention to find other higher-paying jobs. For them, the opportunity costs of finding another job outside their origins is high. Therefore, migration is likely for those who are in the middle of the income distribution. These are the people who have options for higher-paying jobs in other locations and are able to pay for the incurring costs of migration.

The second set of theories lies on the discussion about potential problems in using income as a determinant of socio economic conditions, particularly for economies with high proportions of informal sector workers as discussed by (Moore et al., 2000). Several studies such as (Caner and Wolff, 2004; McKenzie, 2005) addressed these potential problems by proposing household assets as an alternative to income in determining socio-economic conditions. One example of an income-

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[11] Some subsequent studies using data from different countries found a positive relationship between income and migration decision.

induced problem that can be addressed by using household assets is as follows. Informal workers who do not receive regular and fixed payments may not be able to respond properly to the income-related questions in the survey, while it is easier for them and the survey enumerator to confirm their possession of one particular asset, e.g. houses, vehicles, or jewellery. In addition to that, cash from an income can be used immediately to pay expenditures and migration costs, while household assets are not easily sold and be used to cover the migration costs. This reflects that unlike income that has a flow-data characteristic, household assets have a stock-data characteristic. Being stock data, household assets have less fluctuation and are able to show a longer-term condition.

From this assumption, household assets can also be used as an indicator of migration. People who purchased more assets would accumulate assets in their origins. They may purchase occupied or unoccupied houses, decorated with complete appliances and furniture, vehicles, etc. These assets are immovable and need to be looked after when the owners are away, particularly for a long period of time. This will hinder high assets-accumulating people to migrate out from their origins. On the other hand, purchasing and accumulating tangible and immovable assets in a location reflects an expectation of one to stay and live in that location for a long period of time. Therefore, a negative relationship between household assets and migration decision is expected.

2.5 Methodology

2.5.1 Asset Index

Considering the households' asset ownership indicators available in existing surveys, we may need to construct an asset index. (Filmer and Pritchett, 2001) used the Principle Components Analysis (PCA) to construct an aggregation of multiple binary asset ownership indicators into a single dimension. Using data from Indian NFHS 1992 to 1993 and DHS data, they constructed multiple binary indicators of households' asset ownership, whereby 0 is assigned if the household does not have one particular asset and 1 is assigned otherwise. This information is then compiled into one weighted index, through which they could measure all households in their observation consistently. Index numbers produced from the PCA method are believed to be suitable in predicting long-term value rather than fluctuation in current conditions. The same method was also used in studies conducted by (Sahn and Stifel, 2003; McKenzie, 2005; Moser and Felton, 2007; Houweling et al., 2003). While (Nobles et al., 2013) used the same method using IFLS as their main source of data. The PCA method would be relevant to our objective as we would like to analyse the kind of households that migrate, based on their asset ownership.

According to (Filmer and Pritchett, 2001), the first principal component of a set of variable is the most suitable representation of all information that is common to all variables. The construction of the index is as follow. Let set a^*_{1j} to a^*_{Nj} represent the set of N type of assets owned by household j. We start the principal component by specifying each variable (let asset 1) that has been normalised by its mean a^*_1 and standard deviation s^*_1. Hence the normalised term for asset 1 owned by household j is $\frac{(a^*_{1j} - a^*_1)}{s^*_1}$. Let As are the underlying component for each household j and vs are the coefficient on each component for each variable, we can express the selected variables as follow:

$$a_{1j} = v_{11} \times A_{1j} + v_{12} \times A_{2j} + \cdots + v_{1N} \times A_{Nj}$$

$$\cdots$$

$$a_{Nj} = v_{N1} \times A_{1j} + v_{N2} \times A_{2j} + \cdots + v_{NN} \times A_{Nj}$$

The scoring factors from the model are perceived by inverting the above equation. This step will produce a set if estimates for every principal components, such that:

$$A_{1j} = f_{11} \times a_{1j} + f_{12} \times a_{2j} + \cdots + f_{1N} \times a_{Nj}$$

$$\cdots$$

$$A_{Nj} = f_{N1} \times a_{1j} + f_{N2} \times a_{2j} + \cdots + f_{NN} \times a_{Nj}$$

Hence the index for each household based on the first principal component in terms of initial variables is:

$$A_{1j} = f_{11} \times \frac{(a^*_{1j} - a^*_1)}{s^*_1} + \cdots + f_{1N} \times \frac{(a^*_{Nj} - a^*_N)}{s^*_N}$$

We adapt the studies of (McKenzie, 2005; Nobles et al., 2013) in constructing three different asset indices based on their characteristics. These indices include all assets, both fixed and liquid. We will run three different regressions with each index being the variable of interest to show that household assets are robust in explaining the migration decision. The first index covers the households' assets ownership indicator for all assets. The second and third asset indices are the fraction of the first index that counts only fixed assets and liquid assets, respectively (Table 2.2). After the indices have been obtained, we may want to implement PCA post-estimation measurement (Kaiser, 1974). We expect the Kaiser-Meyer-Olkin measure of sampling adequacy score to be at least 0.5 in order to be considered a good index number.

Table 2.2 Assets Ownership Indicators to Construct Asset Indices by PCA

PCA – Total Assets	PCA – Fixed Assets	PCA – Liquid Assets
a) House occupied by the household	a) House occupied by the household	a) Savings, certificate of deposit, or stocks
b) Other house or building	b) Other house or building	b) Receivables
c) Non-agricultural land	c) Non-agricultural land	c) Jewellery
d) Livestock, poultry, or fish pond	d) Livestock, poultry, or fish pond	
e) Vehicles	e) Vehicles	
f) Household appliances	f) Household appliances	
g) Savings, certificate of deposit, or stocks	g) Household furniture and utensils	
h) Receivables		
i) Jewellery		
j) Household furniture and utensils		

Note: List of household assets that are available in IFLS

2.5.2 Estimation Equations

The dependent variable in this study is the migration decision, which is measured by two variables. The first dependent variable is the number of migrants in the household, which is a continuous variable, whilst the second dependent variable is whether there is at least one migrant in the household. Hence, it is a dichotomous variable, where 1 is assigned to households comprising of at least one migrant and 0 otherwise.

Our variable of interest is household assets, which are measured by three variables. All three variables are the index numbers that are constructed using the PCA method from household assets ownership dichotomous indicators. The first variable measures households' total assets index; the second one measures households' fixed assets index; and the third measures households' liquid assets index. As discussed in the previous section, we use two instruments in the benchmark estimation. The first instrument is the interaction between the availability of financial institutions in the community and their furthest distance from the community centre. The second instrument is the availability of *Siskamling* in the community. We control for the heads of households' characteristics, households' characteristics, and community characteristics. We restrict the observation to migrants aged 15 to 50 so that migrants who were 50 years old in Wave

Three are still eligible for work, or still under pension age[12] by Wave Four. We also want to focus on migration exclusively for job-related reasons.

With those aforementioned specifications, our benchmark equation for this paper is as follows. First-stage regression:

$$asset\ index_{ht} = \gamma_0 + \gamma_1 fin\_institution_{ct} + \gamma_2 siskamling_{ct} + v_{ht} \tag{2.1}$$

Where:

$asset\_index_{ht}$: Household asset index in time t

$fin\_institution_{ct}$: Average distance from community centre to financial institution in time t

$siskamling_{ct}$: The availability of *siskamling* in the community in time t

And the second-stage regression:

$$migrant_{ht+1} = \beta_0 + \beta_1 \widehat{asset\ index}_{ht} + (X_{ht})'\delta + (X_{ct})'\delta + \varepsilon_{ht} \tag{2.2}$$

Where:

$migrant_{ht+1}$: Households' migration status in time t+1

$asset\_index_{ht}$: Estimated household asset index in time t

X_{ht}; X_{ct} : Control variables on household and community level

Note that by using our benchmark estimation, we perform two regressions; each regression uses one form of measurement of migration decision, i.e. continuous and binary variables. Hence, a linear probability model will fit the binary variable. Endogeneity test and over-identification test[13] will also be shown in the benchmark results.

In addition to our benchmark results, this paper will also provide some robustness tests. These tests cover:

a) Using an alternative instrument on the first-stage regression.

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[12] Retirement age for civil servants in Indonesia is 56, according to the article 3 subsection 2, Government's Regulation No. 32 Year 1979. This regulation was amended on 2008 and 2014, however, these amendments are not relevant to our study.

[13] Endogeneity test aims to confirm that the endogenous variable is truly endogenous. While over-identification test aims to confirm that the instruments are sufficiently explain the endogenous variable.

b) Using different asset measurement. We will use the proportion of monetary value of fixed assets to the monetary value of total assets.

c) Lowering the observation from household level to individual level. For this step, control variables that were initially measuring household heads' characteristics will be transformed into individual characteristics. While the dependent variable is now in binary form (1 if the household member is migrant and 0 otherwise), LPM will be relevant for this step. Hence, the reduced form equation will be:

$$migrant_{it+1} = \eta_0 + \eta_1 \widehat{asset\,index}_{ht} + (X_{it})'\eta + (X_{ht})'\eta + (X_{ct})'\eta + \omega_{it} \qquad (2.3)$$

Where:

$migrant_{it+1}$: Individuals' migration status in time t+1

$asset\_index_{ht}$: Estimated household asset index in time t

$X_{it}; X_{ht}; X_{ct}$: Control variables on individual, household, and community level

2.5.3 Instrumental Variable Strategy

Using household assets as the main regressor may promote the problem of endogeneity. The first cause of this problem is the reverse causality between household assets and migration decisions. Wealthier households would be better able to finance their migration; hence, household assets might significantly affect the migration decision. However, migrants may have better access to sources of income; hence, they could accumulate more assets than non-migrants. In this case, we would also expect that the migration decision significantly affects household assets.

Unobservable individual effects may also be problematic and may cause endogeneity problems (Hausman and Taylor, 1981; Gardner, 1998; Duncan et al., 2004). These may eventually be correlated with other individual specifications, which may cause further biases. In our case, individual preferences regarding asset accumulation may not be captured. For example, some people who are risk averse tend to purchase more fixed assets, which have a lower yield than liquid assets such as stocks or bonds. This eventually may be correlated to other individual or household level estimators that either overestimate or underestimate the parameters.

To address the first cause, we limit our observation only to those households who had no migration experience at all at the time t. Then we observe the existence of migrants in the same households at the time t+1. We will then construct the number of migrants in the household variable as a continuous variable and the migrant vs. non-migrant household variable as a binary

variable. Each of these variables will be used as the dependent variable for two different regressions. Thus, we eliminate the possibility of reverse causality bias.

An instrumental variable is an appropriate solution to overcome the endogeneity problem that emerged from the second cause. (Card, 1993) suggested that we should find good instruments that meet the exclusion restriction assumption which determines the instruments to be a good estimator for the endogenous variable but having a low correlation to the dependent variable. In our case, we need to find instruments that accurately estimate the household assets variable but with a low correlation to the number of migrants in the household (or migrant vs. non-migrant household).

Asset ownership may have a high correlation to the availability of financial institutions. Financial institutions enable people to save part of their income in savings or time deposits. People can also access a mortgage to buy their property or a vehicle through instalment methods that are provided by many financial institutions. *Kredit Pemilikan Rumah* (KPR) and *Kredit Kendaraan Bermotor* (KKB) are among the most popular ways to purchase houses and vehicles in Indonesia (Hoek-Smit, 2005) and (Struyk, Hoffman, & Katsura, 1990). The administration requirements limit financial institutions to disburse loan only to the registered residents of in their village/district. While migrant in IFLS are those who moved-out from their origins for at least six months. They have to update their residency status to their destination. Therefore, we may assume that a migrant member in the household are not able to access those financial services from financial institutions in the origin.

We cannot include people who get loans for business activities from those financial institutions. Such loans may be negatively correlated to their intention to migrate; specifically job-related migration, since they could run their business in their place of origin. This would violate the exclusion restriction. To overcome this problem, we limit our observations to those financial institutions that do not provide business loans.

We should also consider the ease of access to our model. Hence, following the work of (Lee and Marlowe, 2003), we implement the furthest distance of financial institutions to the community centre. By using this information, we can control the ease of access to the financial institutions for the customers. We may need to apply interaction between this distance variable and the availability of financial information, as explained earlier, to eliminate the missing distance data because of the unavailability of financial institutions in certain communities.

Another potential instrument that we could use is crime condition. (Cobb-Clark and Hildebrand, 2006) studied the relationship between asset holdings and crime condition. Unlike

burglaries, armed robberies do not occur very frequently in Indonesia. Hence, people who live in an area with a higher crime rate may presumably tend to purchase fewer household appliances or other durable goods, since those goods are the main targets for burglars. There is a common community participation activity that may prevent burglaries. This activity is called *Siskamling*, which is basically a neighbourhood watch programme. In this activity, each male head of a household takes shifts to stay awake and, together with official security guards, patrols through the entire neighbourhood at night. This activity aims to reduce the number of burglaries, which usually occur at night. It is hypothesised that where *Siskamling* exists in a community, households living in that community would feel safer to accumulate more assets; hence, there will be a positive relationship with household assets. On the other hand, it is also expected that the correlation between this program and the decision to migrate is relatively low. In addition to that, there is also information in the dataset about the village heads' self-assessment regarding the crime condition in their village. The assessment includes if the crime condition increased or decreased last year. We use this measurement as a subsequent robustness check.

2.6 Quantitative Findings

2.6.1 Household Assets and Migration

The first-stage regression for the benchmark estimation using complete control variables produces a relatively good result with a consistent significance and direction for both instruments, which can be seen in the lower part of Table 2.3. Financial institution interaction variable negatively and significantly affects household assets[14]. It is relevant to our hypothesis, since this variable measure average distance of available financial institution to the community centre, hence, the further the financial institution the higher constraint for the households to get financial services. This eventually reduces households' assets. The siskamling variable also significantly affects household assets in a positive direction. This impact is also similar to our hypothesis where the availability of Siskamling is an incentive for households to purchase more assets.

It negatively and significantly affects the number of migrants in a household. As has been discussed previously, some of the literature suggested that an assets index can adequately represent proxy long-term economic status or living standards. We would not expect those already enjoying a good standard of living to seek another source of income in another location by undergoing migration. On the other hand, we would expect that those who have invested considerably in durable goods (e.g. housing, household appliances, etc.) would have higher

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[14] For the benchmark estimation, household assets are measured by first principal of total household assets.

opportunity costs for migration compared to those who have not. Hence, the negative relationship between these indicators is compatible.

Column two to five of Table 2.3 show the benchmark Instrumental Variable regressions, where column two employs only the characteristics of household heads. Column three shows the household characteristics are employed as control variables. The direction and significance of household assets to the number of migrants in the household remains the same but with a slightly larger magnitude. Column four includes household heads' characteristics, households' characteristics, and the community's characteristics as control variables. We also obtain the same direction and significance and relatively the same level of magnitude. Column five employs complete control variables and shows the highest magnitude among other combinations of control variables, in addition to a similar direction and significance.

In addition to the variable of interest above, household heads' education levels consistently affect the number of migrants in the household in a positive direction and at a significance level. More educated heads of households would have a greater degree of openness to letting his/her household member search for potential jobs outside their community.

The first three cohorts of household heads' ages also show consistent results. The relationship is negative and the magnitude decreases from the first cohort to the next. As discussed in the previous section, younger household heads would have even younger household members; hence, they do not yet have the ability to migrate. As the household heads get older, the household members enter working age and the number of migrants in the household may increase. In addition, the number of children also has a positive and significant result, which is straightforward and confirms the findings of previous studies.

F-statistics of those combinations of regression show significance under the level of significance at one percent. Using an endogeneity test after each regression, we conclude that household assets are endogenous. The tests also conclude that all instruments are valid, i.e. they are uncorrelated with the number of migrants in the household (Baum et al., 2007). To support those validity tests, we also include the OLS estimation in column one. As anticipated, this regression does not produce such good estimators as IVs.

Table 2.3 Instrumental Variable of the Relationship between Number of Migrant in the Household and Household Assets (PCA of Total Assets)

Number of Migrant in HH	OLS	IV	IV	IV	IV
	(1)	(2)	(3)	(4)	(5)
Asset Index – Total Assets	-0.002	-0.282	-0.395	-0.296	-0.446
	(0.61)	(4.12)***	(3.77)***	(4.28)***	(3.70)***
HH head's education	0.002	0.023	0.033	0.023	0.037
	(1.68)*	(4.29)***	(3.87)***	(4.29)***	(3.77)***
HH head's gender	-0.023	0.016	0.015	0.024	0.022
	(1.69)*	(0.76)	(0.61)	(1.09)	(0.80)
HH head's age					
20 – 29 years old	0.014	-0.514	-0.643	-0.528	-0.679
	(0.35)	(3.72)***	(3.32)***	(3.84)***	(3.25)***
30 – 39 years old	0.034	-0.186	-0.194	-0.178	-0.177
	(1.86)*	(3.35)***	(2.84)***	(3.42)***	(2.68)***
40 – 49 years old	-0.025	-0.081	-0.068	-0.071	-0.055
	(1.70)*	(3.44)***	(2.42)**	(3.06)***	(1.90)*
50 – 59 years old	-0.027	0.037	0.016	0.045	0.024
	(1.91)*	(1.57)	(0.59)	(1.81)*	(0.80)
> 60 years old	-0.015	0.061	0.034	0.064	0.033
	(0.93)	(2.29)**	(1.12)	(2.35)**	(1.02)
HH head's religion	Yes	Yes	Yes	Yes	Yes
HH head's race	Yes	Yes	Yes	Yes	Yes

Number of Migrant in HH	OLS	IV	IV	IV	IV
	(1)	(2)	(3)	(4)	(5)
HH number of children	0.016		0.032		0.044
	(4.92)***		(4.46)***		(4.54)***
HH dependency ratio	-0.012		-0.010		-0.008
	(3.67)***		(1.75)*		(1.30)
HH urban/rural	0.021			0.031	0.031
	(1.43)			(1.80)*	(1.45)
HH location	Yes			Yes	Yes
Financial Inst.		-0.001	-0.001	-0.001	-0.002
		(-0.43)*	(-0.41)*	(-0.46)*	(-0.48)*
Siskamling		0.158	0.169	0.243	0.377
		(0.230)***	(4.37)***	(6.41)***	(10.38)**
F Statistics[a]	142.65	11.606	8.679	10.019	5.395
Hansen J statistic[b]		0.143	0.707	0.002	0.004
Endogeneity test[c]		16.740***	23.506***	19.883***	27.595***
Num. Obs.	7,322	7,322	7,322	7,322	7,322

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Note: The values in the parenthesis show the t-values

[a] Kleibergen-Paap rk Wald F statistic for robust standard error

[b] Test for overidentification of the instruments

[c] Endogeneity test for the instruments as a tool in ivreg2 in STATA

Table 2.4 shows the regression results using different measurements of asset indices; i.e. total assets, fixed assets, and liquid assets. Those asset indices produce consistent direction and significance levels. Total asset and fixed asset indices produce relatively similar magnitude. On the other hand, the magnitude is bigger for the liquid asset index. The endogeneity cases on these indices are also confirmed. We can further confirm that the distance to the financial institutions and *Siskamling* are valid instruments for these indices.

Those asset indices produce consistent direction and significance level as regressors for the number of migrant in the households. Total assets and fixed assets indices produce relatively similar magnitude. On the other hand, the magnitude is bigger for the liquid asset index. On the control variables, household heads' education and number of children in the household are the consistent control variables. These findings allow us to conclude that using different asset index measurements, the model robust in affecting migration decision. Using endogeneity test after each regression, we conclude that household assets are endogenous. The tests also conclude that all instruments are valid. These findings allow us to conclude that by using different asset index measurements, the model is robust in affecting migration decisions.

These econometric findings are useful to predict the probability of having migrants in a household by observing the households' assets. The consistent negative value of household assets indices shows that when households invest more in assets, the opportunity cost of migration is greater. On average, an increase of one unit of asset index may lead to a decrease in the probability of having one additional migrant in the household by less than 0.5 times.

Table 2.4 Instrumental Variable of the Relationship between Number of Migrant in the Household and Household Assets (PCA of All Assets Measurements)

Number of Migrant in HH	Total Assets	Fixed Assets	Liquid Assets
	(1)	(2)	(3)
Asset Index	-0.446	-0.442	-0.652
	(3.70)***	(3.52)**	(2.31)*
HH head's education	0.037	0.018	0.026
	(3.77)***	(3.44)**	(2.37)*
HH head's gender	0.022	0.063	-0.125
	(0.80)	(1.55)	(2.62)**
HH head's age	Yes	Yes	Yes
HH head's religion	Yes	Yes	Yes
HH head's race	Yes	Yes	Yes
HH number of children	0.044	0.076	0.036
	(4.54)***	(5.78)**	(4.78)**
HH dependency ratio	-0.008	-0.010	-0.019
	(1.30)	(1.38)	(2.42)*
HH urban/rural	0.031	-0.024	-0.010
	(1.45)	(1.00)	(0.34)
HH location	Yes	Yes	Yes
Financial Inst.	-0.002	-0.001	-0.001
	(-0.48)*	(-1.51)*	(-1.73)*
Siskamling	0.377	0.159	0.067
	(10.38)**	(4.54)***	(2.05)**
F Statistics[a]	5.395	10.982	3.906
Hansen J statistic[b]	0.004	0.397	2.996
Endogeneity test[c]	27.595**	26.996**	20.110**

$* p<0.1; ** p<0.05; *** p<0.01$

Note: The values in the parenthesis show the t-values

[a] Kleibergen-Paap rk Wald F statistic for robust standard error

[b] Test for overidentification of the instruments

[c] Endogeneity test for the instruments as a tool in ivreg2 in STATA

Furthermore, rather than absolute measurements above, we may also be interested in households' relative positions in terms of assets to their risk of migration. In order to do so, we can categorise households into quintiles based on their asset index score. To simplify, we use the benchmark result that uses total assets index and employ all control variables. After estimation, we

predict the number of migrants in the household and plot the predicted number along with the actual index number (Table 2.5).

Households that are in the bottom 20% of assets index distribution have a relatively steep fitted value line, which means that the decrease of the index number will be less sensitive than the increase of expected numbers of migrants in the household. Their predicted value scatters between 0.5 and 1, meaning that it is more likely for them to have at least one migrant in their household. On the other hand, for the households in the top 20% of asset index distribution, it requires a much greater decrease in asset index to increase a particular number of migrants in the household. Their predicted value scatters close to 0, meaning that these households are not likely to have migrants in their households.

Similar to the conclusions of (Stark et al., 1991), people who are relatively poor in terms of assets have more incentive to increase their wellbeing by seeking opportunities elsewhere. Hence, they are more exposed to the probability of migration. These people may not have assets such as houses and appliances; i.e. they rent their currently occupied houses. This would allow them to more easily migrate to other places compared to those who own their occupied houses. Nonetheless, those who own the house may need to consider selling it or looking for someone to look after or rent their house. These people are representative of those among the top 20% of assets distribution. Their economic statuses are already above average and they are sufficiently wealthy. They may have houses with sufficient appliances and utensils, fishponds, and other assets. Consequently, their opportunity cost for migrating increases and the probability of their having migrants in their household is lower.

In terms of frequencies, almost 70% of households in the top 20% of assets distribution are predicted to have no migrant at all. In contrast, over 99% of households in the bottom 20% of assets distributions are predicted to have at least one migrant in their household.

Table 2.5 Predicted Number of Migrant in the Household Based on Household Assets Distribution

| HH Assets Quintile | Predicted Number of Migrant | | | |
	No Migrant	One Migrant	Two or More Migrants	Total
Lowest 20%	4	1,345	272	1,621
21-40%	27	1,443	147	1,617
41-60%	119	1,370	109	1,598
61-80%	493	1,003	117	1,613
Highest 20%	1,121	395	94	1,610
Total	1,764	5,556	739	8,059

Source: Author's calculation using IFLS

Note: The values shown above is the predicted number of migrants in the household using the model that has been developed above

2.6.2 Robustness Tests

Using the Linear Probability Model, we exploit the robustness test using the second measurement of the dependent variable. Applying a binary dependent variable (0 for non-migrant household and 1 for migrant household) rather than a continuous one, we obtain similar results. As can be seen in lower part of Table 2.6, the first-stage regression produces consistent results, where the financial institutions distance has significant negative impact to household assets, while the availability of *Siskamling* in the community significantly support households to accumulate assets.

On the second-stage regressions, Household assets are still negatively correlated to migration decisions. This relationship is relatively consistent in magnitude and significant for all combinations of control variables (Table 2.6).

Household heads' education, the first three cohorts of the household head's age, number of children, and dependency ratio are the consistent and results control variables. Their magnitudes also resemble the benchmark results. The F-statistics are also under one percent of level of significance. We can also confirm that these models are robust in terms of endogeneity problem and the over-identification of instruments.

Table 2.6 Robustness Test of the Relationship between Migrant vs Non-Migrant Household and Household Assets (PCA of Total Assets)

(Migrant HH = 1)	OLS	IV	IV	IV	IV
	(1)	(2)	(3)	(4)	(5)
Asset Index – Total Assets	-0.003	-0.282	-0.403	-0.296	-0.470
	(0.74)	(4.12)***	(3.76)***	(4.28)***	(3.73)***
HH head's education	0.003	0.023	0.035	0.023	0.039
	(2.05)**	(4.29)***	(4.01)***	(4.29)***	(3.86)***
HH head's gender	-0.034	0.016	-0.001	0.024	0.011
	(2.14)**	(0.76)	(0.05)	(1.09)	(0.37)
HH head's age	Yes	Yes	Yes	Yes	Yes
HH head's religion FE	Yes	Yes	Yes	Yes	Yes
HH head's race FE	Yes	Yes	Yes	Yes	Yes
HH number of children	0.026		0.044		0.056
	(6.83)***		(5.73)***		(5.45)***
HH dependency ratio	-0.018		-0.016		-0.015
	(4.56)***		(2.63)***		(2.17)**
HH urban/rural	0.009			0.017	0.020
	(0.73)			(1.07)	(0.94)
HH location FE	Yes			Yes	Yes
Financial Inst.		-0.002	-0.002	-0.000	-0.000

		(-2.38) **	(-2.30) **	(-0.46) *	(-0.15) *
Siskamling		0.230	0.169	0.243	0.172
		(0.38)***	(4.37)***	(6.41)***	(4.42)***
F Statistics[a]	35.54***	20.404	11.387	20.559	9.777
Hansen J statistic[b]		1.268	2.188	0.105	0.049
Endogeneity test[c]		28.195***	33.200***	32.326***	40.076***

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Note: The values in the parenthesis show the t-values

[a] Kleibergen-Paap rk Wald F statistic for robust standard error

[b] Test for overidentification of the instruments

[c] Endogeneity test for the instruments as a tool in ivreg2 in STATA

Furthermore, it is interesting to exploit the robustness tests by using different measurements of household assets. Rather than using the first principal of PCA, we use the monetary value of household assets as the variable of interest. Since the majority of both migrant and non-migrant households possess fixed assets, we should construct the ratio of monetary value of fixed assets to monetary value of total assets.

Table 2.7 shows the specification mentioned above. Using the same specifications of instruments and control variables as the benchmark estimation, we still found consistent results for the first-stage regression, where there is a consistently negative impact of financial institution distance to household assets accumulation, and also a consistent and positive impact of the availability of *Siskamling* in the community to household assets.

On the second-stage regression, we found that household assets are still negatively correlated to the number of migrants in the household. The significance level and magnitude are also consistent across different combinations of control variables. Other control variables that are consistent and significant are similar to the previous results, as are the F statistics. We also verify that, under this specification, the endogeneity problem does exist and the instruments are valid. The difference in magnitude for asset ratio is relatively higher than that which was found in the PCA measurements.

The rationale behind this is that those who invest more in fixed assets - i.e. purchase occupied house, household appliances and utensils, fishpond, poultry, etc. - may seem to have already settled down in their place of origin. This condition would increase the opportunity cost for migrating and hence reduce the probability of having a migrant in that particular household.

Table 2.7 Instrumental Variable of the Relationship between Number of Migrant in the Household and Household Assets (Fixed Asset Ratio)

Number of Migrant in HH	OLS	IV	IV	IV	IV
	(1)	(2)	(3)	(4)	(5)
Fixed Assets Ratio	-0.029	-1.826	-3.268	-1.655	-2.825
	(1.07)	(3.04)***	(2.61)***	(3.23)***	(2.85)***
HH head's education	0.000	-0.007	-0.011	-0.005	-0.007
	(0.30)	(2.24)**	(2.27)**	(2.22)**	(2.10)**
HH head's gender	-0.026	0.085	0.118	0.071	0.084
	(1.55)	(2.15)**	(1.91)*	(2.12)**	(1.81)*
HH head's age	Yes	Yes	Yes	Yes	Yes
HH head's religion FE	Yes	Yes	Yes	Yes	Yes
HH head's race FE	Yes	Yes	Yes	Yes	Yes
HH number of children	0.023		0.053		0.053
	(5.89)***		(4.06)***		(4.57)***
HH dependency ratio	-0.011		0.011		0.009
	(2.40)**		(1.11)		(0.99)
HH urban/rural	-0.001			-0.013	-0.058
	(0.08)			(0.60)	(2.02)**
HH location FE	Yes			Yes	Yes
Financial Inst.		-0.000	-0.002	-0.000	-0.000

		(-1.01)	(-0.92)*	(-1.73)*	(-1.38)*
Siskamling		0.028	0.017	0.032	0.020
		(4.7)***	(2.99)***	(5.23)***	(3.33)***
F Statistics[a]	81.27***	11.302	4.731	14.775	6.259
Hansen J statistic[b]		0.354	0.523	1.588	1.527
Endogeneity test[c]		29.310***	35.041***	28.560***	32.630***

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Note: The values in the parenthesis show the t-values

[a] Kleibergen-Paap rk Wald F statistic for robust standard error

[b] Test for overidentification of the instruments

[c] Endogeneity test for the instruments as a tool in ivreg2 in STATA

As mentioned in the previous part, we also use crime condition as an alternative instrument to check the robustness of our estimations. Table 2.8 shows the regression results which produce a significant effect on household assets and F-statistics. For the first-stage regression results, a consistent and adverse effect of financial institutions distance to household assets can still be found, as well as a consistent and positive effect of *Siskamling* availability in the community to household assets.

While on the second-stage regression results, It also shows consistent direction and magnitude for all indexed numbers, i.e. column one to column three, and relatively bigger magnitude when we use the assets ratio measurement. This set of instruments is also valid and confirms the existence of the endogeneity problem. These estimations also produce consistent results in the number of children parameters as a control variable. However, we may find inconsistent directions of other control variables.

Table 2.8 Robustness Test of the Relationship between Number of Migrant in the Household and Household Assets with Different Instrument (All Assets Measurements)

Number of Migrant in HH	Total Assets	Fixed Assets	Liquid Assets
	(1)	(2)	(3)
Household Asset	-0.371	-0.430	-0.610
	(3.42)***	(3.51)***	(2.30)**
HH head's education	0.030	0.018	0.024
	(3.46)***	(3.43)***	(2.36)**
HH head's gender	-0.005	0.060	-0.119
	(0.18)	(1.52)	(2.65)***
HH head's age	Yes	Yes	Yes
HH head's religion FE	Yes	Yes	Yes
HH head's race FE	Yes	Yes	Yes
HH number of children	0.059	0.075	0.036
	(6.27)***	(5.81)***	(4.96)***
HH dependency ratio	-0.017	-0.010	-0.019
	(2.46)**	(1.43)	(2.52)**
HH urban/rural	0.030	-0.023	-0.008
	(1.49)	(0.96)	(0.28)
HH location FE	Yes	Yes	Yes
Financial Inst.	-0.000	-0.002	-0.000
	(0.15) *	(1.51)	(1.73)*
Siskamling	0.172	0.159	0.068
	(4.42)***	(4.54)***	(2.05)**
F Statistics[a]	8.730	3.853	6.036
Hansen J statistic[b]	2.273	1.025	3.950
Endogeneity test[c]	23.692***	26.119***	18.186***

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Note: The values in the parenthesis show the t-values

[a] Kleibergen-Paap rk Wald F statistic for robust standard error

[b] Test for overidentification of the instruments

[c] Endogeneity test for the instruments as a tool in ivreg2 in STATA

Furthermore, we would lower the observation level from the household level to the individual level. We use a binary dependent variable, where 1 is assigned to household members who migrated between Wave Three and Wave Four, and 0 is otherwise assigned. Due to the unavailability of individual assets information in IFLS, the variable of interest is still measuring the household assets index at the household level.

We use similar specifications of instruments such as the benchmark estimations and add an individual characteristics control variable in addition to household level controls. From our observations, male migrants dominate the group of migrant household members and most of them were at least in junior high school. Most migrants are in the second cohort of age, and are aged between 20 and 29 years old, followed by the first and third cohorts (Table 2.9). These descriptions differ to a certain extent from the migration schedule in Indonesia that was constructed by (Muhidin, 2002). He also found that most migrants are aged between 20 and 29 years old, but found that this group was followed by those aged between 30 and 39 years old and subsequently those below 20 years of age.

Table 2.9 Descriptive Statistics by Migrant and Non-Migrant Household Member

	Non-Migrant Household Member				Migrant Household Member			
	Freq.	(%)	Mean	Std. Dev.	Freq.	(%)	Mean	Std. Dev.
HH Member	5,861	73.47			2,116	26.53		
Education			8.82	3.87			9.26	3.73
Gender: Male	2,599	44.34			1,430	67.58		
Age								
Less than 20 yo.	1,549	26.43			790	37.33		
20-29 yo.	2,857	48.75			839	39.65		
30-39 yo.	1,146	19.55			369	17.44		
40-49 yo.	287	4.90			111	5.25		
50-59 yo.	22	0.38			7	0.33		

Source: Author's calculation using IFLS Wave 3

Similar to our benchmark results, the first-stage regression produces consistent results. We still find a consistent adverse effect of financial institution distance and a positive effect of the availability of *Siskamling* on the accumulation of household assets. While on the second-stage of regressions, IV regressions on individual level produce a significant negative relationship between household assets and migration decision. The directions are still consistent with significant F-statistics. Supporting the robustness result above, IV regressions using fixed asset ratio also produce consistent and significant results (Table 2.10). It is interesting to see that the OLS regressions in both sections are significant and have the same direction as the IVs. The magnitude, however, is much less than the IVs. Nevertheless, having seen that the endogeneity tests confirm the existence of the endogeneity problem and our over-identification tests assure us that the instruments being used are valid, the IVs would be more appropriate.

Table 2.1 Robustness Test of the Relationship between Number of Migrant in the Household and Household Assets on Individual Level

	OLS (1)	IV (2)	IV (3)	IV (4)	IV (5)
PCA: Total Assets	-0.016	-0.279	-0.737	-0.278	-0.753
	(3.69)***	(4.72)***	(2.70)***	(4.70)***	(2.65)***
Member Controls	Yes	Yes	Yes	Yes	Yes
HH Controls	Yes		Yes		Yes
Comm. Controls	Yes			Yes	Yes
F Statistics[a]	20.23***	27.197	4.434	4.223	27.032
Hansen J statistic		0.731	0.000	0.713	0.004
Endogeneity test		31.890***	33.399***	31.685***	33.373***
Assets Ratio	-0.060	-1.091	-2.240	-1.076	-2.188
	(2.10)**	(5.09)***	(4.15)***	(5.19)***	(4.34)***
Member Controls	Yes	Yes	Yes	Yes	Yes
HH Controls	Yes		Yes		Yes
Comm. Controls	Yes			Yes	Yes
F Statistics[a]	19.60***	55.780	17.966	20.664	59.916
Hansen J statistic[b]		1.810	1.394	1.100	0.548
Endogeneity test[c]		31.300***	30.569***	31.875***	31.949***

$* p<0.1; ** p<0.05; *** p<0.01$

Note: The values in the parenthesis show the t-values

[a] Kleibergen-Paap rk Wald F statistic for robust standard error

[b] Test for overidentification of the instruments

[c] Endogeneity test for the instruments as a tool in ivreg2 in STATA

2.7 Discussions

This study analysed the relationship between household assets and migration decision. Of multiple household assets ownership indicators, we constructed an asset index as a singular measurement of households' assets. The households' asset indices were employed with two instruments to address the endogeneity problem. The first instrument was the interaction between the furthest distances of financial institutions to the community centre and the availability of financial institutions in the community. This variable was observed on the community level. The intuition of this variable is that when the financial institution is far away from the community centre, access to financial services for accumulating assets would be limited, thus reducing households' assets ownership. The second instrument is the availability of Siskamling, which is a neighbourhood watch programme in Indonesia. This variable is measured on the community level. The intuition behind this is that when Siskamling is available in the neighbourhood, residents would feel secure enough to accumulate assets and hence would increase their ownership of assets. Meanwhile, the dependent variable for the benchmark result was a continuous variable that measures the number of migrants in the household who migrated between 2000 and 2007. For this specification, instrumental variable regression would be compatible.

The benchmark had been expected to explain the way in which household assets affect migration decision in absolute values, as well as its relationship to the households' positions in the distribution of assets. The first objective above is answered by the benchmark result, which showed that our two instruments are valid with the expected direction and, in the absence of an income-related variable in the model, household assets well predict the number of migrants in the household in a negative direction. This means that households with more assets may be less likely to decide to send a household member to migrate. Alongside the benchmark specification, we also conducted several robustness tests. Regarding the robustness test using different dependent variables, we used a categorical independent variable to distinguish between migrant and non-migrant households. While the robustness test was employed by modifying the independent variable, we used several measurements of household assets and different combinations of instruments. Meanwhile, we lowered the level of observation from the household level to the individual level. All of these robustness tests produced consistent results and confirmed that household assets negatively affect the migration decision. In addition to the main finding above, we can also confirm that household heads' education, household heads' age, number of children and dependency ratio, as well as some religion, race and location fixed effects, are also significant in affecting the migration decision.

In terms of aggregating various household assets indicators, we found that the first principal of the Principal Component Analysis (PCA) method, as proposed by (McKenzie, 2005; Nobles et al., 2013), performed well in our regressions. However, according to (Kaiser, 1974)), due to the limitation of liquid assets ownership data, the PCA from liquid assets ownership indicators is not considered a good index by which to compare the total assets and fixed assets. Moreover, the ratio between the monetary value of fixed assets and total assets is another asset measurement that produced good results in predicting the migration decision in our case. The intuition of this variable is that people who have invested in fixed assets would have a bigger opportunity cost to migrate, which would eventually reduce their incentive to migrate. On the other hand, those who have a higher proportion in liquid assets could easily move their assets (or portions of their assets) to the destination. This would reduce their opportunity cost of migration.

In terms of relative positions in household assets distribution, we can conclude that different elasticities (represented by the fitted value curve steepness) of household assets to the migration decision exist. Households that hold the least assets in the household assets distribution are more likely to migrate. Recalling that we have concluded that more assets indicates a higher opportunity cost to migrate, households that are highest in terms of assets distribution are the least likely to migrate because migration would cost them dearly. This proposition supports the previous literature which stated that assets are a good proxy for a long-term condition as they show a person's position in one particular distribution in a more stable manner.

However, in common with (McKenzie and Rapoport, 2007) , we were unable to find any robust non-linear relationship. In the inverted U-curve which they found in their study, those who were in the lowest and highest groups in terms of wealth distribution were found to have a lower probability of migrating, while those in the middle of the wealth distribution were found to have a higher probability of migrating.

We found a different pattern when using household assets as the migration determinant from when using income as the migration determinant. Our findings supported the previous literature in concluding that income is a source of finance for migration. Hence, it is expected to positively affect the migration decision. People who have less income would not be able to finance the incurred costs of migration, such as transportation and settlement costs. This eventually reduces the probability of their becoming migrants. After employing non-linear regression, we found that income affects the migration decision in an almost-flat concave relationship, rather than the inverted U-curve proposed by many previous studies. However, this finding is similar to the findings of (Adams Jr., 1993) based on a migration case in rural Egypt.

Since we also found relatively robust results for the effect of household income on the migration decision, one may question which indicator should be used in explaining the migration decision. In the introduction, the threats of using household income as a predictor were discussed; hence, several conditions need to be satisfied. We need to ensure that the income information is exact, not an approximate value. We may also need to confirm that all sources of income have been incorporated in our dataset and all potential seasonal biases and changes are controlled. If those conditions were not met, household income might not correctly estimate the migration decision. Therefore, household assets could be a good alternative solution. We do not propose using both variables in the same regression as this would worsen the performance of the control variables.

The use of household assets in determining migration decisions has not yet been exploited. The results in this chapter allows us to propose the next studies to not only observe the impact of income in determining socio-economic phenomenon, but also to observe the impact of households' assets in explaining the phenomenon. More specifically, we suggest that further studies which handle economics with a high proportion of informal workers to use households' assets in exploiting the socio-economic phenomenon.

The finding of this chapter can be beneficial to policy making activities. In the case that policy makers want to limit out-migration in order to avoid the probability of a drop in labour supply or brain drain in a community, they should limit the accumulation of assets of the households in the community. Learning from our instruments, we can propose two strategies to achieve that.

The first strategy entails the policy maker lowering the accessibility of financial institutions that provide consumption credits (e.g. mortgage, lease, household appliances credit, etc) to households. They can do this by limiting financial institutions from expanding their branch. By not having more branches, the average distance to the financial institutions would not be increased and will be less accessible by households. This eventually would limit the household assets accumulation on the next period. On the other hand, the policy makers can also limit the number of credit services that can be disbursed by financial institutions, since financial institutions require the government's approval in disbursing credits to households. The policy maker can reduce the approval it gives, such that the closer and more accessible financial institutions are no longer able to disburse the consumption credits. This may increase the financial institutions distance, which reflects the reduction of the accessibility of credit. This action may also reduce the households' assets accumulation.

The second strategy is that the policy maker should increase the state of the neighbourhood security level. They can promote the *Siskamling* program to areas where the

program does not initially exist. In the case of the program already existing, they can promote the quality of the program by providing better infrastructures for the male members who have their turn so that more members would participate in the program. Such infrastructures can be an enrichment to the hut in which the members stay during the night, communication infrastructures, etc. In addition to *Siskamling*, introducing a professional security system to a community would also increase the state of security level. This would eventually increase the households' assets accumulation.

2.8 Conclusion

This paper assesses household assets as an alternative indicator for migration decision as opposed to household income. Adapting the instrumental variable strategy and using several indicators of household assets possession in IFLS, e.g. principal component analysis (PCA), we found that household assets significantly affect the migration decision. Nevertheless, the behaviour of household assets indicators is contrary to the behaviour of income in affecting the migration decision. Hence, it is an important aspect in explaining migrants' decisions.

Households with greater asset ownership tend to have a lower incentive for job-related migration. This finding matches arguments found in previous studies as, whereas income is used to finance migration, household assets represent households' long-term socio-economic conditions. By all means, those who have already settled down would prefer to stay in their place of origin. Furthermore, using IFLS data, we found that income positively affects the migration decision. Higher income would be beneficial for potential migrants to finance the incurred costs of migration.

After employing our instruments, we conclude that the households' assets indicator is important in explaining the migration decision. It is a good alternative to using income as a determinant of the migration decision, yet should not be used altogether as this negatively affects the performance of empirical results.

Our benchmark empirical findings contradicted those of (McKenzie and Rapoport, 2007) , who found a positive relationship between migration and wealth by studying international migration using Mexican data. Due to the limitations regarding job-related international migration in IFLS, we could not replicate the study using Indonesian data. Therefore, we recommend that future studies should analyse the effects of households' assets for international migrants. It is also recommended that the next studies use the latest wave of IFLS, which is due to be launched in 2016. It may also be interesting to compare the effect of household assets on migration decisions

in other neighbouring countries, such as Malaysia, since RAND also provides the Malaysian Family

Life Survey (MFLS), or countries with similar economic growth such as Nigeria by using the Nigerian

Family Life Survey.

Chapter 3   Internal Migration Induced Drop-out and Child Employment in Indonesia: A Time-to-Event Approach

3.1 Introduction

Studies related to child labour and children's education are important to eradicate child labour and to promote children's education, as well as to break the intergenerational chain of child labour. Child labour and education have been believed to have an inverse relationship. As poverty is believed to be the main predictor of child labour, working may harm their educational attainment. Children with low educational attainment are highly unlikely to get well-paid jobs when they enter the adult labour market. When they become parents themselves, children from poor families and those who have performed child labour themselves tend to send their own children to work to support them financially. This will eventually lead to a poverty and child employment trap. Moreover, children's productivity in the labour market cannot be expected to be as high as adults'. Therefore, industries that employ children may make a less significant contribution to national development.

There have also been extensive studies investigating the effect of migration on children's education and child employment. The effect of migration on both can be ambivalent. Households with migrants may expect remittances; hence, they would be able to cover their educational costs and stop children from working. On the other hand, a reduction in the adult labour supply in the community may increase the demand for child labour as a substitute. At the same time, a reduction in the adult labour supply may also drive up the average wages, thereby increasing the incentive for children to work.

At some point in their lives, children will work, either during their childhood or after entering adulthood. Although studies about migration, child labour, and children's education are been abundant, it is interesting to investigate the duration of schooling and the duration before children's first employment. The duration model, which is the appropriate method for such analysis, has yet to be widely utilised in migration studies. Fortunately, our dataset allows us to construct the migration, education, and working history. This set-up will be of the utmost importance for the aforementioned model.

Understanding the time-to event-approach model is essential not only to fill the gap to the literature but also for the potential policy-making process. Understanding this method allows the policy makers to understand the dynamics of an event to occur in every period and to take relevant policies to delay or accelerate the event they are willing to occur. In this chapter, it is an agenda for policymakers to delay the occurrence of school drop-out of children. It has been discussed in many literatures that the longer time to stay in education affects higher income in the future. Therefore, it is favourable for policymakers to delay, if not eliminate entirely, the occurrence of school drop-out among children. On the other hand, working may interfere with children's human capital accumulation activities, including school-related activities. It eventually will reduce the potential income and welfare of the children in the future. It is also favourable for a policymaker to delay the occurrence of children to enter employment. To the literature, the gap that we aim to fill will support the previous literature which has discussed migration, child labour, and children's education, particularly those studies without access to longitudinal datasets and researchers who have been unable to construct the event history data set-up. To the best of our knowledge, this is the first study that analyses those three aspects using the time-to-event approach, particularly in Indonesia, as a representative of a middle-income country with relatively high internal migration.

The purpose of this paper is to investigate whether the children from migrant households or those from non-migrant households leave education faster, and also which group starts working earlier. With the influence of different migration environments, our empirical strategy will be grouped into three focuses: (1) children's schooling period, measured by drop-out status; (2) child employment, measured by child working status; and (3) schooling period among working children. After controlling for individual, household, and community characteristics, we will empirically perform discrete-time survival regressions to obtain the hazard rate of each focus mentioned above. At a latter stage, we may reconstruct the dataset in the form of continuous-time survival analyses and perform the continuous-time regressions as robustness tests.

This paper contributes to the previous literature by utilising a longitudinal dataset, which allows us to construct a unique panel dataset for all individuals, from the time they are first exposed to the risk of drop-out and child labour to the time when they actually leave education and/or start working. This set-up allows us to answer the following questions: (1) Who leaves education earlier? (2) Who starts working earlier? And (3) Who drops out faster among child labourers?

The remainder of this study will be structured as follows. Part 2 will describe the recent condition in Indonesia, Part 3 discuss the previous studies related to child employment, child schooling, and migration. A brief discussion of the data and descriptive statistics will be provided in Part 4. Following this, Part 5 elaborates on the theoretical foundation and Part 6 elaborates

quantitative methodology, while Part 7 presents the quantitative findings. Finally, Part 8 discusses the quantitative findings and Part 9 concludes the paper.

3.2 The Case of Indonesia

3.2.1 Migration in Indonesia

Indonesia is a large archipelagic country with five main islands and thousands of smaller islands. It ranks as the fifth most populous country. As a typical middle-income country, Indonesia suffers from an infrastructure development gap between the economic centres and other areas. Rapid economic development in the city centres creates more employment which attracts potential workers to migrate from other areas, particularly the less developed areas. In addition, poverty as the push factor from less developed areas also exists.

Focusing on job-related migration, common internal migration in Indonesia is the rural-urban and urban-urban migration. These types of migration support the pull and push factors mentioned above. Taking an example of Jakarta[15] as the destination, many people from other areas attempt to find not only skilled but also unskilled jobs in Jakarta.

Due to their limited funds, migrants do not always bring all of their household members. Hence, migrants are expected to send remittance to those members of their household remaining in the place of origin, in order to support the household finances. There may not be sufficient remittance data for internal migration in Indonesia. However, Indonesians hold the value that each household member should financially support the household as much as he can. Hence, even though the migrant may not be the breadwinner, we may assume that the household still receives financial support.

Such support may be used to finance the household's needs, including tuition fees for the children. It may also prevent children in the household from being sent to work. However, a settlement period may exist for migrants. Upon arrival in their destination, their payment may not be transferred quickly enough to the remaining family members. Hence, there may be gaps between the migrant's departure and the effect of his/her migration on the remaining household members.

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[15] Jakarta is the capital city of Indonesia. Unlike other countries that separate the centre for administrative and governance, Jakarta is both the country's centre of government and centre of economic activities.

3.2.2 Child Labour and Education in Indonesia

The government has implemented efforts to eradicate child labour in Indonesia. Regulation number 23 in 2002 was concerned with child protection and regulation number 23 in 2003 limited the minimum employment age to 18 years old. Nevertheless, according to the latest survey conducted by the National Statistics Agency and ILO, there are still 4.1 million children aged 5 – 17 (around 6.9 percent of the total number of children) who are classified as child labourers. Of those children, 1.7 million are involved in the worst forms of child labour, including slavery, social exploitation, illegal activities, and activities that may harm their health. The majority of them work in the informal agriculture and trade sector. Jakarta is equally bad in terms of child labour. Despite the high economic growth and relatively better social infrastructure, over 93,000 children living in the city were classified as child labourers in 2010. Over 75% of those children worked in the trade sector and 77.97% came from poor families.

Recent studies have investigated the involvement of children working in tobacco industries. As a labour-intensive industry, children are a source of cheap labour to operate the non-skilled jobs; hence, they can reduce the cost of production. In one tobacco plantation in eastern Indonesia (Amigó, 2010) children spend most of their time tying up tobacco leaves to poles, planting seeds, and watering and fertilising the tobacco corps. More interestingly, the tasks of tying up tobacco leaves to poles and planting seeds are done entirely by children; no adults are involved in those activities. During the tobacco season, children may work every day, leaving them little time to do school-related activities or play. However, the number of child labourers may vary depending on the households' poverty conditions.

The tobacco case mentioned above supports the description of child labour in Indonesia. Child labourers in Indonesia mostly work as private workers (44.9%), in this case is children who are hired by private companies[16]. This is followed by unpaid family workers (34.4%) and self-employed (8.9%). Although we are unable to define the kind of jobs that each child does, we are able to see that most children who work as private workers mostly work in the manufacturing sector (28.5%), followed by the wholesale, retail, restaurants, and hotel sector (19.8%) and the agriculture, forestry, fishing, and hunting sector (13.2%). In the manufacturing sector, children may be hired in smaller factories where the child labour regulation enforcement is not as strict as how it is in larger factories. For an example of the food manufacturing industry, children may play less-skilled roles such as sorting raw material for food production based on its size, preparing the raw material for the cooking process, and putting final products into their packaging. In the wholesale, retail and

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[16] More detailed descriptive statistics can be found in appendix B

restaurant sector, an example of the most common role that children hold is being a store keeper, food server, or cleaning. As unpaid family workers, the majority of children work in the agriculture, forestry, fishing, and hunting sector. Children may be expected take part in farm or ranch activities to help their parents in producing livestock or farmland products.

Age wise, younger child labourers (aged 10 to 15) mostly participate as unpaid family workers (45.5%) followed by the private workers (35.8%), while older child labourers (aged 16 and 17) vastly participate as private workers (53.6%). This is compatible as older children have more ability to work with people outside their family and engage with more binding responsibilities.

The proportion of child labourers occur mainly in the third quintile (22%) and the second lowest quintile (21%) across households' income distribution. In terms of households' size, child labour is more likely to be found in bigger households as the largest percentage of child labour (31%) is found in the fourth quintile of households' size distribution. The looser state of law enforcement of child labour in rural areas may promote more incidences of child labour, where 56% of child labour is found in the households living in rural areas, while 44% live in urban areas.

As briefly mentioned above, education and working are alternative options for Indonesian children. Given the same available time in a day, children who are working will have to reduce their schooling time allocation and other activities to increase their human capital.

Similar to other countries, there are two types of schools in Indonesia: public and private schools. Public schools are subsidised by the government; hence, the tuition fees are lower than those in private schools. Therefore, children from poor families rarely go to private schools. However, although the tuition fees in public schools are low or non-existent, parents are still expected to pay for their children's uniforms, textbooks, and other expenses.

Indonesia adopts three levels of education for the non-degree education: Elementary School, Junior High School, and Senior High School. On average, at the age of six, children enter elementary school. There are six grades in this level. Children spend one year in each grade and there is one local examination at the end of each grade. At the end of sixth grade in the elementary school, children have to sit the national examination, as a result of which their score is used to determine their next school. At the age of twelve, depending on their elementary national examination score, children continue to junior high school. There are three grades in this level with further local examinations at the end of each grade. At the end of the third grade of junior high school, children will sit another national examination, before entering the senior high school at the age of fifteen. There are three grades in this level and at the end of the third grade, they will sit a further national examination to determine whether they have graduated.

Over the past decade, the school participation rate for children aged 6-12 has been relatively high. On average, over 95% of children attended elementary school – the respective level of school for this age range. However, the participation rate dropped to around 85% in the next age group 13 to 15, where the respective level of school is junior high school. The rate dropped more significantly to 50% in the next age group of 16 to 18-year-olds, whose respective level of school is senior high school. The senior high school certificate is important for anyone intending to continue his/her education to university level.

Of the figures reported above, not all children enrolled in school graduated and obtained a certificate due to some dropping out during each grade and each school level (Kristiansen & Pratikno, 2006). Only around 80% of enrolled children actually graduated and obtained the respective certificate.

The low participation rate mentioned above may alarm us as 50% of the population, particularly those from poor families, will not be able to lift themselves out of the poverty trap as they will not have adequate university certificates. Although the condition does not always bind, the university certificate is an important prerequisite for job applications in Indonesia. Hence, those labourers with a university certificate are expected to have better prospective jobs and better earnings.

3.3 Literature Review

3.3.1 Definition of Child Labour

The definition of child labour has yet to be universally agreed. According to Convention Number 138 in 1976, the International Labour Organisation (ILO) defines child labour as people under 18 years of age being involved in hazardous work or those under 15 years of age being involved in other work. However, many definitions of child labour have been discussed in many studies, as reported by (Edmonds, 2008). According to his report, child labour, as defined by (Basu and Van, 1998), is a condition in which children participate in the labour market to support a household to meet its basic needs. After the basic needs have been fulfilled, or the adult members in the household have reached a certain threshold of income, children would stop participating. (Genicot, 2005) used similar terminology to describe child labour in his study. Another common definition of child labour was proposed by (Baland and Robinson, 2000), who related it to children who have to choose between working and not working in their time allocation. On the other hand, some other studies have relaxed the working condition as referring to those children not in formal education (Dessy and Pallage, 2005; Jafarey and Lahiri, 2002; Hazan and Berdugo, 2002; Tanaka, 2003).

3.3.2 Child Labour and Child Schooling

For many years, studies have investigated the effect of child labour on children's education. Almost all of these studies have concluded that child labour negatively affects education. In a two-state condition whereby children distribute their time between schooling and non-schooling, their involvement in work reduces their time allocation in school; hence, it will reduce their performance in school and/or highest grade obtained.

Many factors force children to enter the working state. The adult wage is one of the most commonly discussed determinants of child labour. In the popular luxury axiom proposed by (Basu and Van, 1998), "A family will send the children to the labour market only if the family's income from non-child-labour sources drops very low". This implies that the probability of children being sent to work is high in families with low adult income, particularly in very poor countries. In the Egyptian context, (Wahba, 2006) studied the influence of market wages, together with parental working history, on the supply of child labour and found a negative effect of market adult wage on child labour. (Basu et al., 2010), (Ersado, 2005), and (Dessy and Pallage, 2005) adopted a similar approach in their studies.

The axiom above can also imply that poverty has a positive impact on child labour. Parents in poor households will be more willing to send their children to work. Moreover, the children may voluntarily earn money to support their parents as they believe that their parents are forced to send them to work due to their poverty (Vincent, 1981) and (Anderson, 1971). A positive relationship was also identified and also discussed by (Canagarajah and Nielsen, 2001; Grootaert and Kanbur, 1995; Ray, 2000a, 2000b; Blunch and Verner, 2001). However, some recent studies have also concluded that the relationship between poverty and child labour does not bind. Although he found a significant positive relationship between poverty and child labour in Pakistan, (Ray, 2000a) did not reach a similar conclusion for the Peruvian case.. Neither did (Jensen and Nielsen, 1997) find such a relationship in the Zambian case; nor (Canagarajah and Coulombe, 1997) in the Ghanaian case. On the contrary, a negative relationship between poverty and child labour was found for male child labour in Pakistan by (Bhalotra, 2003a). Unobserved characteristics may bias the estimates; hence, (Nielsen, 1998) found less responsiveness of child labour to income in the context of Zambia.

Another important factor that influences child labour is household characteristics. As (Wahba, 2006) and (Grootaert & Ravi, 1995) discussed in their studies, parents' characteristics, such as education and working history, play an important role in the probability of child labour. Parents with lower levels of education, ceteris paribus, will likely have a lower value of non-working

activities (i.e. education) and expect their children to follow the same track. Parents' working sector may also play an important role in the child labour prevalence. Parents who run their own businesses may introduce the business-life and skills to their children as early as possible in the hope of preparing their children for adulthood and independence (Lindbeck, 1997). Parental education is also important as the probability of children being sent to work is higher among parents who experienced child labour themselves (Wahba, 2006). The father's education has a stronger negative effect in sending boys to work rather than girls (Canagarajah and Coulombe, 1997).

Other household characteristics, such as ethnic group, religion, and race, together with community characteristics, also need to be taken into account. For example, some ethnic groups may have norms that dictate that education for girls is not as important as that for boys, hence the probability of girls working would be higher than that of boys. On the other hand, in other ethnic groups, parents might be proud if they can send their children to school without being interrupted by working activities, even though the parents are not wealthy enough and being indebted is the cost of their pride. Moreover, we may anticipate that child labour incidence is higher in rural areas than in urban areas (Nielsen, 1998).

External shocks may also be important in explaining the probability of child labour. Using the Brazilian case, (Duryea and Arends-Kuenning, 2003) found that the condition of the child labour market changed during crisis periods. (Grootaert, 1998) also found a significant and positive impact of the financial crisis on child labour in Cote d'Ivoire. In Indonesia, although (Cameron, 2001) found little evidence that the 1997 Asian Financial Crisis affected child labour, we may need to revisit her findings by using more comprehensive data (as she only used 100-village data) and incorporating the latest 2008 Global Financial Crises.

It is generally agreed that working affects schooling. Children who work would have to reallocate their leisure time for working. Not being able to rest properly, revise for lessons in school, or do school assignments may reduce children's performance in school. Several studies have observed the relationship between child labour, children's performance in school, and children's school attainment (Heady, 2000; Canagarajah and Coulombe, 1997; Gunnarsson et al., 2006; Akabayashi and Psacharopoulos, 1999)

Child labour and educational attainment are two inseparable decisions. It is a trade-off between which children must choose (Wahba, 2006). Hence, the determinants of child labour that have been discussed above are also responsible for educational attainment. Educational infrastructure can be a good additional determinant. Although, using Zambian data, (Nielsen, 1998) found that school infrastructure and other related aspects are not among the significant

determinants of educational attainment, (Anker, 2000) argued that the schooling aspect is highly related to children's motivation to stay in school. Hence, it affects children's performance and educational attainment more than children's working status, depending on the type and number of working hours (Bhalotra, 2003b).

3.3.3 Child Labour, Schooling, and Migration

There has been ample literature about the effect of migration on child labour and schooling (Mansuri, 2006; Acosta, 2006; Wahba, 2006; Hanson and Woodruff, 2003; Amuedo-Dorantes and Pozo, 2010; Admassie, 2002). Remittance from migration plays an important role as a support to household finances. Since the financial issue is less likely to be a household problem, parents are no longer compelled to send their children to work. Therefore, the probability of child labour reduces. Having another source of income (i.e. remittance) also implies that parents can afford to pay for their children's tuition fees and other schooling costs. Hence, children are more likely to attend and remain at school. (Tansel, 2002) employed the ease of migration in Turkey and found a significant impact on education. Nonetheless, as ease of migration may reflect the expectation of future employment in the destination, (Mansuri, 2006) did not find a similar impact on school attainment.

3.4 Data

3.4.1 Descriptive Statistics

Table 3.1 shows the relationship between drop-out and child labour, based on the migration incidence at the community level. We classify the migration incidence based on its distribution. We categorise a district as being a low migration group if the migration incidence in that district is in the first quartile of migration incidence distribution. We perform the same process for the second, third, and fourth quartiles. Based on our observations, we can see that the proportion of working children (regardless of their schooling status) gradually decreases from low migration incidence community to high migration incidence community. Similarly, the proportion of children who drop out also decreases as the quartile goes up.

Table 3.1 Percentage of Drop-out and Child Working based on Migration Incidence

	Migration Incidence on Community Level			
	Quartile 1	Quartile 2	Quartile 3	Quartile 4
Working	1,629	1,360	1,397	1,176
	(29.29%)	(24.45%)	(25.12%)	(21.14%)
Drop-out	2,841	2,191	1,930	1,566
	(33.31%)	(25.69%)	(22.63%)	(18.36%)

Sources: Author's computation from the IFLS

Note: Values in the parenthesis represent percentage of total children in our observation

The quartiles are defined based on the lowest number of migration incidence to highest number of migration incidence in the community

Table 3.2 shows the proportion of children's schooling status and working status by the household migration status. The first rows of the table show the proportions of children based on their schooling and employment history, differentiated by the household migration status. The proportions of children who did not drop out and have never been sent to work during their childhood are higher in migrant households than in non-migrant households. The proportion of children who did not drop out but have been sent to work during their childhood is however also higher in migrant households compared to their counterparts. On the other hand, the proportion of children who drop out but have not been sent to work is higher among the non-migrant households. Yet the proportion of those who drop out and are sent to work is higher among the migrant households. We can preliminarily conclude that being in a migrant household increases the probability of children being sent to work, while staying in school is more likely for children in migrant households.

On average, the period of time between the age of six to the time of first employment is relatively similar between children in migrant households and children in non-migrant households, regardless of their schooling status. However, the standard deviation is slightly bigger for those from migrant households. On the other hand, the average duration between the age of six and dropping out is longer for children from migrant households than for their counterparts.

Conditional on child labour, the duration of children's first employment to dropping out is longer for children in migrant households than for those in non-migrant households. Using this condition, we may still preliminarily conclude that migration has a positive correlation to schooling.

Table 3.2 Descriptive Statistics

		Non-Migrant Household		Migrant Household	
		Num. Obs	(%)[a]	Num. Obs	(%)
Not-Drop-out	Not-working	12,667	60.22	2,753	67.11
	Working	887	4.22	300	7.31
Drop-out	Not-working	6,532	31.06	804	19.60
	Working	947	4.50	245	5.97
Total		21,033	83.68	4,102	16.32
Average duration since age 6	to Working[b]	9.04 (1.80)[d]		9.04 (1.91)	
	to Drop-out[c]	8.20 (2.00)		8.87 (1.76)	
Average duration between First Time Working and Drop-out[e]		2.82 (1.02)		2.99 (1.18)	

Sources: Author's computation from the IFLS

[a] percentage of total children in our observation

[b] duration (years) since age 6 to the first employment, regardless schooling status

[c] duration (years) since age 6 to drop-out, regardless working status

[d] values in parenthesis represent standard deviation

[e] duration (years) of drop-out, conditional on child labour

The majority of children work in the sectors of agriculture, forestry, fishing, and hunting, followed by the manufacturing, wholesale, retail, restaurants, and hotels sectors. In terms of the employment type, most children work in private sector jobs and as unpaid family workers. In terms of education, the majority of working children finished only the elementary school. Among the working children group, 37% obtained an elementary school certificate, 35% and 25% obtained junior high school and senior high school certificates, respectively, and 2% did not have a certificate at all. In contrast, over half of the non-working children group managed to finish senior high school and more than 11% completed a diploma degree or higher degree. Moreover, 19% and 16% finished junior high school and elementary school, respectively. Yet 3% of them did not finish elementary school at all. Using our data, we may preliminarily confirm that working has a negative impact on school attainment. An extended descriptive statistics table is available in the appendix.

Figure 3.1 shows the proportion of children based on their schooling and working status across age levels. We classify children into four groups: (a) in school and not working; (b) in school and working; (c) drop-out and working; and (d) drop-out and not working.
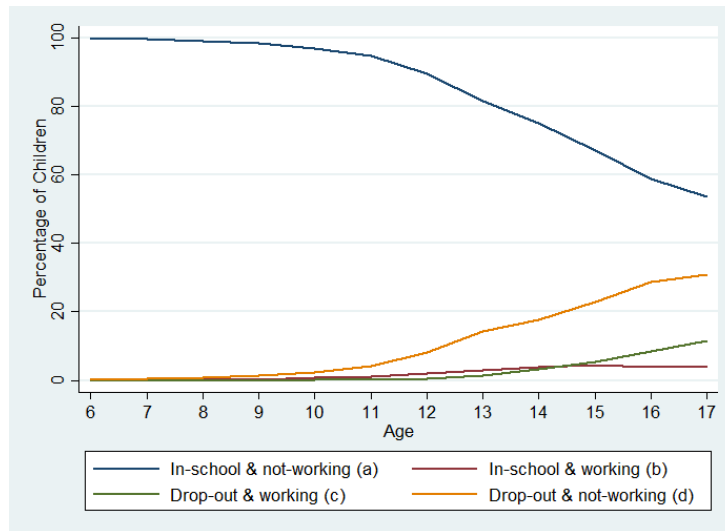
Figure 3.1 Children's Schooling and Working Status across Ages

Source: Author's Calculation from IFLS

As expected, the proportion of children in the first group is the highest one at all age levels. This group is the most desirable since children are attending school and are not being sent to work. Although we found no inflection point, we found that the slope gets steeper at the age of 12. This is the average age of children graduating from elementary school. The proportion gets lower and reaches almost 50% at the end of childhood. This means that only around 50% children stay in school and are not sent to work at all during their childhood.

The other proportions are close to zero at the initial age levels. The proportion of children who work while attending school shows an increase at the age of 12. At the same age level, the proportion of children not continuing to junior high school but starting work also increases. Between the ages of 14 and 15, the proportions of these two groups intersect, meaning that more children drop out and work even before they graduate from junior high school. Although the last group is not of interest for this study, it is surprising to see that the percentage of children who drop out and do not work offsets the proportion of children who work and keeps increasing until children reach adulthood.

3.4.2 Data Limitation

As has been mentioned in Chapter Two, ILO distinguishes child labourers as people under 15 years of age who work, or people under 18 years of age who work in hazardous jobs. We are able to classify people based on their ages and work status by using IFLS; however, we cannot distinguish whether they work in hazardous or non-hazardous sectors. Therefore, we will only use ILO's children classification (i.e. below 18 years old) for those who were working in a particular year.

In the absence of household chores information in IFLS, we may also be unable to classify children who work in market work and domestic work. Hence, we will simply include a child to a working group if he/she answered the survey question that he/she had worked in a particular year.

3.5 Theoretical Foundation

The theoretical background of this chapter rests on two sets of theory. The first set of theory is the longstanding results about the role of migration on child labour and schooling, building on the seminal work of (Basu and Van, 1998). The second set of theory is the results of implementing and observing the duration of an event taking place.

Recent works have shown two channels on how migration affects child labour. Through the income channel, an additional income from the migrating member of the household increases the household's disposable income. Parents require less support from their children to work and support household finance. Hence, children who are already child labourers may exit employment, while those who are prone to child labour would face less risk of being sent to work.

On the other hand, through a household's labour supply channel, the absence of the migrating household member reduces the number of labour suppliers in the family. Children are expected to cover the role of the migrating member. They may be required to increase their time allocation to do the household chores to the extent where the child labour definition is met. Alternately, for households that are running a business, children are expected to cover the migrating member by helping their parents in their business. Both ways increase the probability of children to fall into the child labour classification.

The role of migration on school drop-outs is rather straightforward. The aforementioned additional income from the migrated member of the household can be used to pay children's tuition fees and school related costs. Therefore, by being in a migrant household, not only do the children avoid the potential of dropping out from school, they are also able to stay longer in school and continue to higher education levels.

We may need to analyse the role of migration on child labour and schooling altogether. Children's time can generally be used either for increasing their human capital, which includes school-related activities, or increasing current consumption through employment. Ideally, the allocation to increase human capital should be maximised. However, under conditions where children are sent to work, they have to reallocate their time, such that the allocation for human capital accumulation is tapered. This condition eventually increases their risk of becoming school drop-outs (Wahba, 2006). Therefore, later in the analysis, we model the children's activity through

the lens of attending school only, work only, doing neither or combining work and school (Guarcello et al., 2009).

Taking the trade-off between working and schooling above, being sent to work faster accelerates the probability of children to drop out from school. Dropping out from school early not only will reduce children's education and knowledge, it will also prevent children from obtaining required certificates that are important for applying for jobs in their adulthood.

Analysing the duration of an event occurrence in the migration environment has been effectively used by (Bijwaard and Wahba, 2014). Using a similar method, we fix the age of six as the point where children are exposed to school drop-outs and child labour. This point is the formal age for children to be enrolled in elementary school. At this point, we also assume that parents think that their children are old enough to start to introduce household chores and the family business to them. Then, based on households' migration status, we analyse the duration from that starting point to the occurrence of children formally starting work, the occurrence of children dropping out from school, or both.

The hypothesis is expected to align with and support the previous studies. We expect that children in migrant households stay longer in education, while being sent to unpaid work may be faster for children in migrant households.

3.6 Methodology

3.6.1 Survival Analysis

In this section, we will perform estimates in an attempt to investigate the effects of households' migration status on children's education and working probabilities. Lancaster (1990) characterised such dynamic transitions using a hazard rates method. In analysing these phases in children's activities, this study focuses on the year-to-year changes in children's schooling and working status; hence the time unit in this paper is measured in discrete-time forms. Therefore, the discrete-time survival analysis method is appropriate.

In the survival analysis discrete-time models, there are several assumptions to be made. First, we assume that the time-unit takes only positive integer values, i.e. t = 1, 2, 3..., as in our study, the t would be in years. Our second assumption is that an individual i (with i = 1, ..., N where N is the total number of individuals in the sample) is observed t = 1. Then we observe the individual up to time t_n, at which point either the individual is making transition from current status into the event, in our case is schooling/working, or the observation is right-censored (where this censoring is assumed to be independent of the hazard rate). The censoring case implies that the individual

can be observed up to time t_i but cannot be observed afterwards. We are also allowed to observe a set of M x 1 vector of covariates. These covariates may vary across the time period. The basic discrete-time hazard rate is defined as follows:

$$P_{it} = \Pr[T_i = t | T_i \geq t, xit] \tag{3.1}$$

where *T* is a discrete random variable representing the time at which the end of the spell occurs, or the uncensored time of event occurrence. Equation (3.1) gives the conditional probability that a transition from a state occurs at time *t*, given that it had not yet occurred or that the state still runs at time *t*. The primary interest from Equation (3.1) is in the distribution of T_i.

We can then specify the hazard rate in Equation (3.1) to depend on time and the explanatory variables. One commonly used non-proportional hazard specification for the hazard rate is the logistic regression function, such that:

$$P_{it} = \frac{1}{[1+exp(-\alpha t - \beta' xit)]} \tag{3.2}$$

with αt represents the constant terms, which also denotes the unspecified function of time, similar to the case in the continuous-time method.

In general, the likelihood contribution consists of two components: (1) the contribution of all the completed spells, and (2) the contribution of the (last) censored spell. For Equation (3.2), these two components of the likelihood function can be expressed as follow:

$$L = \prod_{i=1}^{n}[Pr(T_i = t_i)]^{\delta_i} [Pr(T_i > t_i)]^{1-\delta_i} \tag{3.3}$$

The first term on the right-hand side refers to the contribution of completed spells, while the second term represents the contribution of the last (censored) spell. Equation (3.3) can be elaborated in terms of the conditional probabilities where:

$$L = \prod_{i=1}^{n}(P_{it} \prod_{s=1}^{t-1}(1 - P_{is}))^{\delta_i} + (\prod_{s=1}^{t}(1 - P_{is}))^{1-\delta_i} \tag{3.4}$$

Taking the logarithm of Equation (3.4) yields the log-likelihood function, which can be written as:

$$\log L = \sum_{i=1}^{n} \delta_i \, log\left[\frac{P_{it_i}}{(1-P_{it_i})}\right] + \sum_{i=1}^{n} \sum_{s=1}^{t_i} log[1 - P_{is}] \tag{3.5}$$

We can then substitute the appropriate function for P_{it} from either Equation (3.4) into Equation (3.5), and maximize the log likelihood function using the Maximum Likelihood approach with respect to αt and β.

Furthermore, if we define a dummy of dependent variable, y_{it} = 1 if an individual experience an event at time t, and y_{it} = 0 otherwise (hence, if δ_i = 1 the dependent variable y_{it} = 1 at $Ti = t$ and y_{it} = 0 otherwise; whereas if δ_i = 0 the dependent variable y_{it} = 0 for all t), then Equation (3.8) can be re-written as:

$$\log L = \sum_{i=1}^{n} \sum_{s=1}^{t_i} y_{it} \log \left[\frac{P_{is}}{(1-P_{is})} \right] + \sum_{i=1}^{n} \sum_{s=1}^{t_i} \log[1 - P_{is}] \tag{3.6}$$

Equation (3.6) is simply a log-likelihood function for a dichotomous dependent variables regression analysis. Thus, the discrete-time hazard models can also be estimated using programs for the analysis of logistic method or similar.

Using the discrete-time survival analysis explained above, we will perform two benchmark equations to investigate the hazard rate of drop-out and child working in different migration environment. The first equation is aimed to measure the hazard rate of drop-out among children in migrant and non-migrant household. While the second equation will measure the hazard rate of child working among similar migration status. We measure the duration since children are exposed to education and working i.e. age 6 as the average age of start schooling. Therefore, the appropriate regression specification would be:

$$\_out_{it} = \vartheta_0 + \vartheta_1 Migrant_{ht-1} + (X_{it})'\vartheta + (X_{ht})'\vartheta + (X_{ct})'\vartheta + \sigma_{it} \tag{3.7}$$

And

$$child\_work_{it} = \iota_0 + \iota migrant_{ht-1} + (X_{it})'\iota + (X_{ht})'\iota + (X_{ct})'\iota + \varsigma_{it} \tag{3.8}$$

We will also combine the two measurements by looking the hazard rate of drop-out conditional that the children are working. In the other words, we are analysing the hazard rate of drop-out conditional on child labour. The spell length is measured since the first-time children start working to the time that the children drop-out or being censored. Hence the equation will be:

$$drop\_out_{it} = \Pr\,(drop\_out_{it} = 1|child_{work_{it}} = 1) = \kappa_0 + \kappa_1 migrant_{ht-1} + (X_{it})'\kappa +$$
$$(X_{ht})'\kappa + (X_{ct})'\kappa + \tau_{it} \tag{3.9}$$

3.6.2 Competing Risk

The above equations represent only a single-risk model, whereby an individual arrives at only one destination. We may extend our analysis by analysing the probability of arriving at more than one destination. This method is commonly known as the competing-risk model. Depending on the type of destination, the equations above can be generalised. Let there be *m* different kind of destination,

where j = 1, 2, … , m and let J defines which event occurs. Hence, the discrete-time hazard rate of Equation (3.4) for event j can be written as:

$$P_{tj} = Pr[T = t, J = j \mid T \geq t]$$

(3.10)

where $P_t = \sum_j P_{tj}$.

The appropriate likelihood function of Equation (3.16) can be written as:

$$L = \prod_{i=1}^{n} \left(\left[\frac{P_{t_i j_i}}{(1 - P_{t_i})} \right] \right)^{\delta_i} + \left(\prod_{k=1}^{t_i} (1 - P_k) \right)$$

(3.11)

Equation (3.11) implies that, unlike the competing risks model in the continuous-time analysis, the likelihood function of the discrete-time competing risks model cannot be factored into separate components for each of the m kind of events. As a consequence, the Maximum Likelihood estimations must be done simultaneously for all kinds of events.

Similar to the single-risk model, the appropriate function for P_{tj} can be substituted into Equation (3.16), hence finding the values of α and β can be done by maximising the function using the ML method. The logistic function of P_{it} in Equation (3.6) can be generalized as:

$$P_{tj} = \frac{exp[\alpha_{jt} + \beta'_j x_t]}{(1 + \sum_l exp[\alpha_{lt} + \beta'_l x_t])}$$

(3.11)

with j = 1, 2, … , m. Thus, substituting Equation (3.11) into Equation (3.10) and taking the logarithm, would yield the log-likelihood function, that resembles log likelihood function for a multinomial logit model, where each time measured of all individuals are treated as separate and independent observation. The competing-risks analyses are more popular than the single-risk models as it explains the time analyses more comprehensively and simultaneously.

Using the concept above, we will further exploit the ways in which different migration environments affect children's schooling and working status. We will analyse which event occurs first. The duration is measured from the age of six up to the time when the child either drops out or starts working. Hence, the equation will be:

$$child\_event_{it} = \lambda_0 + \lambda_1 migrant_{ht-1} + (X_{it})'\lambda + (X_{ht})'\lambda + (X_{ct})'\lambda + \varrho_{it}$$

(3.12)

3.7 Quantitative Findings

3.7.1 Hazard Rate of School Drop-Out

Table 3.3 shows the benchmark result for the hazard rate of educational attainment. Column one shows the regression that controls only individual characteristics. We add household characteristics and community characteristics sequentially in columns two to five. Column five is our desired regression specification, in which we employ the complete set of control variables.

Table 3.3 Benchmark Result for the Hazard Rate of School Drop-Out

Drop-out=1	(1)	(2)	(3)	(4)	(5)
Migrant Household	-0.251	-0.167	-0.156	-0.118	-0.111
(Migrant HH=1)	(5.76)***	(3.70)***	(3.44)***	(2.49)**	(2.32)**
Time variable	Yes	Yes	Yes	Yes	Yes
Individual Characteristics					
Gender	-0.121	-0.183	-0.182	-0.195	-0.184
	(5.35)***	(7.25)***	(7.22)***	(7.50)***	(7.05)***
Race	Yes	Yes	Yes	Yes	Yes
Religion	Yes	Yes	Yes	Yes	Yes
Household Characteristics					
HH Head's Gender		0.225	0.218	0.175	0.151
		(5.07)***	(4.91)***	(3.87)***	(3.32)***
School Distance		-0.019	-0.019	-0.020	-0.021
		(12.94)***	(12.92)***	(13.25)***	(13.35)***
HH Head's Education		Yes	Yes	Yes	Yes
HH Head's Race		Yes	Yes	Yes	Yes
HH Head's Employment Type		Yes	Yes	Yes	Yes
HH Head's Job Sector		Yes	Yes	Yes	Yes
HH Head's Religion		Yes	Yes	Yes	Yes
Income		-0.125	-0.114	-0.136	-0.118
		(12.73)***	(10.84)***	(12.55)***	(10.12)***
Urban		-0.470	-0.472	-0.374	-0.370
		(15.03)***	(15.10)***	(9.10)***	(8.95)***
Size		-0.072	-0.073	-0.071	-0.067

Drop-out=1	(1)	(2)	(3)	(4)	(5)
		(9.91)***	(9.95)***	(9.59)***	(9.17)***
Sex Ratio		-0.164	-0.157	-0.134	-0.101
		(3.77)***	(3.59)***	(3.03)***	(2.27)**
Community Characteristics					
Average Adult Wage			-0.045	-0.066	0.006
			(3.07)***	(4.09)***	(0.29)
Location				Yes	Yes
Economic Cycle					Yes
Num. Obs.	174,305	174,305	174,305	174,305	174,305

* p<0.1; ** p<0.05; *** p<0.01

Note: The values in the parenthesis show the t-values

The migrant household variable shows a consistent and significant impact on the hazard rate of drop-out. Being in a migrant household reduces the probability of drop-out. The hazard rate also increases as the spell of drop-out increases. Figure 3.2 shows that children in migrant households have a lower hazard rate of drop-out than children in non-migrant households. The figure also shows that there is a dip in the hazard rate from the eight to the ninth years and another downturn in the hazard rate after the tenth year after children start their education.
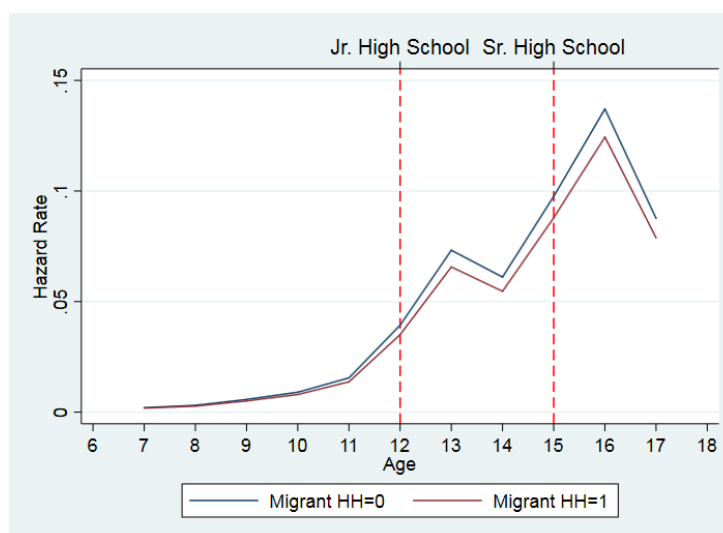
Figure 3.2 Hazard Rate of School Drop-Out in the Migrant Households

Source: Author's Calculation from IFLS

Children's gender variable is also significant in affecting the hazard rate of drop-out in a negative way. Although household heads' gender is also significant in affecting the hazard rate of drop-out, the direction is opposite to children's gender one. As expected, the distance from house

to school is also negatively significant in affecting the hazard rate of drop-out. We also find similar results for households' income variable, urban vs. rural, households' size, and households' sex ratio.

We found a significant and negative effect of the average adult wage in the community in columns three and four. However, once we control the wave in which data were collected, it is no longer significant and changes its direction. The wave, which was designed to capture the economic cycle, and community fixed effect may capture its effect.

3.7.2 Hazard Rate of Child Labour

Table 3.4 shows the benchmark result for the hazard rate of child labour. Similar to the previous benchmark results, column one is the regression specification, where we employ only children's individual characteristics. Households' characteristics and various community characteristics are sequentially added in columns three to four.

Table 3.4 Benchmark Result for the Hazard Rate of Child Working

Working=1	(1)	(2)	(3)	(4)
Migrant Household	0.292	0.110	0.089	0.112
(Migrant HH=1)	(6.84)***	(2.50)**	(2.02)**	(2.42)**
Time variable	Yes	Yes	Yes	Yes
Individual Characteristics				
Gender	0.257	0.268	0.262	0.269
	(8.62)***	(8.67)***	(8.43)***	(8.52)***
Race	Yes	Yes	Yes	Yes
Household Characteristics				
HH Head's Gender		-0.126	-0.114	-0.128
		(2.79)***	(2.53)**	(2.77)***
HH Head's Education		Yes	Yes	Yes
HH Head's Race		Yes	Yes	Yes
HH Head's Employment		Yes	Yes	Yes
Income		-0.004	-0.033	-0.052
		(0.39)	(2.98)***	(4.28)***
Urban		-0.387	-0.381	-0.275
		(11.32)***	(11.11)***	(5.73)***
Size		0.091	0.093	0.095
		(14.36)***	(14.68)***	(14.50)***
Sex Ratio		0.158	0.141	0.147
		(3.37)***	(3.02)***	(3.10)***
Community Characteristics				
Average Adult Wage			0.000	0.000
			(8.35)***	(9.17)***
Location				Yes
Num. Obs.	195,499	195,499	195,499	195,499

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Note: The values in the parenthesis show the t-values

The migrant household variable significantly affects the hazard rate of child labour. Unlike the previous hazard rate, being in a migrant household increases the hazard rate of children being sent to work. For the length of the spell, we may see a similar pattern to that in the hazard rate of drop-out. The hazard rate increases as the spell increases. Figure 3.3 shows the increasing hazard rate of child labour, differentiated by the households' migration status. From that figure we can see

the hazard rate for children in migrant households is higher than for their counterparts. Contrary to the drop-out case, we see no significant downturn of the hazard rate in any period of time.
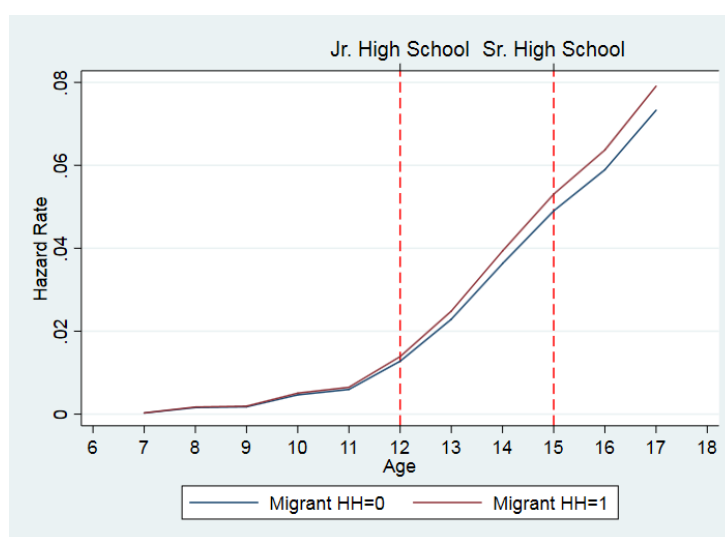
Figure 3.3 Hazard Rate of Child Working in the Migrant Households

Source: Author's Calculation from IFLS

Children's gender also significantly affects the hazard rate of child labour in a positive way. Households' size, households' sex ratio, and the average adult wage in the community also affect the hazard rate of child labour in a similar manner. On the other hand, household heads' gender negatively affects the hazard rate of child labour, as well as households' income and households' location. Child labour seems not to be affected by time trends, unlike child schooling, once we control for the community fixed effects. This might be due to the community fixed effects capturing norms and regulations.

3.7.3 Hazard Rate of Drop-Out Among Child Labour

Table 3.5 shows the hazard rate of drop-out among child labourers. We measure the spell from the time when children start working to the time event when they drop out, while the order of columns is similar to those shown previously.

Table 3.5 The Hazard Rate of Drop-out among Child Labour since the Start Working

Drop-out=1	(1)	(2)	(3)	(4)
Migrant Household	-0.412	-0.321	-0.318	-0.311
(Migrant HH=1)	(2.77)***	(2.06)**	(2.03)**	(1.98)**
Time Variables	Yes	Yes	Yes	Yes
Individual Characteristics				
Age	0.249	0.288	0.287	0.285
	(7.17)***	(7.54)***	(7.50)***	(7.44)***
Gender	0.006	-0.068	-0.063	-0.063
	(0.05)	(0.41)	(0.38)	(0.38)
Race	Yes	Yes	Yes	Yes
Religion	Yes	Yes	Yes	Yes
Household Characteristics				
HH Head's Gender		-0.070	-0.074	-0.078
		(0.39)	(0.41)	(0.43)
HH Head's Education		Yes	Yes	Yes
HH Head's Race		Yes	Yes	Yes
HH Head's Employment Type		Yes	Yes	Yes
HH Head's Job Sector		Yes	Yes	Yes
HH Head's Religion		Yes	Yes	Yes
Income		-0.210	-0.177	-0.142
		(4.61)***	(3.18)***	(2.24)**
Urban		-0.093	-0.083	-0.099
		(0.61)	(0.54)	(0.64)
Size		-0.009	-0.015	-0.022
		(0.30)	(0.48)	(0.71)
Sex Ratio		0.067	0.073	0.073
		(0.30)	(0.33)	(0.33)
Community Characteristics				
Average Adult Wage			-0.103	0.025
			(1.16)	(0.21)
Economic Cycle				Yes
Num. Obs.	3,368	3,368	3,368	3,368

* p<0.1; ** p<0.05; *** p<0.01

Note: The values in the parenthesis show the t-values

Being in a migrant household reduces the hazard rate of drop-out among child labourers. From the time variables and also as depicted in Figure 3.4, the hazard rate of drop-out decreases as the spell becomes longer. The hazard rate gap between children in migrant households and their non-migrant counterparts is relatively high during the initial years; however, the gap becomes narrower as the spell increases.

Although children's and household heads' gender is not statistically significant in affecting the hazard rate of drop-out among child labourers, children's age does have a positive and significant impact. On the other hand, household income significantly affects the hazard rate in a negative way.
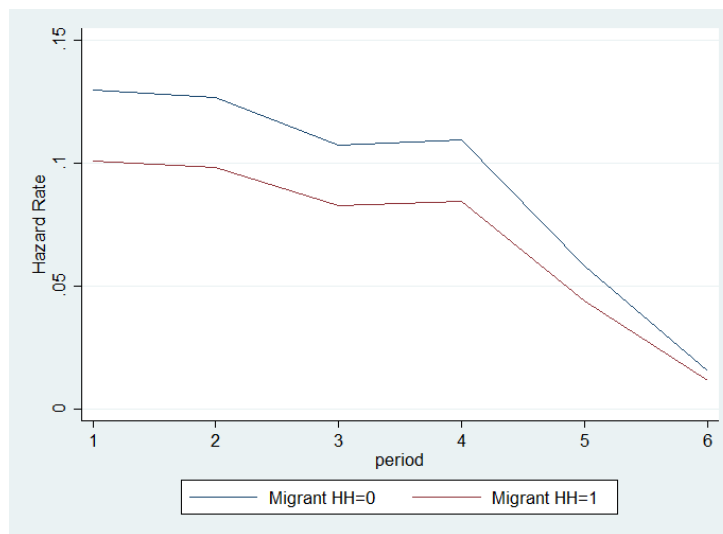
Figure 3.4 The Hazard Rate of Drop-out among Child Labour since the Start Working

Source: Author's Calculation from IFLS

3.7.4 Robustness Tests

The data set-up for the benchmark specifications allows for time varying covariates; hence, discrete time analysis is appropriate. Setting up the data in such a way that continuous time analysis would be appropriate may reduce the amount of useful information. However, it is interesting to see how such a data set-up would behave to our specification as a robustness test.

We were unable to conclude that our data satisfies proportional hazard assumption. Therefore, Cox proportional hazard estimation would not be appropriate. Table 3.6 shows the results of the hazard rate of educational attainment using Weibull distribution. We can see that the coefficient of children's migrant status consistently and significantly reduces the hazard rate of drop-out. We found that the hazard of school drop-out increases overtime as seen from the ln_p coefficient.

Table 3.6 Robustness Test for the Hazard Rate of School Drop-Out Using Continuous Time Analysis

Drop-out=1	Weibull	Weibull	Weibull
	(1)	(2)	(3)
Migrant Household	-0.558	-0.342	-0.319
(Migrant HH=1)	(12.44)***	(6.98)***	(6.26)***
Individual Characteristics			
Gender	-0.160	-0.202	-0.198
	(5.23)***	(6.18)***	(5.80)***
Highest Education Obtained	Yes	Yes	Yes
Race	Yes	Yes	Yes
Household Characteristics			
HH Head's Gender		0.150	0.109
		(2.47)**	(1.79)*
HH Head's Race		Yes	Yes
HH Head's Job Sector		Yes	Yes
HH Head's Employment Type		Yes	Yes
HH Head's Religion		Yes	Yes
Income		-0.051	-0.056
		(4.05)***	(4.16)***
Urban		-0.362	-0.267
		(8.99)***	(4.87)***
Size		-0.042	-0.038
		(4.20)***	(3.70)***
Sex Ratio		-0.398	-0.364
		(6.11)***	(5.50)***
Community Characteristics			
Adult Wage			-0.119
			(5.43)***
Community FE			Yes
ln_p	1.356	1.404	1.404
	(95.91)***	(94.73)***	(94.78)***
Num. Obs.	12,243	12,243	12,243

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Note: The values in the parenthesis show the t-values

Children's gender and that of household heads also consistently and significantly affects the hazard rate of drop-out in a positive and negative manner, respectively. Moreover, household income, location, size, sex ratio, and average adult wage in the community also consistently affect

the hazard rate of drop-out in an opposite way. On the other hand, using the same distribution, household migrant status does not have a statistically significant effect on the hazard rate of child labour (Table 3.7), though some other control variables resemble the sign and significance of that in the discrete time analysis

Table 3.7 Robustness Test for the Hazard Rate of Child Working Using Continuous Time Analysis

Working=1	Weibull	Weibull	Weibull
	(1)	(2)	(3)
Migrant Household	-0.033	-0.004	0.000
(Migrant HH=1)	(1.82)*	(0.28)	(0.01)
Individual Characteristics			
Gender	-0.079	0.268	0.280
	(9.19)***	(7.36)***	(7.45)***
Highest Education Obtained	Yes	Yes	Yes
Religion	Yes	Yes	Yes
Race	Yes	Yes	Yes
Household Characteristics			
HH Head's Gender		0.090	0.119
		(1.46)	(1.90)*
HH Head's Education		Yes	Yes
HH Head's Working Status		Yes	Yes
Income		-0.018	-0.033
		(1.33)	(2.44)**
Urban		-0.336	-0.242
		(8.45)***	(4.07)***
Size		0.011	0.008
		(1.38)	(0.90)
Sex Ratio		-0.196	-0.171
		(3.02)***	(2.57)**
Community Characteristics			
Adult Wage			0.114
			(4.43)***
Community FE			Yes
Num. Obs.	12,909	12,909	12,909

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Note: The values in the parenthesis show the t-values

3.7.5 Competing Risk Model

Table 3.8 shows the competing risk results for the hazard rate of drop-out and child labour among different households' migration characteristics. We set the base category as children who do not drop out and do not work. While the duration is measured since the time children start their education until either destination (i.e. drop-out or being sent to work) occurs.

Table 3.8 Competing Risk Regression Result for the Hazard Rate of Child Schooling and Child Working

		mlogit (1)	mlogit (2)	mlogit (3)
0 =Not Drop-out & Not Working	(Base category)			
1 = Not Drop-out & Working	Migrant (1 = Migrant HH)	0.436 (7.37)***	0.227 (3.60)***	0.225 (3.56)***
	Time Variables	Yes	Yes	Yes
	Individual Characteristics	Yes	Yes	Yes
	Household Characteristics		Yes	Yes
	Community Characteristics			Yes
2 = Drop-out & Working	Migrant (1 = Migrant HH)	0.424 (4.60)***	0.237 (2.38)**	0.241 (2.42)**
	Time Variables	Yes	Yes	Yes
	Individual Characteristics	Yes	Yes	Yes
	Household Characteristics		Yes	Yes
	Community Characteristics			Yes
3 = Drop-out & Not Working	Migrant (1 = Migrant HH)	-0.323 (6.98)***	-0.193 (4.10)***	-0.192 (4.06)***
	Time Variables	Yes	Yes	Yes
	Individual Characteristics	Yes	Yes	Yes

	mlogit	mlogit	mlogit
	(1)	(2)	(3)
Household Characteristics		Yes	Yes
Community Characteristics			Yes
Num. Obs.	195,976	195,976	195,976

*p<0.1; ** p<0.05; *** p<0.01*

Note: The values in the parenthesis show the t-values

For those whose destination is working while staying at school, we found a consistent and positive effect of migration. Similarly, for those whose destination is working and dropping out, the effect of migration is also positive. At this point we can see that the effect of migration on child labour is still consistent. Although we may expect smaller migration effect magnitude of working and drop-out group compared to the working and non-drop-out group, the first group nonetheless has a slightly higher magnitude than the second group. On the other hand, as expected, the effect of migration on drop-out and not-working children is negative.

3.8 Discussions

Ample studies have investigated the probability of educational attainment and child labour being affected by households' migration characteristics. However, using IFLS allows us to analyse the duration from the point at which a child is first exposed to the risk of dropping out and working to the point at which the child actually drops out or is sent to work. IFLS also allows us to equip our analysis with time varying covariates, hence increasing the precision of our estimates. Therefore, this study investigates the hazard rate of educational drop-out and child labour among different household migration environments.

We started our analysis by estimating the effects of a migrant household on the hazard rate of drop-out. The spell is measured from the time when children are at the age of 6, which is the average age for starting school. The spell ends when the children drop out of school, or when they exit childhood without any drop-out event.

Being in a migrant household reduces the hazard rate of educational drop-out. Households may receive remittance from the migrants; hence, the household would be able to cover the incurred costs from schooling. At each level of education, the probability of children dropping out increases as they proceed to a higher grade. Once they have managed to reach the highest grade and proceed to the next level of education, the drop-out probability decreases for a temporary

period of time. While the probability of children to drop-out from school is 11% lower for those from migrant household than their counterparts.

Girls are more likely to drop out in a shorter spell than boys. This finding supports the conservative belief that girls will have to devote their lives to serving their families. Hence, a high level of education is not necessary and spending households' resources to pay for girls' educational costs would not be worthwhile. On the other hand, boys are expected to support the household financially as they get older. As people with a high level of education are believed to find it easier to get a job and ultimately to earn higher wages, investing in the education of boys is expected to yield higher rewards compared to girls.

Children who live in rural areas have a higher hazard rate of drop-out. This is not only because the aforementioned conservative belief is more widely spread, but also due to the fact that the school-related infrastructures in rural areas are not as good as those in urban areas. The ratio of schools to the total area may be smaller in rural areas; hence, it takes more time for children to travel from their houses to schools. This may also imply increased transportation costs. Therefore, education is costlier for rural children, and ultimately increases their hazard rate of drop-out.

On the other hand, children in migrant households are more likely to be sent to work in a shorter spell than their counterparts. Having a migrant in the household may reduce the labour supply in the household to run the family business; therefore, children are the next source of labour supply to keep the family business running smoothly. On average, the hazard rate increases significantly once children have completed their elementary education. At this point, many children are considered old enough to fulfil the roles initially held by the migrants. At this level, therefore, the majority of children help with the family business without seeking monetary payment. On the other hand, older children are expected to support their households financially; hence, monetary payment from a private employer would be their main motivation. Children's motivation to work may also be supported by the average adult wage in the community. Though children's wages may be a fraction of adult wages, an increase in the adult wage may lead to an increase in children's wages. This eventually increases the probability of children starting work.

As opposed to the drop-out case, boys are more likely to be sent to work in a shorter spell than girls. In line with the conservative norms and religion, household heads tend not to allow their daughters to work. Allowing their daughters to work at a young age may be risky, as parents may not be able to monitor and guard their daughters while they work. Moreover, the impact of male household heads is greater than that of their female counterparts.

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As anticipated, richer households are not motivated to send their children to work as they may face fewer financial problems. Sending children to work is also less likely for urban households. On the other hand, since bigger households may have to deal with the allocation of their resources and poverty, the probability of sending their children to work in a shorter spell is more likely for them.

Among children who are sent to work while still attending school, the hazard rate of drop-out is vast during the early years after they start to work. The hazard rate is lower for children in migrant households. This may be because, even though children have to support their households financially, the migrants also contribute to the household finances. Therefore, the burden on children in migrant households may not be as heavy as for children in non-migrant households. A lower burden allows them to reallocate less time from education to working.

The hazard rate decreases as time continues. Two arguments may be proposed to explain this fact. Firstly, should we see working as a shock in children's schooling phase, as children are urged to reallocate their time from their schooling to working. Children may find it difficult to multitask between school and work. In the event of financial pressure, they are forced to set working as their first priority. This eventually harms the continuity of their education. However, should they manage to reallocate their schooling and working time, they might survive the first year of working without dropping out and may adapt to the condition. They are more likely to be able to survive in the subsequent years as well. Therefore, the hazard rate of dropping out subsides as time continues. The second argument refers to the additional income/effort contributed to the household by the children. This additional income/effort increases the households' income. Therefore, households are more likely to be able to cover the children's educational costs. Eventually the probability of dropping out decreases as time continues.

The results on the impact of migration that delays school drop-out is consistent and supports previous studies, where many previous studies found a positive impact of migration on the probability of school drop-out (Mansuri, 2006; Acosta, 2006; Wahba, 2006; Hanson and Woodruff, 2003; Amuedo-Dorantes and Pozo, 2010; Admassie, 2002). On the other hand, many of those previous studies also found a positive impact of migration on the probability of child labour. We found a contrary result to those studies as we found that migration accelerates child labour. However, this case is significant for the children who work as unpaid family workers. In this type of employment, the children become the next immediate source of labour supply in the household business and are expected to cover the role of the migrated household members.

Particularly in Indonesia, the policy implication from this chapter can be useful to two government institutions. The Ministry of Education may rather be interested in the school drop-out case. The ministry noticeably aims to reduce school drop-outs and push school attainment among children up as high as possible. Through the finding of this chapter, they learned that children in the migrant household stay longer in education. Therefore, migration should be promoted. However, taking migration-promoting policies is not their main role. They then should be able to make recommendations to the related ministry to promote migration. They are able, however, to take precautionary policies to delay school drop-outs in communities where the migration rate is relatively low. They could strengthen the compulsory schooling regulation in that community, providing scholarships that act like an additional income to the households that resemble remittances in migrant households, as well as providing counselling to the students on how important it is to stay in education for as long as possible.

While the Ministry of Manpower may benefit from the child labour results, in order to comply with the government regulation that aims to reduce child labour, the ministry should not promote migration, as migration accelerates children to start employment. An example of policies that they could take is by creating more jobs in the communities with high prevalence of migration, therefore, the push factor of migration can be reduced, and migration incidences can also be reduced. They can also promote stricter law enforcement to prohibit children from working.

However, as we see the conflicting migration-related policies that can potentially be taken by the two ministries, a good policy-mix is necessary. Taking into account that migration has more benefits to keep children in school longer yet pushes them to participate in household businesses, the suggested policy-mix should still promote migration and force the time limitation on children's participation in household business such that the working activities would not interfere with children's schooling activities.

3.9 Conclusion

The effect of migration on child labour and drop-out may be ambiguous. The contribution of migrants to the households' finances allows households to cover their children's educational costs. On the other hand, a reduction of the labour supply in a community may increase the average adult wage, which will eventually increase the labour supply from children. For those households owning family businesses, having one or more migrants in a household may interfere with business activity due to the reduction in the number of potential family workers (paid or unpaid). Hence, children are expected to substitute for the migrant's initial role. Although we could not capture the proportion of households' chore activities from our data, having migrants in the household may

also increase the burden of household chores on children. This eventually forces them to reallocate time from schooling to doing the household chores.

In this paper, we estimate the hazard rates of childhood educational drop-out and child labour. We use the discrete-time survival analysis and competing risk model to account for the correlation between migration and children's schooling and employment status. We control for individual characteristics, household characteristics, and community characteristics. For the analysis, we use longitudinal panel data from all waves of the Indonesian Family Life Survey (IFLS).

The empirical results show that migration has different effects on children's schooling status and child labour. Children in migrant households stay longer in education than children in non-migrant households. On the contrary, children in migrant households are sent to work faster than their counterparts.

It would be interesting for future studies to analyse the case of international migration, as it is hoped that the next waves of IFLS will offer more international migration observations. Once the information becomes available, it would also be interesting to compare the findings with those of other countries.

Chapter 4   The Impact of Unconditional Cash Transfer on Self-Employment and Entrepreneurship: The Case of the Bantuan Langsung Tunai (BLT) Programme in Indonesia

4.1 Introduction

In the event of economic shock, people are urged to find the best strategy to smooth their income, which will eventually smooth their consumption too. These strategies may include increasing their working hours for a paid worker, or, on the other hand, entering the job market for those who were previously excluded; a housewife who starts selling goods to get additional household income is an example of the latter case. Moreover, in cases where the economic shock causes a paid worker to lose their job, they may also switch to self-employment.

Starting a self-employment activity requires capital. Many studies have focused their analysis on the impact of cash transfer programmes as a source of capital for self-employment activities or entrepreneurship. Cash transfer programmes have been widely introduced by governments across different countries, some to overcome the impact of economic shock, some not. Equally, some programmes were conditional, and some unconditional. Regardless the factor or the conditionality, recipients can reallocate their consumption and consequently use the additional disposable income as the capital for their self-employment activities.

The government of Indonesia first introduced a cash transfer programme as a response to the domestic fuel price increase in 2005, led by the government's fuel subsidy cut. The programme, named *Bantuan Langsung Tunai* (BLT), was unconditional and aimed as an immediate aid to Indonesian citizens who were the most affected by the impact of induced inflation. In that year, inflation and unemployment skyrocketed to over 17% and 10%, respectively. Unemployment benefit is yet to be available in Indonesia and the number of informal workers is significant. Therefore, it is interesting to discuss how the use of BLT would affect the probability of self-employment.

This study is aimed to contribute to the literature by analysing the impact of unconditional cash transfer programmes on the probability of self-employment activity. Although there have been abundant studies focusing on the impact of cash transfer programmes to self-employment or entrepreneurship, most of those studies utilise conditional cash transfer as their treatment, e.g.

Oportunidades in Mexico, *Bolsa Familia* in Brazil and *Mi Familia Progresa* in Guatemala. These programmes are mainly addressed to households with school-aged children and require them to enrol their children to be able to access the fund. Another example the fund being targeted to households with pregnant women, breast-feeding mother and infants. Such households need to provide medical and/or vaccination records to be able to access those funds.

Our study is unique because we observe the impact of unconditional cash transfer. Under conditionality, we may lose some information from households with no school-aged children or households without pregnant women. The number of such households may not be negligible and is important to be addressed in the relevant policy. Although studies using unconditional cash transfer in the self-employment and entrepreneurship environment are also available, they focus on the rate of return of the programme to the profit of the entrepreneurs rather than observing the probability of someone deciding whether he/she starts, leaves, stays-in, or stays-out of a self-employment activity. This decision is also very important as it is closely related to the degree of unemployment in the economy.

BLT is a government programme rather than an experimental research design. Therefore, unlike other programmes, the BLT recipients are non-randomly selected. Although administrative problems in disbursement exist, all poor households are targeted to the programme regardless their background and location. We propose the novelty by attempting to address the non-random condition by implementing several regression strategies, which will be discussed in part 3.

To answer the research objective mentioned above, the relevant research question is: Using the example of the *Bantuan Langsung Tunai* programme, does unconditional cash transfer promote self-employment or entrepreneurship?

The remainder of this study will be structured as follows. Part 2 discusses previous studies related to self-employment and entrepreneurship, cash transfer programmes and the BLT programme while part 3 elaborates the quantitative methodology, part 4 presents the quantitative findings, part 5 discusses the quantitative findings and part 6 concludes.

4.2 Literature Review

4.2.1 Self-employment in the Event of Economic Shock

In the developing countries, including Indonesia, the self-employed and entrepreneurs are most commonly in an informal sector. According to the latest publication from the Indonesian Statistics Agency, the self-employed and entrepreneurs account for 38.20% of total employment, the largest

among all other employment status types[17]. By contrast, in Latin America the sector may range around 25 to 50% of employment and may be substantially more in the poorer regions, e.g. Africa. As such, many studies have argued that this sector plays an important role in economic growth and a shock to this sector would risk the aggregate economy.

The impact of economic shock on the shift in labour market structure and economic shock has long been discussed. (Fallon and Lucas, 2002) studied the impact of labour market conditions in some Asian and Latin American countries during the economic crises in the 1990s when families increased their labour force participation to smooth the household income. In Indonesia, they found that the proportion of self-employed and family workers increased in the aftermath of the crises. A similar condition happened in Mexico. In addition to the increase in unemployment, the proportion of self-employed people increased between the periods of 1994 to 1996 where the crisis intensified. These coping strategies was found to be more significant in the female labour force than the male labour force (Lim, 2000)(Thomas et al., 2000).

In addition to additional labour supply from the above households, adjustment in the labour market proportion may happen through another channel. The financial crisis caused many companies to shut down; therefore, they had to lay off many of their workers. In order to keep their households running smoothly, the laid-off workers had to find another source of income. Starting a small business is among the immediate strategies to generate income, since starting a micro-business does not require too much paperwork, as would be the case in developed countries (Smith et al., 2002)(Dong, 2015).

In the case of the developed economies, Fairlie (2013) found that, during the great recession period in the US, unemployed people responded to the economic shock by starting businesses. However, the study did not find evidence that people who were employed responded in the same way. During this period, there existed some self-employment assistance and lump-sum payments to encourage the unemployed to start a business. These programmes significantly promoted participants to enter their own businesses (Kosanovich et al., 2001).

4.2.2 Cash Transfer Programmes

Cash transfer as an additional source of income can be used directly on the expenditure or may have a substitution effect if the cash transfers are conditional. A positive impact of cash transfer to poverty alleviation has been widely discussed using programmes in many different countries. A comparative study focusing on children which targeted cash transfer in South African and Latin

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[17] Using 2017 data, the proportion of paid workers is 30.08%, unpaid family workers is 14.59% and other workers is 9.14%

American countries was conducted by (Barrientos and DeJong, 2006). In Mexico, the PROGRESA, *Bolsa Escola* and some other programmes led to a reduction in poverty reduction and the poverty gap (Skoufias and di Maro, 2008); (Agostini and Brown, 2011).

Cash transfers may affect one's labour market participation decision in an ambiguous way. Disbursement of cash transfers induces an income effect whereby the additional income from the programme allows members of the recipient household to buy more goods. Let leisure be the normal goods that one can buy and a perfect substitute of work during the day. An increase in income will increase the demand for leisure, hence, reducing the allocation of time to work. Therefore, we may predict that cash transfer programmes have an adverse effect on labour market participation.

On the other hand, the effect may be different when the cash transfer is conditional, e.g. conditional on children's school attendance. If the children were initially working and contributing to the household's income, participating in the cash transfer programme will force children to increase their time allocation for school. As a consequence, they will reduce the time allocation for working, hence, the total labour supply in the household may be reduced. In consequence, there will be an increase in the relative price of labour in the household, which will lead to an increase in the adult labour supply.

Using data from a conditional cash transfer programme in Brazil, (Ferro and Nicollela, 2007) found a positive impact of the programme in regards to the number of hours worked by the parents, although the probability of them participating in the labour market was not statistically affected. (Sahn and Alderman, 1996) also found a relatively large effect of rice subsidy in regards to labour supply in Sri Lanka. Through the child labour channel, the programme effectively reduced the probability of girls to work rather than boys. Using the same cash transfer programme case, (Foguel and Barros, 2010) concluded that the impact of the programme on the male labour participation rate was positive, although relatively small. However, the impact for females was not and offset the results when the data were pooled.

Some studies, on the other hand, found no impact of conditional cash transfer programmes in regards to labour market participation. Using the PROGRESA case, (Skoufias and di Maro, 2008) rebutted the concern about the adverse effect of cash transfer programmes on adult work incentive. They found that there was no significant impact relationship between the programmes and the adult labour supply. Insignificant impact was also found by (Bourguignon et al., 2003). Although recent study about cash-transfer in the developed countries has not been growing as

rapidly, (Moffitt, 1992), (Blundell and Macurdy, 1999) and (Widerquist, 2005) showed the impact of cash-transfers on labour market participation in the US and the UK.

In the existing entrepreneurship environment, (De Mel et al., 2008) studied the impact of incremental cash investment on the return of investment among randomly selected micro-enterprises in Sri Lanka. The study found a significant effect of the treatment in male-owned enterprises, while there was no positive return for female-owned enterprises. Using cash and in-kind transfers to micro-enterprises in Ghana, (Fafchamps et al., 2011) found that the programme contributed to a large increase in business profit, and was more successful than those with high pre-treatment profits. Similar impact was also found by (Blattman et al., 2013) in a cash transfer programme in Uganda.

Applying the absence of conditionality, an experiment was conducted in Kenya where an average USD709 was disbursed to a randomly-selected group of poor households. Using profit from self-employment as a product of unconditional cash transfer programmes, (Haushofer and Shapiro, 2013) found that households invested a proportion of the fund to increase the inventories of their business, hence, leading to an increase in profits from self-employment activities.

As a response to severe drought in one rural area in Malawi, $12.26 per month was disbursed unconditionally to poor households. (Davies and Davey, 2008) found that, although weak, there was a negative effect of cash transfer on the unemployment rate. In addition, they also found a positive impact in regards to investment in education and health. The programme created a multiplier effect that encouraged local people to set up a new business. However, this kind of multiplier effect was rejected by (Haushofer and Shapiro, 2013).

4.2.3 *Bantuan Langsung Tunai* (BLT) Programme

Beginning in 2000, geopolitical problems occurred in many oil producing countries and subsequently led to a disruption of the global oil supply. In addition, the significant industrialisation in China and India pushed oil demand from those countries. These factors eventually led to an incessant increase on global oil prices.[18]

Meanwhile, Indonesia had been implementing a subsidised fuel price regime. This regime allowed the domestic fuel price to be fixed at an agreed price level,[19] while the difference between the domestic price and global oil price was subsidised by the government. The increase in global oil prices during the mentioned period increased the subsidy allocation in the government's budget.

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[18] The WTI crude oil price increased from USD19.31 per barrel in 1999 to USD41.25 in 2000.

[19] The price level of domestic fuel price was stated in the government's budget and had been agreed by the parliament.

To reduce the fiscal burden, the government decided to lift the fuel subsidy in 2005, which subsequently increased the price of domestic fuel.[20]

As an immediate effort to reduce the effect of the shock, the government introduced the *Bantuan Langsung Tunai* (BLT). BLT was an unconditional cash transfer programme that was targeted at poor households, which had benefited least from the old regime yet were at most risk from the negative shock of the fuel price increase. The BLT provided an immediate cash transfer to the targeted households, which was funded by the budgetary savings from the lifting of the subsidy. In the medium and longer term, the government planned to reallocate the budgetary savings from the reduction of subsidy to more productive expenditure, such as physical investments. Therefore, a wider scope of beneficiaries would be benefited and the multiplier effect would be greater.

Through BLT, each poor household received IDR100,000 (approx. USD12) per month for a two-year period. On average, this amount was equal to 15% of regular expenditure and was intended to allow the household to readjust its spending pattern in the aftermath of high inflation due to the fuel price increase.

Unlike the conditional cash transfer programmes in many Latin American countries, BLT was targeted and disbursed to all households across Indonesia below a certain poverty level. However, studies found that there were administration issues that led to some disbursement problems (Alatas et al., 2012) (Rosfadhila et al., 2013). (World Bank, 2006) estimated that 45% of BLT was disbursed to non-poor households. On the other hand, 47% of poor households did not receive the fund.

The government lifted the fuel subsidy further in 2008 and 2013. This also led to another fuel price increase. Although the increase was not as big as that in 2004 and the inflation hiked at a slower pace, the government again introduced *Bantuan Langsung Sementara Tunai* (BLSM), an unconditional cash transfer, as a measure to reduce the impact of the negative shock. However, it is assumed problematic to use the BLSM in 2008 in this research since the global financial crisis also took place during the period. Neither can we use the BLSM in 2013 since the data for 2015 are not yet available.

4.3 Theoretical Foundation

The theoretical foundation in this chapter will be based on two sets of studies. The first set of studies lie on the households' strategy in the event of economic shock. Such condition is more

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[20] The domestic fuel price increased to 88%, 186% and 105% for gasoline, kerosene and solar, respectively.

harmful to poor households in the developing economies. When the condition occurs, some studies found that starting small business is one of the most commonly taken strategies that these households take. Household members who lost their job because of companies shut down may start small business to keep making money. On the other hand, members who initially did not participate in labour activities may voluntarily or forced start small business to help household in generating income. Members who are already setting-up business may want to stay in their business as switching to employment may not be possible as companies are not expanding, hence are not recruiting.

Table 4.1 Self-Employment Transition Matrix

Self-Employment Status		Post-BLT	
		SE	Not-SE
Pre-BLT	SE	6,110 (14.00%)	840 (1.92%)
	Not-SE	1,686 (3.86%)	35,018 (80.22%)

Source: Author's calculation using IFLS

Table 4.1 above shows the transition matrix between the pre and post BLT program for all households. As discussed above, there are a 3.86% of household members that moving from either paid jobs or unemployed to self-employment activities. On the other hand, there are 14.00% of household members that stay in self-employment activities. Later in this chapter, we will classify these members as the self-employed people. While the agriculture, forestry, fishing and hunting sector; wholesale, retail, restaurants and hotels sector; and manufacturing sector being the sector with highest self-employment proportion[21].

The second set of studies have found that households that receive cash from cash transfer programs have higher participation in labour market activities. In our context, the unconditional cash transfer money is disbursed to those kinds of households: poor households. By receiving some amount of money, in addition for consumption activities, households are able to allocate a proportion of the money to find alternative or additional source of income. In the self-employment context, there are several common activities that households members can do. Members can start buying light ready-made commodities and sell them in a stall in front of their houses, by the street or in the local market and city centre. The example of the commodities are cigarettes, factory-made snacks and foods, etc. Another common self-employment activities that members do is cook some food and sell them in a push-cart or the similar aforementioned locations[22]. We may not expect a

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[21] The proportion can be seen in appendix C

[22] The hygiene regulations for selling food products in Indonesian, particularly for Small and Medium Enterprises are not as strict as it is in the developed countries.

large-scale self-employment or entrepreneurship to be relevant in this research. Not only does those activities generate more income to pay current expenses, they also allow the households to prepare themselves for the expectation where the future expenses will increase due to the economic impact. By understanding these contexts, we hypothesise that there is a positive impact of unconditional cash transfer to self-employment activities.

According to a poverty classification provided by the National Statistics Agency, post offices create the list of beneficiaries of the program in their regions. The post offices then provide the information regarding the program to the people in their regions. The money can only be disbursed through those post offices. Normally, post offices are located close to the village-head office, where the village-head office should be located in the centre-most location of the village. However, we may still find post-office that are located in a further and less accessible location. A closer post office to the village-head office (lower in kilometre or minutes) make it more accessible to households. This allows households not only to gain information regarding the availability of the BLT program, but also to collect the program the money has been ready to be cashed. Therefore, there should be a negative impact of the distance of the post office to the probability of one to get a BLT. Hence in our context, there is an indirect effect of the post office distance to self-employment.

4.4 Methodology

4.4.1 Data

We use the Indonesian Family Life Survey (IFLS) as our primary dataset. Collected by RAND, these are the only longitudinal data available in Indonesia. BLT was disbursed in 2005 and 2006; therefore, it is appropriate to use the IFLS wave 3 (which was collected in 2000) and wave 4 (which was collected in 2007) to construct the panel dataset. As a supporting dataset, particularly for community level variables, we also use The National Socioeconomic Survey (SUSENAS) for the relevant panel. This dataset is collected and provided in a cross-section manner and was collected by the National Statistics Agency.

4.4.2 Regression Specifications

As our benchmark regression, we perform a panel regression on household level. The outcome variable is the individual self-employment status. This variable is in binary form, where an individual is assigned 1 if he/she was self-employed and 0 if otherwise, while the variable of interest is his/her household BLT recipient status. This variable is also in binary form, where an individual is assigned 1 if their household received BLT and 0 if otherwise. We control for individual, household and community level characteristics. In addition, we may also need to introduce the proportion of self-

employed to the community's population to capture the competition effect or knowledge effect within the community. Using the specification above, the appropriate regression equation is:

$$SE_{it} = \alpha_0 + \alpha_1 BLT_{ht} + (X_{it})'\alpha + (X_{ht})'\alpha + (X_{ct})'\alpha + \varepsilon_{it} \qquad (4.1)$$

Where:

SE_{it} : Self-employment status

BLT_{ht} : Household's BLT recipient status

$X_{it;ht;ct}$: Individual, household and community level control variables

In addition to the specification above, an additional strategy will also be implemented in order to absorb the impact of the administration problem mentioned in the previous part. Rather than performing regression to all of our observations, we will perform regression by quintile. Those in the lower are assumed to be those who meet the BLT eligibility. Therefore, we may expect a different impact of BLT on self-employment decision. Moreover, the administration problem also caused households to receive different amounts of BLT. Suppose that household A and household B both received BLT, the monetary amount could be different between those two households. Measuring BLT in Ln IDR form may allow us to capture the impact of this variation on self-employment decision.

There are at least two potential biases that may occur by using the specifications mentioned above. A treatment endogeneity problem may arise since the BLT-recipients were not randomly selected; households who met the government's poverty criteria would receive BLT, while others would not. Unfortunately, we do not have sufficient data to perfectly model the BLT participation; this may lead to a treatment endogeneity problem.

The BLT was disbursed based on the criteria that had been set by the government. In the time-span between the government lifting of the fuel subsidy and introducing BLT, the provisional recipients were appointed and the fund was disbursed was relatively quickly (World Bank, 2012). Therefore, households were presumably not able to adjust their socioeconomic condition and choose whether they belonged to the recipient group or otherwise. On the right-hand side of the equation, we include all employment types to our sample, including those who are self-employed or entrepreneurs, paid or unpaid workers, and those who are not working. Considering these conditions, we may assume that the selection bias can be negligible in our specification.

Ignoring the potential biases that have been discussed above and using simple Ordinary Least Square (OLS) regression will create a fundamental problem and bias in our estimates.

However, measuring the change of self-employment status between two periods as a function of time-variant observables may overcome this problem. Both the First Difference method and Fixed Effect regression become plausible, as we have panel dataset.

Our model and data allow us to control all observables characteristics on the right-hand side of our equation. However, there may still exist some unobservable characteristics that may influence one's decision to be self-employed or an entrepreneur. For example, we are unable to capture the entrepreneurial ability, whereby one may argue that people with low entrepreneurial ability may not make enough profit from their business and, hence, increase their probability of participating in BLT. Ignoring these characteristics may potentially create an omitted-variable bias in our estimations.

To overcome the potential bias above, we propose an instrumental variable regression strategy. We exploit the panel characteristics in our dataset by using first difference (Anderson and Hsiao, 1982) and introduce an instrument that affects the BLT participation, but which is uncorrelated to one's decision to be self-employed or an entrepreneur. As has been discussed previously, BLT eligibility did not exactly meet its participation targets as there were cases where people who were eligible for BLT did not get the fund. Since the BLT fund was disbursed through post offices[23], we propose the distance between the post office and the village head's office to be the instrument. We also control for whether the post office is located in the village or outside the village. Should the post office be available in the village and centrally located, it would be easier for households to cash the fund.

We assume that the distance of post office does not have any correlation to the error term of the self-employment regression, hence affecting the self-employment decision only through the BLT participation. Post office availability in the village and its distance do not affect the day-to-day activities of the relevant self-employment activities as discussed in part 4.3. On the other hand, the availability and easily access post office is important for household members to be informed about the BLT program and to collect the money. However, one may think that post offices are located close to the local market, where the availability and distance of local market is important in determining those relevant self-employment activities. To handle this, we control for the local market distance in the reduced form of regression.

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[23] Following RAND's assumption where the office of the head of the village/township is the reference point concerning distance.

Since all individuals did not get any BLT in time t-1, i.e. all BLT=0, a first differencing method will be used. Otherwise, the BLT variable will automatically be omitted from the regression. Therefore, the instrumental variable regressions are:

$$BLT_{ht} = \gamma_0 + \gamma_1 Post\_office\_dist_{ct-1} + \gamma_2 Post\_office_{ct-1} + \omega_i \qquad (4.2)$$

$$\Delta SE_i = \alpha_0 + \alpha_1 \widehat{\Delta BLT}_h + (\Delta X_i)'\alpha_i + (\Delta X_h)'\alpha_h + (\Delta X_c)'\alpha_c + \varepsilon_i$$
(4.3)

Where:

Post_office_dist$_{ct-1}$: Distance between village head's office to post office (km)

Post_office$_{ct-1}$: 1 if the post office is in the village, 0 if otherwise

In addition to the main analysis above, further analysis and several robustness tests will be performed. Those tests include:

1. We use different measurement for the outcome variable. We narrow down the self-employment criteria so that only people who were self-employed and hired workers can be assigned 1 in our outcome variable, otherwise will be assigned 0.

2. We split the observation by gender. This allows us to see the impact of BLT to male entrepreneur and female entrepreneur separately. In addition, we also split the observation based on the gender of the household head, this allows us to analysis if there is any difference between male-headed household and female-headed household in the event of BLT program.

3. We perform different set of regression by using different regression method. Since fixed-effect regression is the most favourable one, we expect the First-difference regression would produce identical results, hence assures us that the benchmark results are valid.

4. We use different level of observation. Rather observing on individual level, we aggregate the observation and perform the regression on the household level. The binary outcome variable will be 1 if there exist at least one self-employed or entrepreneur in the household, and 0 if otherwise. We also all measurements of BLT, i.e. BLT status (in binary form) and BLT amount (in continuous form).

4.4.3 Descriptive Statistics

Table 4.2 shows the proportion of household members' employment type across period and BLT programme participation. The table shows that the self-employed people increases in both types of household from 2004 to 2007. However, the increase of self-employed people in the BLT-

recipient household in this period is 6.34%, slightly bigger than self-employed people in non-BLT-recipient that is 6.07%. In addition, there was an increase in gap between self-employment between BLT-recipient households and non-BLT-recipient households. The gap in 2004 was 1.79% while in 2007 the gap became 2.06%. While Table 4.3 shows the descriptive statistics for variables used in the regressions.

Table 4.2 Proportion of Employment Type across Period and BLT Recipient Households

Period	Employment type	Non-BLT-Recipient Household		BLT-Recipient Household	
2004	Other employment	11,072	71.84%	3,258	70.05%
	Self-employed	4,341	28.16%	1,393	29.95%
2007	Other employment	10,137	65.77%	2,963	63.71%
	Self-employed	5,276	34.23%	1,688	36.29%

Source: Author's calculation using IFLS

Table 4.3 Descriptive Statistics

Indicator	Non-BLT Household		BLT Household	
	Mean	sd	Mean	sd
BLT amount (IDR thousand)	-	-	489.131	575.499
HH head's education Level	1.998	1.213	1.228	0.881
HH head's Age	42.615	13.183	45.288	13.062
HH head's gender	0.895	0.307	0.840	0.366
HH income (IDR thousand)	16,260	38,099	7,694	12,398
HH size	5.911	3.278	6.550	3.107
Urban	0.569	0.495	0.379	0.485
Proportion of Entrepreneur in the community	0.188	0.046	0.195	0.044
Distance to post office (minutes)	26.699	0.151	18.386	0.358
Num. Obs.	31,168		9,420	

Source: Author's calculation using IFLS

On average, the head of household of BLT recipient households have lower education attainment and relatively older than the head of household of non-BLT recipient households. As expected, the income of BLT recipient households is lower than their counterparts, and they also have more family members living in their household. The average BLT recipient households live in rural areas as opposed to the non-BLT recipient households that live in urban area. Since public

service facilities in rural areas tend to be less abundant, the distance to post office is relatively further for those who received BLT.

4.5 Quantitative Findings

4.5.1 Main Regression Results

In this section is the main result of our quantitative approach. As has been discussed in the previous part, an OLS regression would bring us biases. Our first attempt in overcoming those biases is using fixed effect regression approach, which result can be seen in table 4.4. Initially, we performed both fixed effect and random effect regression, and observed the Hausman test result. The Hausman test then proposed that fixed effect regression is more favourable. We also performed the first difference approach and obtained identical result. This is reassuring that the impact of BLT to self-employment is consistent.

In the first half of the table, the BLT is measured in binary form. While BLT is measured in continuous form in the second half of the table. Though still significant and consistent, we find a smaller impact of BLT amount to the probability of self-employment in compare to the BLT recipient status. This finding is also still consistent later with that in table 4.5. The relatively small amount of BLT may be the driving factor of this issue.

Table 4.4 Fixed Effect Regression Results for the Impact of BLT to Self-employment

(Self-employed=1)	FE	FE	FE
	(1)	(2)	(3)
BLT	0.042	0.042	0.040
(BLT recipient=1)	(8.43)***	(8.36)***	(8.03)***
Characteristics			
Individual	Yes	Yes	Yes
Household		Yes	Yes
Community[a]			Yes
BLT	0.003	0.003	0.003
(Log of Amount)	(8.38)***	(8.31)***	(7.99)***
Characteristics			
Individual	Yes	Yes	Yes
Household		Yes	Yes
Community[a]			Yes
Num. Obs.	40,586	40,586	40,586

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Note: The values in the parenthesis show the t-value

[a] We include the proportion of entrepreneur to total population in all regressions.

Table 4.5 shows the regression results using instrumental variable approach. As also have been discussed in the previous part, we introduce the availability of post office and its distance as our instrument. This is one of the approach to overcome the potential endogeneity problem occurred from omitted variable bias that cannot be addressed by the first set of regressions above.

In the table, the dependent variable is dichotomous status of self-employment. A household member as assigned 1 if he/she was self-employed and 0 if otherwise. While our variable of interest is measured in two measurements. BLT participation in column one to four is measured in binary form, 1 if the household received BLT and 0 if otherwise. On the other hand, BLT participation is measured continuously as Log of amount of BLT in column five to eight. We also control for individual characteristics, household characteristics, and community characteristics. As we have discussed earlier, we instrument the BLT participation using our proposed instrument, i.e. distance between post office and village head's office.

From this table, we see that individuals in the BLT recipient household have higher probability to be a self-employed rather than their counterparts. Similarly, for the other BLT

measurement, we find that individuals in higher amount of BLT tend to have higher probability to be a self-employed. We find that using plain vanilla OLS, the impact of BLT is underestimated and not significant. On average, not including time-invariant unobservables into our estimations tend to underestimate the impact of BLT. The coefficients produced by OLS are less than the coefficient produced by IV regressions.

Table 4.5 Instrumental Variable Regression for the Impact of BLT to Self-employment

(Self-employment=1)	(BLT Recipient=1)				BLT Amount (Log)			
	OLS	IV	IV	IV	OLS	IV	IV	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
BLT	0.095	0.249	0.239	0.239	0.004	0.018	0.018	0.018
	(1.10)	(20.33)***	(19.77)***	(19.29)***	(9.76)	(20.32)***	(19.76)***	(19.27)***
Individual Characteristics								
Age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gender	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Risk Index	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Race	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household Characteristics								
Head's Gender	Yes		Yes	Yes	Yes		Yes	Yes
Head's Educ.	Yes		Yes	Yes	Yes		Yes	Yes
Income	Yes		Yes	Yes	Yes		Yes	Yes
Size	Yes		Yes	Yes	Yes		Yes	Yes
Community Characteristics								
Urban	Yes			Yes	Yes			Yes
Population	Yes			Yes	Yes			Yes

(Self-employment=1)	(BLT Recipient=1)				BLT Amount (Log)			
	OLS	IV	IV	IV	OLS	IV	IV	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Prop BLT HH	Yes			Yes	Yes			Yes
Prop Entrep to Population	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Post Office		0.241	0.252	0.259		3.306	3.453	3.539
		(59.8)***	(57.35)***	(57.32)***		(59.61)***	(57.16)***	(57.13)***
Post Office Distance		-0.019	-0.016	-0.016		-0.273	-0.235	-0.230
		(-3.34)***	(-2.85)***	(-2.79)***		(-3.45)***	(-2.96)***	(-2.90)***
F-stat[a]		631.08***	573.10***	573.13***		627.27***	569.63***	569.66***
Hansen J Stat		12.200**	9.878*	9.711*		12.157**	9.854*	9.680*
Endogeneity Test[b]		363.5***	334.0***	321.0***		364.2***	321.5***	321.5***
Num. Obs.	20,293	20,293	20,293	20,293	20,293	20,293	20,293	20,293

* p<0.1; ** p<0.05; *** p<0.01

Note: The values in the parenthesis show the t-values

[a] tests above refer to the first-stage regression

[b] the endogeneity test follows endogeneity test in ivreg2 function in STATA

Table 4.6 shows the impact of BLT to the probability of self-employment where the individuals are classified based on household heads' gender. The magnitude and significance level are still consistent with previous results. However, the magnitude is bigger in individuals who live in female-headed household. Table 4.7 shows the difference of BLT impact to self-employment probability between male and female. The impact of BLT to self-employment probability is still consistently significant where female household members have bigger magnitude of the impact than male household member.

Table 4.6 Instrumental Variable Regression Results for all Individuals Based on Household Heads' Gender

(Self-employed=1)[a]	(BLT Recipient=1)		BLT Amount (Log)	
	Female Head	Male Head	Female Head	Male Head
	(1)	(2)	(3)	(4)
BLT	0.250	0.237	0.018	0.017
	(8.90)***	(17.35)***	(8.89)***	(17.34)***
Num. Obs.	2,389	17,904	2,389	17,904

* p<0.1; ** p<0.05; *** p<0.0

Note: The values in the parenthesis show the t-values

[a] The regressions use a complete set of control variables

Table 4.7 Fixed Effect Regression Results for all Individuals Based on Gender

(Self-employed=1)[a]	(BLT Recipient=1)		BLT Amount (Log)	
	Female	Male	Female	Male
	(1)	(2)	(3)	(4)
BLT	0.264	0.219	0.019	0.016
	(14.79)***	(12.65)***	(14.78)***	(12.64)***
Num. Obs.	9,154	11,139	9,154	11,139

* p<0.1; ** p<0.05; *** p<0.0

Note: The values in the parenthesis show the t-values

[a] The regressions use a complete set of control variables

Table 4.8 shows the regression results when we change the definition of self-employment. In the outcome variable, we assign value one for self-employed people who hired workers and assign value 0 if otherwise. For this table, we may call these people as entrepreneurs. The table shows that the impact of BLT to the probability of entrepreneurship is still consistent with the previous results. However, the magnitude becomes relatively smaller.

Table 4.8 Fixed Effect Regression Results on Entrepreneurship Definition of Self-employment

(Entrepreneur=1)	(BLT Recipient=1)			BLT Amount (Log)		
	IV	IV	IV	IV	IV	IV
	(1)	(2)	(3)	(4)	(5)	(6)
BLT	0.105	0.097	0.101	0.001	0.008	0.007
	(11.34)***	(10.63)***	(10.87)***	(4.24)***	(11.34)***	(10.62)***
Characteristics						
Individual	Yes	Yes	Yes	Yes	Yes	Yes
Household		Yes	Yes		Yes	Yes
Community			Yes			Yes
Num. Obs.	20,063	20,063	20,063	20,063	20,063	20,063

* $p<0.1$; ** $p<0.05$; *** $p<0.0$

Note: The values in the parenthesis show the t-values

4.5.2 Robustness Tests

In addition to the main results above, we conduct several robustness tests. These tests will cover (1) regressions by income distribution, (2) regression by different classification of household location, and (3) change in level observation.

Table 4.9 shows the fixed effect regression by quintile of poverty index distribution, where Q1 being the group of poorest people based on the National Statistics Agency poverty criteria, and Q5 being the richest group of people. The first half of the table shows the set of regression results where the BLT is measured in the binary form, while the second half of the table shows the set of regression results where BLT is measured in the continuous form. From both lines, we can see that the BLT significantly affect self-employment probability for all quintiles, yet the highest impact is to those in the fourth and third quintile of poverty index distribution.

Table 4.9 Instrumental Variable Regression Results for all Individuals Based on Poverty Index Distribution

(Self-employed=1)[a]	Q1 (1)	Q2 (2)	Q3 (3)	Q4 (4)	Q5 (5)
(BLT Recipient=1)	0.125	0.174	0.292	0.399	1.209
	(8.52)***	(8.12)***	(8.66)***	(7.70)***	(6.56)***
F-stat[b]	353.95***	173.28***	90.07***	60.29***	16.80***
BLT Amount	0.009	0.013	0.021	0.029	0.089
(Log)	(8.50)***	(8.10)***	(8.65)***	(7.72)***	(6.53)***
F-stat	352.06***	172.40***	88.14***	60.47***	16.64***
Num. Obs.	3,933	3,947	4,054	4,524	3,835

* $p<0.1$; ** $p<0.05$; *** $p<0.0$

Note: The values in the parenthesis show the t-values

[a] The regressions use a complete set of control variables

[b] Refer to the first-stage regression

Table 4.10 shows the fixed effect regression result based on household location; i.e. urban or rural. The impact of BLT to the probability of self-employment is still consistent, however the magnitude is bigger for those who live in urban area than those who live in rural area.

Table 4.10 Instrumental Variable Regression Results for all Individuals Based on Household Location

(Self-employed=1)[a]	(BLT Recipient=1)		BLT Amount (Log)	
	Rural (1)	Urban (2)	Rural (3)	Urban (4)
BLT	0.185	0.331	0.014	0.024
	(13.33)***	(13.24)***	(13.32)***	(13.25)***
F-stat[b]	395.72***	202.26***	393.24***	201.06***
Num. Obs.	9,651	10,642	9,651	10,642

* $p<0.1$; ** $p<0.05$; *** $p<0.0$

Note: The values in the parenthesis show the t-values

[a] The regressions use a complete set of control variables

[b] Refer to the first-stage regression

In table 4.11, we change the level of observation from individual level to household level. We aggregate the relevant variables, while the outcome variable becomes 1 if there exist at least one self-employed member in the household and 0 if otherwise. We find relatively consistent result, where the probability of existence of at least one self-employed household member increases when

the household receives BLT. However, we could not find consistent result when using the log of BLT mount as a predictor.

Table 4.11 Instrumental Variable Regression Results on Household Level

(Self-employed=1)[a]	(BLT Recipient=1)		BLT Amount (Log)	
	IV	IV	IV	IV
	(1)	(2)	(3)	(4)
BLT	0.305	0.307	0.189	0.181
	(18.24)***	(17.70)***	(1.67)*	(1.56)
Characteristics				
Household	Yes	Yes	Yes	Yes
Community		Yes	Yes	Yes
F-stat[b]	410.64***	396.19***	408.14***	393.75***
Num. Obs.	11,156	11,156	11,156	11,156

*$p<0.1$; ** $p<0.05$; *** $p<0.0$

Note: The values in the parenthesis show the t-values

[a] The regressions use a complete set of control variables

[b] Refer to the first-stage regression

4.6 Discussions

This paper discusses about the impact of *Bantuan Langsung Tunai* (BLT) on self-employment and entrepreneurship in Indonesia. BLT is an unconditional cash transfer scheme, introduced by the government of Indonesia in 2005 as a response to the lifting of the fuel subsidy and the high inflation rate. This programme differs from many cash transfers that can be found in other countries to the extent of conditionality and target of recipients. First, BLT is unconditional; as long as a household was classified as a poor household, the household would receive the BLT, regardless of the children's school enrolment status, infants' medical record, etc. Second, BLT is non-random.; all poor households were eligible and should have received the fund, unless there were administration problems.

Previous studies have discussed the impact of cash transfer programmes on the profit of the self-employed and entrepreneurs. By addressing several potential biases that may occur, our study analyses the impact of BLT on the decision to start self-employment and entrepreneurship, whereby these activities are the immediate strategy to maintain household income in the event of high inflation and potential economic crisis.

After instrumenting, we find that individuals who live in BLT-recipient households have higher probability to be self-employed. The additional source of income from BLT participation may be used to start a self-employment activity, or, on the other hand, a substitution effect may take place as an indirect impact. We find that being in a BLT-recipient household increases the probability of one to be self-employed by as much as 24%. However, an increase of one's amount of money from a BLT programme brings relatively small impact to the probability of one starting a self-employment activity.

Both males and females in BLT-recipient households have higher probability to be self-employed, with higher impact on females. The probability of males being in self-employment increases by around 26% when their households receive BLT, while the probability of females to participate as a self-employed worker increases by 21% when their household receives BLT. This finding is relevant to the study by (Foguel and Barros, 2010) where they found that, in the event of economic crises, female who initially did not participate in the labour market, voluntarily start self-employment to support households in generating income. Households in Indonesia tend to allow their female members to start a small family business to support their household financially. This activity allows them to make additional money in the event of high inflation or economic crisis. An example of these activities includes selling food or home-produced goods. These activities can be done in several places, such as in front of their house, the local market, or made to order.

On the other hand, the impact of BLT is significant on the both male-headed and female-headed households, with relatively higher impact on female-headed ones. Being in a BLT-recipient household where the head is male, one's probability to be a self-employed worker increases by 23.7%, while one's probability to be self-employed increases 25% when the BLT is disbursed to his/her female-headed household. On average, female-headed households have lower household income than their counterparts. The average number of household members is also higher for female-headed households, which makes their financial burden relatively higher. For them, the value of BLT should be more than sufficient to get through a high inflation period, and, therefore, allows them to manage the money and obtain an additional source of income. The additional source of income can be found immediately through starting self-employment activities, hence, increasing the impact of BLT to promote self-employment. These gender subgroup analysis also support the social microcredit constraints that are explained in the study by (Banerjee et al., 2015) where female are less likely to get microcredit approval. Microcredit approval is more difficult when one being a female or in a female-headed household. BLT does not have the same disbursement criteria as what microcredit has, therefore, it is easier for female and female-headed households to access

the fund. Instead, the lower income in female-headed households may increase the probability of the household to be eligible and collect the BLT fund.

Taking poverty classification as set by the National Statistics Agency into account, the impact of BLT affects mostly medium to rich people. These people may undergo less effect of high inflation; therefore, their initial income may still be sufficient for smoothing consumption. Therefore, the BLT that they received can be used as a strategy to get additional income, e.g. self-employment activities. However, poorer people may use the BLT fund solely to smooth their consumption pattern without being able to allocate some fraction of the fund for self-employment activities.

We find that living in urban areas increases the probability of one being self-employed by as much as 33%, while the probability increases only 18.5% for those who live in rural areas. Individuals who live in urban areas tend to be more mobile than their counterparts. Hence, they are more affected by the increase of cost of transportation if the fuel subsidy is lifted. Therefore, starting self-employment or entrepreneurial activities is one of their immediate strategies to maintain their consumption and income. On the other hand, there are more post offices available in urban areas than rural areas. More post offices make it is easier for BLT recipients to cash their BLT. This, consequently, means the probability of self-employment is higher in urban areas.

One may argue that self-employment activity has a lower multiplier effect on the economy than entrepreneurial activity. Entrepreneurs create jobs for other workers, hence, reduce unemployment and generate income. To see whether BLT also has a positive impact on entrepreneurship, we also relaxed our outcome to people who actually hired other people in their business. We found that the BLT still significantly affects entrepreneurial decision, although to a relatively smaller extent than its effect on ordinary self-employment activity. Being in a BLT-recipient household, the probability of one being an entrepreneur and able to hire other people increases by approximately 10%. An entrepreneurial activity may require more capital than its counterpart. Therefore, the amount of BLT may not be sufficient to promote one to start a business with workers directly.

4.7 Conclusion

Previous studies have different conclusions about the impact of cash transfer programmes on self-employment and entrepreneurial activities. Some studies have found a positive impact of cash transfer recipients and their labour market participation through several channels, particularly through profit to self-employment and entrepreneurial activities. The fund from the programme can be used to increase the capital of the participating entrepreneurs. On the other hand, the

number of studies that found little to no impact of cash transfer programmes on self-employment and entrepreneurial activities is abundant.

In this paper, we observe a different kind of cash transfer programme, the *Bantuan Langsung Tunai* (BLT). The programme was aimed to overcome a potential financial shock, hence, unlike other programmes, the recipients were not random and there was no common conditionality, such as children's school enrolment or medical records. This paper also examines the impact of BLT on the probability of individuals to start or to exit self-employment and entrepreneurship. Using the Indonesian Family Life Survey (IFLS) wave three and wave four, we instrument the BLT recipient status using the availability of a post office in the community and its distance. We also control for individual characteristics, household characteristics and community characteristics in our estimation.

The empirical result shows that individuals in BLT-recipient households have higher probability to start self-employment and entrepreneurial activities for both males and females. However, we found no evidence that BLT has any impact on individuals in female-headed households. Under several robustness tests, the impact of BLT on self-employment and entrepreneurship is still consistent.

It would be interesting for future study to observe the consistency of such impact in the subsequent unconditional cash transfer introduced by the Government of Indonesia. [24] We are as yet unable to analyse this issue because the latest wave of IFLS has not yet covered the year in which the programme was introduced.

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[24] In particular the *Bantuan Langsung Sementara Masyarakat* (BLSM) in 2013.

Chapter 5 Summary

This thesis aims to contribute to better understanding of several important features of labour markets in developing countries, focusing on the case of Indonesia. Indonesia is a good example as it is considered as one of the emerging markets with an abundant labour force. As the fourth most populous country in the world, it is important for economists and policy makers to address this potency to reach a higher level of economic growth and social welfare. In addition, Indonesia has a massive area that is scattered by seas. This has been a challenge to establish a good infrastructure development. Different pace of infrastructure development causes vast inequality between big cities as the centre of economies, mainly in Java Island, and other areas. Job-related migration becomes one of the consequences of this condition, which can provide a good observation for migration studies. In this thesis, we utilise the four latest waves of Indonesian Family Life Survey data provided by RAND.

This thesis contributes to the labour economics literature by discussing three independent topics. We start the thesis by discussing the determinant of migration in Indonesia. Rather than income, which has been long-standing as a determinant of migration, we propose household assets as an alternative. Many studies have addressed the challenges of using household income and the advantages of using household assets as an alternative indicator of several socioeconomic phenomenon, yet there are limited studies that extensively analyse the impact of household assets on migration decision. This is something we aim to contribute to the literature.

The household assets information in the IFLS data is very rich. Of multiple types of household assets, we construct one dimension of household assets measurement using Principle Component Analysis (PCA). Using PCA, we construct three different asset indices: total asset index, fixed asset index and liquid asset index.

Similar to the threats of using household income as indicator of socio-economic conditions, using household assets as an indicator of migration decision may also suffer from potential endogeneity problems, particularly from reverse causality bias and unobservables. We adopt the instrumental variable regressions one more time. The instrument that we introduce in this chapter is the availability of *Siskamling* (a community watch programme in Indonesia) and the availability of a financial institution that provides consumption credits.[25] The availability of *Siskamling* affords a state of security for households to accumulate more assets, while the availability of financial

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[25] We exclude financial institutions that provide job-related credit facilities.

institutions allows households to purchase more assets. Both have insignificant correlations to migration decision. In the robustness tests, we use the number of migrants in the household as a different migration measurement and we also use a different set of instruments.

We found that household assets significantly reduce the migration decision for all types of household assets indices. The robustness tests also produce consistent results. This impact contradicts the impact of household income in affecting the migration decision. We also found different behaviour with household income. In the household income literature, migrants are people who are in the middle of income distribution. Poorer people could not cover the migration-related costs, while richer people would find job-related migration costs them in terms of high opportunity cost.

As an additional check, we include household assets and household income indicator in one equation. Though still significant, we found that this model performs worse than the one with only household assets as the indicator. This suggests to us that, rather than complementary, household assets index is a good substitute for household income in explaining migration decision in Indonesia. One may use the household assets index as an alternative when the household income indicator seems to be problematic.

On the second topic, we analyse the incidence of child labour and child schooling in the event of migration in the household. We analyse the child labour and child schooling both separately and simultaneously. The impact of migration on child labour and child schooling may go through several channels. The absence of one or more household member due to job-related migration may bring remittances to the left-behind household and deters children from being sent to work and dropping out from school. However, the absence of a household member may reduce the household's labour supply in enabling the family business to function. In this environment, children have higher probability to support their parents in running the family business and are more exposed to the risk of being child labour. Moreover, in the absence of the migrant, children may also be expected to increase their assistance to their parents in doing household chores. These activities may eventually affect the risk of children dropping out from school.

We contribute to the literature by adopting the discrete time-to-event approach. Our data enable us to track respondents' working status and schooling status from the age of 6 to the age of 17, i.e. their childhood age. By grouping children into those from migrant households and those from non-migrant households, this approach allows us to observe which type of children are sent to work sooner and which type of children drop out from school quicker. Furthermore, we also

adopt the competing risk model, which allows us to analyse the transition from children's initial state (i.e. staying in school and not working) to other different states.

In terms of the risk of being child labour, children from migrant households are being sent to work sooner than children from non-migrant households. Although we are unable to measure the amount of remittances being sent from migrants to the left-behind family, we are able to analyse the job type of the left-behind children. Our findings support the hypothesis wherein the children are expected to replace the position of the migrants in the family business as unpaid family workers. On the other hand, the impact of migration is not true for children who work as paid workers, while the impact of migration is significant only for boys rather than girls.

On the other hand, the risk of school drop-out is higher for children from migrant households. Children from migrant households stay longer in school than children from non-migrant households. This finding is also consistent with previous literature, as the remittances from migrants can be used to cover the tuition fees and school-related costs. The impact is significant for girls, while parents' decision to withdraw their boys from school seems unaffected by remittance.

In addition, the competing risk model allows us to pool the child labour and child schooling event together. We find that children from migrant households are more likely to move from their initial state to the state where they become child labour and drop out from school rather than to the state where they become child labour and stay in school.

The last topic in this thesis covers self-employment and entrepreneurship, which play an important role in Indonesian economy due to the vast numbers and potential multiplier effect to the economy. We exploit this topic by taking one of the government's policy into account. The *Bantuan Langsung Tunai* (BLT), an unconditional cash transfer programme, was disbursed by the government in 2005 as a compensation for the fuel price subsidy cut and the mitigation for the subsequent economic shock this caused. Unlike other cash transfer programmes that are randomly disbursed to respondents, this programme is unique since it was unconditionally targeted to all poor households. This chapter analyses the impact of the household's participation in the BLT program on the probability of household members starting self-employment or entrepreneurial activity.

We address the potential fundamental and unobservable problems by performing Instrumental Variable regression. The BLT fund was cashed by the households through a post office. Therefore, we propose the availability of a post office in the village and its distance as the instruments. For the BLT measurement, we employ two measurements, i.e. (1) the BLT participation status; and (2) the log amount of BLT received by the households. The latter

measurement is important to take into account the administrative problems in the BLT disbursement. Although it was deemed as a successful programme, administrative problems existed and caused a difference in the amount of BLT received across households.

Using this approach, we found that individuals in the BLT-recipient households have higher probability to start and stay in self-employment activities. We found this is true for both measurements of BLT participation, while our findings also support the hypothesis that females have higher probability to increase their labour supply to support the household's financial issues. We found that the probability of females to start and stay in self-employment is positively affected by the households' BLT participation. On the other hand, although still significant, we found a relatively similar impact of BLT on individuals in male-headed households and female-headed households. One potential problem in this sub-analysis is because we are only able to identify the head of the household, while the decision-maker about the BLT fund in the household remains unidentifiable.

The impact of BLT on self-employment is significantly bigger for individuals living in urban areas. Not only is the market bigger than rural areas, but individuals may be urged to find an additional source of income since the impact of subsidy cuts are bigger in the urban areas. Moreover, individuals in poorer households may overuse the BLT fund only to smooth their consumption. At the end of the day, they have less amount of unused BLT fund to start or maintain their activities in a self-employment activity. Although significant for all household types, we found that the impact of BLT is increasing and peaks for individuals in the richer households.

Equally interesting, we found consistent results when we restrict the definition of self-employment to the self-employed who only hire other people. We may define them as entrepreneurs. This is important, since these types of people create jobs, hence, have a higher multiplier effect to economic growth. The impact is significant to promote entrepreneurship, although the impact is still relatively smaller than in previous findings.

This thesis proposes recommendations for future research and policies. The first topic of this thesis proposes that the future studies and policy makers take into account household assets, as these have been shown to be a good alternative measurement for the determinant of migration. The second topic encourages policy makers to adopt education systems by which students have flexible hours of schooling during peak periods of employment. In particular, our data has shown that the majority of children that drop out participate in the agriculture sector. The flexibility may be in the form that the school break is set to be at the same time as the harvesting season wherein the activities are relatively busier than other seasons. The last topic increases our awareness of the

indirect effects of unconditional cash transfer on entrepreneurship. If the policy makers intend to promote self-employment and entrepreneurship, in particular among poor households and during the economic shock period, the allocation of fund should be disbursed as unconditional cash transfers.

Appendix A

A.1 Extended Descriptive Statistics

From the latest population survey in Indonesia that was conducted by the National Statistics Agency at 2010, the number of migrants that entered Java Island accounted for 29% of total in-migrant to other islands. Almost 70% of those migrants mainly came from Sumatera Island. This figure is followed by the number of migrants that entered Sumatera Island that accounts 26% of total in-migrant to other islands. More than 90% of them came from Java Island. These figures bring us to a conclusion where Java Island and Sumatera Island are the most popular migration destination because the economic activity, as well as other public services and infrastructure (represented by the HDI) in these islands dominates other islands. Hence people have a better expectation of well-being by migrating to these islands.

Looking further to the pattern of the migrants' origin, 91% of migrants in Sumatera Island came from Java Island. Migrants from Java Island were accounted for 69.80%, 47.17%, and 64.70% of all migrants in Kalimantan Island, Sulawesi Island, and other islands respectively. Since migrants from Java Island dominated migrants from elsewhere, we can see that the pattern of migrants' origin was not randomly selected.

Non-migrant households own more occupied house, vehicles, jewellery, and household appliances and utensils than migrant households (Table A.1). In contrast, migrant households own more houses, household appliances, and receivables than non-migrant households. Both types of household own relatively the same proportion of non-agriculture land, livestock; poultry; or fishpond, and savings; certificate of deposits; or stocks.

Table A.1 Distribution of Assets Ownership by Migrant and Non-Migrant Household

	Non-Migrant HH		Migrant HH	
	Do Not Have	Have	Do Not Have	Have
Occupied House	1,680	4,797	502	1,080
	26%	74%	32%	68%
Other House	5,852	625	1,389	193
	90%	10%	88%	12%
Non-Agricultural Land	5,414	1,063	1,326	256
	84%	16%	84%	16%
Livestock, Poultry, or Fishpond	6,275	202	1,528	54
	97%	3%	97%	3%
Vehicles	3,564	2,913	887	695
	55%	45%	56%	44%
Household Appliances	1,530	4,947	323	1,259
	24%	76%	20%	80%
Savings, Certificate of Deposit, or Stocks	4,838	1,639	1,184	398
	75%	25%	75%	25%
Receivables	5,738	739	1,397	185
	89%	11%	88%	12%
Jewellery	2,578	3,899	676	906
	40%	60%	43%	57%
Household Furniture and Utensils	390	6,087	109	1,473
	6%	94%	7%	93%

Source: Author's calculation using IFLS Wave 3

Focusing on the assets ownership by the origin area, both migrant and non-migrant households in Sulawesi area own most occupied house (Table A.2). They also own the most non-agricultural land, household furniture and utensils, and jewellery more than households in other areas. On the other hand, migrant households in Kalimantan own more unoccupied houses. The distributions across areas for other type of assets are relatively equal. Among all available types of household assets, livestock; poultry; or fishpond and receivables are the least type of assets that are being possessed by both households.

Table A.2 Distribution of Households' Assets Ownership by Areas

	Sumatra		Java		Kalimantan		Sulawesi		Bali & Nusa Tenggara	
	Non-Migrant	Migrant	Non-Migrant	Migrant	Non-Migrant	Migrant	Non-Migrant	Migrant	Non-Migrant	Migrant
Occupied House	635	139	2,721	610	169	23	304	83	604	127
	63%	59%	74%	68%	71%	52%	89%	83%	80%	73%
Other House	95	24	378	119	18	9	18	11	77	20
	9%	10%	10%	13%	8%	20%	5%	11%	10%	11%
Non-Agricultural Land	154	37	661	157	31	8	98	32	85	17
	15%	16%	18%	17%	13%	18%	29%	32%	11%	10%
Livestock, Poultry, or Fishpond	20	6	135	33	0	0	4	3	14	3
	2%	3%	4%	4%	0%	0%	1%	3%	2%	2%
Vehicles	349	96	1,897	443	107	22	107	30	271	63
	35%	41%	52%	49%	45%	50%	31%	30%	36%	36%
Household Appliances	738	184	2,930	735	190	35	234	78	509	127
	73%	78%	80%	81%	80%	80%	68%	78%	68%	73%
Savings, Certificate of Deposit, or Stocks	221	68	1,057	234	45	9	83	27	159	36
	22%	29%	29%	26%	19%	20%	24%	27%	21%	21%
Receivables	105	33	415	99	21	3	55	15	84	26
	10%	14%	11%	11%	9%	7%	16%	15%	11%	15%
Jewellery	447	113	2,284	518	143	28	277	77	482	107
	44%	48%	62%	57%	60%	64%	81%	77%	64%	61%
Household Furniture and Utensils	922	212	3,436	831	231	41	340	99	727	168
	91%	90%	93%	92%	97%	93%	99%	99%	96%	96%
Total Household	1,009	236	3,682	902	237	44	343	100	754	175
	81%	19%	80%	20%	84%	16%	77%	23%	81%	19%

Source: Author's calculation using IFLS

In the ethnic group section, Sumbawa ethnic group has the highest percentage of migrant household in compare to all households in the other ethnic groups (Table A.3). Meanwhile West Nusa Tenggara Province is one of the highest proportions of migrant household in compare to all households in other provinces (Table A.4). These facts become relevant and consistent since Sumbawa Ethnic Group is the inhabitant of West Nusa Tenggara Province. Palembang, Komering, and Melayu Deli ethnic groups are also on the top rank of percentage of migrant household. Those ethnic groups are the original residence of central part of Sumatra Island. Batak and Minang ethnic groups have also relatively high percentage of migrant household. Since these ethnic groups are also located in Sumatra Island, we could confirm (Muhidin, 2002) that Sumatra culture supports their members to *merantau*, which is out-migrating from their origins to find a job. It is contrary for

the Betawi Ethnic Group that are the native inhabitants of DKI Jakarta Province. DKI Jakarta is the capital city of Indonesia and the centre of economic activity, a magnet for migrants who seek for the jobs (Temple, 1975), (Sundrum, 1976), and (Titus, 1978). Hence, they are expected to have less incentive to out-migrate due to work-related reason.

Table A.3 Distribution of Ethnic Group

Ethnic Group	Non-Migrant	Migrant	Percentage of Migrant Household
Sumbawa	22	16	42.11%
Palembang	19	10	34.48%
Komering	12	6	33.33%
Melayu Deli	11	5	31.25%
Toraja	33	13	28.26%
Batak	183	62	25.31%
Bugis	194	58	23.02%
Minang	270	76	21.97%
Sasak	226	62	21.53%
Jawa	2,418	641	20.95%
Sunda	743	180	19.50%
Bima Dompu	100	17	14.53%
Madura	192	31	13.90%
Bali	300	46	13.29%
Banjar	150	23	13.29%
Makassar	76	11	12.64%
Tionghoa	46	6	11.54%
Betawi	262	28	9.66%
Nias	23	1	4.17%

Source: Author's calculation using IFLS

South Sulawesi Province is one of the most sending-migrant provinces in terms of percentage of migrant household to total household (Table A.4). Supported by the fact that Bugis ethnic group ranks above average, we can again support (Muhidin, 2002) statement that Bugis ethnic group that originally reside in South Sulawesi Province is one of the best sailors in Indonesia, hence would have more access for migration. We can also see that the percentage of migrant household in three biggest provinces in Java Island, i.e. Central Java, West Java, and East Java

Provinces, have similar values. This may infer that the movement between these provinces are quite high since not only is Java Island the centre of Indonesia's economic activity, it also has the best infrastructure and transportation facilities in the country (Kusharjanto and Kim, 2011). Relevant to their study, some observation area such as East Nusa Tenggara, Irian Jaya, and Maluku Provinces do not have migrant household during this period. These provinces are located in the easternmost part of Indonesia, where infrastructure and transportation hinder them to move to central part of Indonesia. These statistics description supports us to include both ethnic group and province to increase the precision of our estimations.

Table A.4 Distribution of Province of Origin

Province of Origin	Non-Migrant HH	Migrant HH	Percentage of Migrant Household
South Sulawesi	347	100	22.37%
West Nusa Tenggara	415	114	21.55%
Central Java	842	211	20.04%
West Java	996	249	20.00%
East Java	999	249	19.95%
West Sumatra	306	75	19.69%
North Sumatra	430	101	19.02%
DKI Jakarta	548	116	17.47%
DI Yogyakarta	377	77	16.96%
Bali	356	61	14.63%
South Kalimantan	236	39	14.18%
South Sumatra	282	39	12.15%

Source: Author's calculation using IFLS

In terms of migration direction, we can see that majority of migrants move from the same category of origin and destination, i.e. rural area to rural area or urban area to urban area (Table A.5). It is followed by migration from rural area to urban area and migration from urban area to rural area. When we go into Quintiles, households on the bottom 20% of household assets distribution were located in the rural area. Majority of them (approximately 46%) migrated to rural area and around 11% migrated to urban area. While those who lived in urban area were more likely to migrate to also urban area, only fraction of those who lived in urban area that migrated to rural area. To the other end of household assets distribution, majority of migrant household lived in urban area, more than half of them migrated also to urban area. Only 2% of them migrated to rural

area. Meanwhile, on the same Quintile, majority of those who lived in rural area migrated also to rural area rather than to urban area.

Table A.5 Migration Direction

Household Assets	Rural To Rural	Rural To Urban	Urban To Rural	Urban To Urban
All observations	42.25%	9.06%	3.46%	45.23%
Q1	46.30%	11.28%	4.28%	38.13%
Q2	44.11%	9.09%	4.38%	42.42%
Q3	44.52%	8.39%	3.87%	43.23%
Q4	44.64%	5.88%	2.08%	47.40%
Q5	32.08%	10.92%	2.73%	54.27%

Source: Author's calculation using IFLS

Percentage of rural urban migrants decreased from the lowest Quintile to the second highest Quintile but spiked up on the highest Quintile. Meanwhile, the percentage of rural area rural migrants and urban rural migrants decreased from the lowest end to highest end. In contrast, the percentage increases for the case of urban-urban migration, which is saying that richer people tend to migrate to the place where with the same living of standard like that in their origins.

Appendix B

Table B.1 Sector and Employment Type of Child Labour (% of total child labour)

	Self Employed	Government Worker	Private Worker	Unpaid Family Worker	Other Worker	Total
Agriculture, Forestry, fishing, and hunting	28.90	27.60	13.20	57.70	27.90	31.60
Mining and quarrying	2.80	0.00	1.50	0.70	3.70	1.60
Manufacturing	20.60	6.90	28.50	13.50	14.80	21.00
Electricity, gas, water	0.40	3.40	1.00	0.10	1.00	0.60
Construction	1.00	3.40	4.40	0.20	6.40	2.80
Wholesale, retail, restaurants, and hotels	24.10	6.90	19.80	21.20	14.00	19.90
Transportation, storage, and communications	5.70	0.00	3.00	0.40	3.30	2.40
Finance, insurance, real estate, and business services	4.50	6.90	7.80	1.50	14.50	6.10
Social services	9.90	41.40	18.70	3.90	12.40	12.20
Total	8.90	0.50	44.90	34.40	11.30	100

Table B.2 Sector and Employment Type of 10-15-year-old Child Labour (% of total child labour)

	Self Employed	Government Worker	Private Worker	Unpaid Family Worker	Other Worker
Agriculture, Forestry, fishing, and hunting	2.00	0.00	2.10	0.80	1.40
Mining and quarrying	26.90	18.20	16.20	57.30	31.30
Manufacturing	4.10	0.00	1.60	0.50	3.20
Electricity, gas, water	22.00	0.00	27.90	15.00	15.50
Construction	0.00	0.00	1.10	0.10	0.70
Wholesale, retail, restaurants, and hotels	0.40	0.00	4.40	0.10	4.60
Transportation, storage, and communications	23.70	18.20	17.70	21.10	14.40
Finance, insurance, real estate, and business services	4.50	0.00	2.00	0.50	4.20
Social services	4.10	18.20	6.70	1.20	14.80
Total	8.50	0.40	35.80	45.50	9.80

Table B.3 Sector and Employment Type of 15+ year-old Child Labour (% of total child labour)

	Self Employed	Government Worker	Private Worker	Unpaid Family Worker	Other Worker
Agriculture, Forestry, fishing, and hunting	2.10	4.80	2.10	1.20	1.90
Mining and quarrying	28.60	38.10	11.80	57.90	24.70
Manufacturing	2.10	0.00	1.60	0.80	3.80
Electricity, gas, water	21.40	9.50	29.10	12.50	15.30
Construction	0.60	4.80	1.10	0.00	1.10
Wholesale, retail, restaurants, and hotels	1.20	4.80	4.50	0.30	7.40
Transportation, storage, and communications	25.60	0.00	20.20	21.00	14.00
Finance, insurance, real estate, and business services	6.30	0.00	3.20	0.40	3.60
Social services	4.20	0.00	8.40	1.30	15.10
Total	9.10	0.60	53.60	24.20	12.70

Table B.4 Extended Descriptive Statistics

	Not Working		Working	
	Not Drop-out	Drop-Out	Not Drop-out	Drop-Out
	mean	*mean*	*mean*	*mean*
	(sum)	*(sum)*	*(sum)*	*(sum)*
Household Heads' Working Sector				
Agriculture, Forestry, fishing, and hunting	1,827	1,602	446	1,226
Mining and quarrying	143	60	18	65
Manufacturing	1,069	419	174	397
Electricity, gas, water	90	9	13	14
Construction	322	196	34	140
Wholesale, retail, restaurants, and hotels	1,138	538	207	357
Transportation, storage, and communications	373	196	44	128
Finance, insurance, real estate, and business services	615	108	107	148
Social services	1,302	335	101	237
Other	106	74	11	30
Household Heads' Employment Type				
Self Employed	1,842	1,353	252	730
Self Employed with Unpaid Family Worker	1,177	484	366	645
Self Employed with Permanent Worker	155	19	27	30
Government Worker	1,068	94	71	44
Private Worker	2,034	1,111	280	826
Unpaid Family Worker	172	131	57	97
Other Worker	537	345	102	370
Household Heads Highest Education				
Did not finish elementary school	586	633	114	401
Elementary School	3,262	2,372	592	1,848
Junior High School	1,442	666	219	491
Senior High School	2,772	453	377	221
Diploma/Undergraduate	978	45	130	37
Postgraduate	82	5	3	2
Rural	3145	2503	675	1785
Urban	5977	1671	760	1215
Household Total Income (IDR Million)	15.65	10.48	21.39	13.94
	(35.04)	(28.37)	(44.02)	(29.59)
Household Size	3.37	3.14	4.79	4.33

	(2.83)	(2.91)	(2.37)	(2.59)
Household Sex Ratio	0.31	0.31	0.41	0.42
	(0.37)	(0.38)	(0.37)	(0.38)
School Proximity (minutes)	15.03	20.22	19.92	21.97
	(15.04)	(19.99)	(16.27)	(18.29)
Average Adult Wage per District (IDR)	561,302	507,127	767,760	627,708
	(509,116)	(481,747)	(509,944)	(487,354)
	7.90	7.13	7.87	8.19
Number of Out-migrant per district (person)				
	(8.08)	(7.26)	(7.53)	(7.64)

Note: The values in the parenthesis show the standard deviation

Table B.5 Robustness tests for the Hazard Rate of Drop-Out Based on Age Groups

Drop-out=1	(6-12)	(13-15)	(16+)
Migrant Household	-0.202	-0.185	-0.022
(Migrant HH=1)	(1.69)*	(2.77)***	(0.31)
Time variable	Yes	Yes	Yes
Individual Characteristics	Yes	Yes	Yes
Household Characteristics	Yes	Yes	Yes
Community Characteristics	Yes	Yes	Yes
Num. Obs.	87,270	50,990	27,137

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Note: The values in the parenthesis show the t-values

Table B.6 Robustness tests for the Hazard Rate of Drop-Out Based on Gender

Drop-out=1	(Female)	(Male)
Migrant Household	-0.178	-0.038
(Migrant HH=1)	(2.85)***	(0.59)
Time variable	Yes	Yes
Individual Characteristics	Yes	Yes
Household Characteristics	Yes	Yes
Community Characteristics	Yes	Yes
Num. Obs.	88,904	83,789

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Note: The values in the parenthesis show the t-values

Table B.7 Robustness tests for the Hazard Rate of Child-Work Based on Age Groups

Working =1	(6-12)	(13-15)	(16+)
Migrant Household	0.292	0.099	0.089
(Migrant HH=1)	(2.14)**	(1.48)	(1.38)
Time variable	Yes	Yes	Yes
Individual Characteristics	Yes	Yes	Yes
Household Characteristics	Yes	Yes	Yes
Community Characteristics	Yes	Yes	Yes
Num. Obs.	78,172	59,235	38,030

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Note: The values in the parenthesis show the t-values

Table B.8 Robustness Tests for the Hazard Rate of Child-Work Based on Gender

Working=1	(Female)	(Male)
Migrant Household	-0.050	0.205
(Migrant HH=1)	(0.72)	(3.44)***
Time variable	Yes	Yes
Individual Characteristics	Yes	Yes
Household Characteristics	Yes	Yes
Community Characteristics	Yes	Yes
Num. Obs.	100,691	92,987

* p<0.1; ** p<0.05; *** p<0.01

Note: The values in the parenthesis show the t-values

Table B.9 Robustness tests for the Hazard Rate of Child-Work Based on Employment Type

Working =1	(Unpaid Family Workers)	(Other Employment Type)
Migrant Household	0.162	0.090
(Migrant HH=1)	(2.16)**	(1.58)
Time variable	Yes	Yes
Individual Characteristics	Yes	Yes
Household Characteristics	Yes	Yes
Community Characteristics	Yes	Yes
Num. Obs.	159,791	182,121

* *p<0.1; ** p<0.05; *** p<0.01*

Note: The values in the parenthesis show the t-values
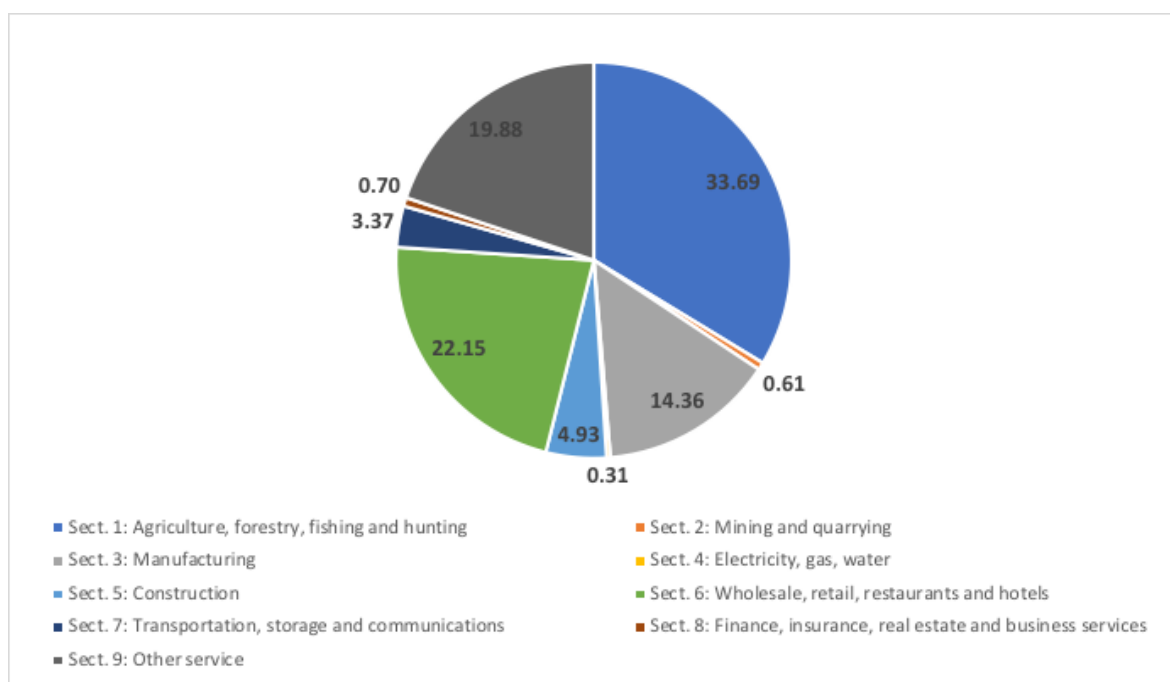
Appendix C

Figure C.1 Self-Employment Activities by Sector
Source: Author's calculation using IFLS

Table C.1 Instrumental Variable Regression for the Impact of BLT to Self-employment (Village Size as Additional Instrument)

(Self-employment=1)	(BLT Recipient=1)				BLT Amount (Log)			
	OLS	IV	IV	IV	OLS	IV	IV	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
BLT	0.095	0.235	0.229	0.228	0.004	0.017	0.017	0.017
	(1.10)	(16.21)***	(15.84)***	(15.32)***	(9.76)	(16.22)***	(15.85)***	(15.32)***
Individual Characteristics								
Age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gender	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Risk Index	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Race	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household Characteristics								
Head's Gender	Yes		Yes	Yes	Yes		Yes	Yes
Head's Educ.	Yes		Yes	Yes	Yes		Yes	Yes
Income	Yes		Yes	Yes	Yes		Yes	Yes
Size	Yes		Yes	Yes	Yes		Yes	Yes
Community Characteristics								
Urban	Yes			Yes	Yes			Yes
Population	Yes			Yes	Yes			Yes

Prop BLT HH	Yes			Yes	Yes			Yes
Prop Entrep to Population	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LM Stat		2071.4***	2076.3***	1998.7***		2060.7***	2065.0***	1986.8***
Hansen J Stat		31.746***	26.232***	26.206***		31.432***	25.997***	25.980***
Endogeneity Test		210.7***	196.9***	185.3***		211.9***	198.0***	186.3***
Num. Obs.	20,293	20,293	20,293	20,293	20,293	20,293	20,293	20,293

* p<0.1; ** p<0.05; *** p<0.01

Note: The values in the parenthesis show the t-values

Table B.1 above fixes the missing data of the post office distance variable due to the availability of post office in the village. In the questionnaire, when there is a post office data in the village, the distance to the post office is no longer questioned. Therefore, we capture the information using the village size in km halved. Assuming that the post office is located in the village centre, hence the furthest distance for the post office to the village border would be half of the village size. The instrument is the interaction between the availability of the post office and the village size halved. In the table, the result is relatively consistent with the benchmark result, where the benchmark results apply median for those missing data.

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