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WIDER Working Paper 2020/143

Progress and stagnation in the livelihood of informal workers in an emerging economy

Long-term evidence from Indonesia

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November 2020

United Nations University World Institute for Development Economics Research
wider.unu.edu

Abstract: We use long-spanning individual longitudinal data to examine the long-term labour market outcomes of low-tier informal workers. We investigate their characteristics, calculate the extent of switching, and identify the characteristics of those who have switched. Finally, we estimate the earnings premium of switching. We find that individuals are negatively selected into low-tier informal work. Almost half of individuals who started out as a low-tier informal worker remained as low-tier informal workers through the next 8–19 years. The other half switched on average three times. Most switches take place from low-tier informal to low-tier formal sector work. High-tier jobs are relatively closed off to those who started their career as low-tier informal workers. We find that the earnings premium that low-tier informal workers could gain by switching is large and statistically significant. An effective policy, therefore, is to support low-tier informal workers to improve their livelihoods by becoming low-tier formal workers.

Key words: earnings premium, Indonesia, informal sector, long-term outcomes

JEL classification: J31, J46, O17

Acknowledgements: We would like to thank reviewers from UNU-WIDER for their comments and suggestions.

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This study has been prepared within the UNU-WIDER project Transforming informal work and livelihoods.

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ISSN 1798-7237 ISBN 978-92-9256-900-6

https://doi.org/10.35188/UNU-WIDER/2020/900-6

Typescript prepared by Joseph Laredo.

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The Institute is funded through income from an endowment fund with additional contributions to its work programme from Finland, Sweden, and the United Kingdom as well as earmarked contributions for specific projects from a variety of donors.

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1 Introduction

A common characteristic among emerging economies is the existence of a large informal sector. La Porta and Shleifer (2014) find that the informal sector makes up about 40 per cent of total economic activity in the poorest countries. The share is only about 15 per cent in the richest countries.

The existence of an informal sector can be explained by three main theories: exclusion, rational exit, and dual economy (Rothenberg et al. 2016). The exclusion theory argues that the informal sector exists because workers could not find jobs in the formal sector. The rational exit theory stipulates that the net benefits of joining the formal sector are negative. Finally, the dual economy theory states that the informal and formal sectors co-exist; they produce different goods, have different productivity levels, pay different wage levels, and cater to different consumers.

The literature on emerging economies generally finds support for the dual economy theory. Workers and firms in the two sectors are different. Gindling and Newhouse (2012) and La Porta and Shleifer (2014) find that informal firms are small, unproductive, and stagnant. They argue that a better regulatory environment would not bring these firms into the formal sector. Rothenberg et al. (2016) evaluate an Indonesian government programme to ease firm registration. They find that the programme has negligible impact, mainly because informal firms are not interested in registering. Moreover, switching between sectors is rare. McCaig and Pavcnik (2015) found that only 17 per cent of informal workers switched to formal work in a four-year period, while de Mel et al. (2010) observed that less than 10 per cent of own-account workers in Sri Lanka grew to having employees within three years. Taken together, these findings support the dual economy theory.

In general, studies from emerging economies have two shortcomings. First, the heterogeneity of the informal sector—documented by among others Gunther and Launov (2012)—is often ignored. Second, the long-term livelihood of informal sector workers and firms is rarely studied. Most studies in emerging economies rely on cross-sectional datasets. In Sri Lanka, de Mel et al. (2010) could only observe the same entrepreneurs for three years. In Viet Nam, available datasets allow McCaig and Pavcnik (2015) to follow individuals for only four years.

In this study, we use a rich household longitudinal dataset from Indonesia that spans 19 years, from 1996 to 2014, to examine the livelihood of informal workers. The data also allow us to differentiate between low-tier and high-tier informal and formal workers. Finally, the data span a period in which Indonesia grew from a low-income to a middle-income country. Thus, we were able to examine changes in the proportion of low-tier informal workers as an economy grows.

In particular, we address the following research questions:

1. What is the proportion of individuals whose first job is low-tier informal compared with those whose first job is high-tier informal, low-tier formal, or high-tier formal? What are the characteristics of individuals whose first job is low-tier informal compared with those whose first job is high-tier informal or formal?
2. Has (1) changed over two decades, as Indonesia has become a middle-income country?
3. Among individuals whose first job was low-tier informal, what is the proportion of those who switch to other job types? Is the switch permanent or temporary? Does the path from low-tier informal to formal always go through high-tier informal? What are the characteristics of the individuals who managed to switch?

4. What is the earnings premium of switching to either high-tier informal, low-tier formal, or high-tier formal jobs, relative to staying in low-tier informal jobs?

2 Economic development and informal workers in Indonesia

After tumultuous years during the 1960s, which culminated in a regime change, Indonesia started its economic development at the end of that decade. The new government was able to quickly restore macroeconomic stability and, awash with revenue from oil windfall, invested heavily in infrastructure. After that, Indonesia experienced high economic growth, averaging around 7 per cent annually, for the next three decades.

The mid-1980s witnessed a drop in international oil prices, which quickly dried up the government's coffers. Due to the inward-looking import substitution strategy adopted during the previous decade, Indonesian industries were inefficient and unable to compete in the international market. To deal with the dire situation, the government changed course quickly, adopting an export-orientation strategy. The change in strategy was initiated through a large devaluation of the rupiah, whose exchange rate was pegged to the US dollar at that time. This was followed by various deregulation measures to make the economy more efficient. As a result, high economic growth was quickly restored.

This was brought to a sudden stop at the end of 1990s by the Asian financial crisis (AFC). Starting as a currency attack on Thailand's baht in 1997, the crisis quickly spread to other East Asian countries. Indonesia, whose political future was perceived as highly uncertain on account of its old and ailing president and lack of a clear successor, soon became the worst affected country. In 1998, the rupiah lost more than 80 per cent of its value in less than a year, prices skyrocketed (food prices rose by 120 per cent), and the economy contracted by an unprecedented 14 per cent.

The crisis brought a lot of changes. The country once again underwent a regime change as the authoritarian New Order government was toppled and Indonesia became a democratic country. Central and regional government leaders are now elected regularly by the people. Furthermore, pressure from the regions forced the new government to decentralize, both politically and fiscally. Regional autonomy was largely granted to the districts, bypassing the provinces.

The economy soon recovered from the crisis. The contraction in 1998 was followed by near zero economic growth in 1999, and in 2000 the economy began to grow again—on average by around 6 per cent annually—helped by a commodity boom. The boom ended in 2011, slowing economic growth to around 5 per cent annually. The country's post-crisis economic growth is clearly lower than its pre-crisis level; nevertheless, the economy has grown steadily and respectably by world standards.

Throughout Indonesia's economic development, various social and economic indicators have steadily improved. Per capita income has increased, poverty has declined, education levels have risen, and access to basic services has improved. In the labour market, the proportion of informal workers in the total workforce has shown interesting trends. In general, higher per capita income and improvement in welfare are usually accompanied by a declining proportion of informal workers. This was true in Indonesia during the pre-crisis period. However, during the post-crisis period, this relationship did not hold. Even though the economy continued to grow and per capita income increased, the proportion of informal workers either increased or stagnated. Only after 2014 did the proportion of informal workers tend to decline again.

A deeper look at the labour market situation indicates that the reverse in the relationship between economic growth and the proportion of informal workers was largely due to the change in labour market regulations. During the pre-crisis period, labour movement was tightly regulated and only one labour union was allowed to operate. On the other hand, in the post-crisis period the regulatory framework became pro-labour, resulting in high minimum wages and severance payments, complicated hiring-and-firing mechanisms, and mushrooming labour unions. This resulted in firms avoiding hiring workers, especially on a permanent basis, as much as possible. As a result, very little employment was created in the formal sector during this period. On the other hand, around 2 million new workers entered the labour market every year. Since there were few employment opportunities in the formal sector, most of them joined the informal sector, resulting in growing numbers of informal workers.

3 Data

3.1 The Indonesian Family Life Survey (IFLS)

Our primary data source is the Indonesian Family Life Survey (IFLS), an ongoing longitudinal socioeconomic survey in Indonesia. There are five waves of the IFLS, all publicly available. The first wave, IFLS1, administered in 1993, was based on a sample of more than 22,000 individuals from 7224 households across 321 sampling areas in 13 provinces. The data represented about 83 per cent of Indonesia's population in 1993. The other waves were fielded in 1997 (IFLS2), 2000 (IFLS3), 2007 (IFLS4), and 2014 (IFLS5). Household attrition is very low, at around 5 per cent for each wave. The latest wave, IFLS5, managed to survey 6647 households that had been surveyed in all waves since 1993 (Strauss et al. 2016).

The IFLS consists of two sets of surveys: a household survey and a community survey. The community survey collects information regarding infrastructures at the level of the community, including health facilities, schools, roads, water supplies, and sanitation. The household survey collects both household- and individual-level information and includes data on each household member, such as their education, employment, and health. Information relevant to this study includes labour market outcomes, education attainment, health outcomes, household expenditure, and demographic information.

Each IFLS collects labour market information on adults in respondent households since the previous survey. For example, in 1993, it collected labour market information since 1988. Thus, the whole five rounds of IFLS data contain annual labour market information on the same individuals from 1988 to 2014. However, the annual labour market outcomes module was modified in two ways between waves. First, IFLS3 was the first survey to differentiate between self-employment with and without employees; IFLS1 and IFLS2 make no such distinction, which is important in our study. Second, IFLS4 and IFLS5 did not record earnings, which means that we could only address the fourth research question with relatively short-term data covering seven years, i.e. 1996–2000, 2007, and 2014. The following sub-section provides more details.

3.2 Informal workers in IFLS

In this study, we use the last three rounds of the IFLS (2000, 2007, 2014). We start with the 2000 wave because (a) 94 per cent of answers on the year of starting work and occupation codes are missing in 1993; and (b) the classification of work status in 1997 differs from the other waves: in IFLS 1993 and IFLS 2000 onwards, the classification of work status for self-employment type consists of self-employment without help, self-employment with help of unpaid family/temporary

worker, and self-employment with help of permanent/regular worker. IFLS 1997, however, lumps them into only one category of self-employment.

The IFLS classifies workers as either employees or self-employed. Among the self-employed, as stated above, it indicates whether individuals are self-employed without help, with the help of unpaid family/temporary worker(s), or with the help of permanent/regular worker(s). Employees are specifically asked whether they work for the government, for a private company, or as an unpaid worker in the family business.

The IFLS provides information on the type of each individual's work. There are two sources of information in the data: an occupation classification code and a list of daily primary duties. In each survey the interviewer asks individuals about their occupation using open-ended questions. The answers, recorded as free text, are then coded using 2-digit International Standard Text Code (ISTC) occupation codes. The IFLS team also assign 1-digit sector codes to the open-ended answers on occupation.

In this study, we differentiate low-tier and high-tier informal workers through a classification of both work status and work type. Those who are employees of either the government or a private company, in any job type, are classified as formal workers. All those who are self-employed with the help of permanent/regular worker(s) are high-tier informal workers. Individuals whose work status is self-employed without help or self-employed with the help of unpaid family/temporary worker(s) and whose work type is professional, managerial, or official/administrative are also considered to be high-tier informal workers. The classification of high-tier informal workers is determined not only by the data on daily primary duties, but also by the 2-digit ISTC code. It includes occupation codes of 40 or less and codes 50, 60, 70, 80, and 90, which indicate a managerial level of workers in the service, agricultural, and production sectors. The rest of the self-employed without help or self-employed with the help of unpaid family/temporary worker(s) are considered to be low-tier informal workers, as are all unpaid family workers.

The classification of all employers as informal sector workers may not be completely accurate. For example, employers whose businesses are formally registered with the government or taxed should be considered as formal, but unfortunately the IFLS does not collect such information. In the context of Indonesia, however, 96 per cent of micro firms (employing fewer than five people) and 93 per cent of small firms (employing between 5 and 19 people) are not taxed and can therefore be considered as informal (Rothenberg et al. 2016). This stylized fact supports our decision to consider individual employers as informal, rather than formal, workers. That said, this is an area for further study, once data become available.

We define all government employees or private sector employees as formal workers. To distinguish between high-tier and low-tier formal, we use the same definition we use for informal workers: workers whose work type is professional, director, or official are considered to be high-tier formal. The rest are low-tier formal. Table 1 provides the classification matrix of types of workers based on work status and work type.

We apply the above definitions not only to an individual's current job but also to past jobs. Each wave of the IFLS provides information on individuals' employment before the survey: for example, IFLS 2000 gives information on individuals' annual employment in 1996–99; IFLS 2007 on employment in 1999–2006; and IFLS 2014 on 2007–15. We do not include 2015 employment in the analysis because of the higher rate of missing values in the occupation coding. Using this strategy, we can observe an individual's employment record for a maximum of 19 years, from 1996 to 2014.

Table 1: Definition of low-tier/high-tier and informal/formal workers

		Work status					
		Self-employed	**Self-employed with family member**	**Employer**	**Government employee**	**Private sector employee**	**Unpaid family worker**
Work Type	**Professional**	HTI	HTI	HTI	HTF	HTF	LTI
	Director or manager	HTI	HTI	HTI	HTF	HTF	LTI
	Official or administrative	HTI	HTI	HTI	HTF	HTF	LTI
	Sales	LTI	LTI	HTI	LTF	LTF	LTI
	Labour	LTI	LTI	HTI	LTF	LTF	LTI
	Production	LTI	LTI	HTI	LTF	LTF	LTI
	Transportation	LTI	LTI	HTI	LTF	LTF	LTI
	Unskilled	LTI	LTI	HTI	LTF	LTF	LTI

Note: LTI = low-tier informal; HTI = high-tier informal; LTF = low-tier formal; HTF = high-tier formal.

Source: authors' construction.

Other than current and past jobs, the IFLS also has a module on the first employment of individuals. Given the information on the first job's status and type, we can identify whether an individual started as an LTI, HTI, LTF, or HTF worker, using the same procedure. There is also information on the year of starting work. However, when we compared data from the first job module and data from the current and past jobs module, we found that 8 per cent of the work types were different. We therefore decided to use the informality type of first job supplemented by information from the latter module.

Individual characteristics

To identify the characteristics of individuals whose first jobs are LTI, HTI, LTF, or HTF, and the characteristics of individuals who switch tier or remain LTI workers, we include demographic characteristics such as age, years of schooling, height, and parental education. We use height as an indicator of early childhood health levels (Hatton et al. 2018), standardizing each individual's height data into a mean of zero and a standard deviation of one. The correlates also include urban vs. rural residence.

For a subset of individuals (those between 7 and 24 years old in IFLS3), we have information on their mathematics and cognitive skills. We measure cognitive and mathematics skills using the results of the Raven's and maths tests provided in each wave of IFLS since 2000. The tests were administered for 7–14 and 15–24-year olds. The test design for the younger group consists of five primary-school level arithmetic and five shape-matching problems. There are five (more complex) arithmetic and eight shape-matching problems for the older age group.

Community characteristics

To examine whether access to public services has an impact on first jobs, transitions into other types of job, and earnings, we include information on schools, health facilities, and roads. We do not measure these variables using the community survey in IFLS because more than 80 per cent of the sample has missing information on the community they are located in. We use the Potensi Desa (Village Potential Census) instead. Potensi Desa (Podes) is a village census carried out once every three or four years. It contains information on village-level characteristics from geographical location to infrastructures in the village.

We merge IFLS and Podes data. However, as village codes differ between IFLS and Podes, we use information on schools, health facilities, and roads from Podes at the district level. District-level school infrastructure comprises the average number of primary schools (SD) in the village, the average number of junior high schools (SMP) in the sub-district, and the average number of senior high schools (SMA) in the district. We differentiate district-level school infrastructure on the basis of its administration level in accordance with the Indonesian government policy of ensuring that all villages have at least one primary school, all sub-districts at least one junior high school, and all districts at least one senior high school. District-level health and road facilities are measured as a percentage of villages with a health centre and roads that are usable year-round. We use Podes 2000, 2008, and 2014 to match with IFLS 2000, 2007, and 2014 respectively.

4 Method

In this study, our focus is on individual workers rather than firms. Specifically, we limit our sample to male workers in the non-agricultural sector. Given our focus on following individuals from the time they began working, we further restrict our sample to young workers (starting jobs a maximum of seven years before the wave administered). Finally, we limit our sample to those with no missing data on relevant variables. We use information on individuals' work status and work type to create four groups: low-tier informal workers, high-tier informal workers, low-tier formal, and high-tier formal workers.

The first and second research questions are tabulations by cohort and demographic characteristics across IFLS3 to IFLS5. To answer the third research question, our sample consists of individuals who began as a LTI workers either in 1996–2000 (observed in IFLS3) or in 2001–2007 (observed in IFLS4). To examine their characteristics, we use the same correlates as above, but only using the year on the first job conditions to avoid reverse causality. We estimate a survival model, since our data are censored on the right. We create the following outcome indicators: an indicator of switching to either HTI or formal employment, employment spells in each job type, and the number of switches between job type.

The fourth research question examines whether switching to HTI, LTF, or HTF jobs generates higher earnings compared with staying in LTI jobs. We build on the method used by Levine and Rubinstein (2017). Specifically, we estimate the following linear earnings equation:

$$y_{it} = \alpha + \beta_1 \mathrm{HTI}_{it} + \beta_2 \mathrm{LTF}_{it} + \beta_3 \mathrm{HTF}_{it} + \beta_X \mathrm{X}_{it} + \varepsilon_{it} \quad (1)$$

where the outcome variable y_{it} is the log hourly earnings of individual *i* in year *t*. Because log zero is undefined, we transform the log hourly earnings into inverse hyperbolic sine (IHS) form to allow the retention of zero-valued observations. Hourly earnings are calculated from individual *i*'s wage and profit information divided by hours worked and adjusted using the Consumer Price Index (CPI, 2012=100) from Statistics Indonesia.

In equation (1), HTI_{it} equals 1 if individual *i* in year *t* is an HTI worker and 0 otherwise; LTF_{it} equals 1 if individual *i* in year *t* is an LTF worker and 0 otherwise; HTF_{it} equals 1 if individual *i* in year *t* is an HTF worker and 0 otherwise. X_{it} is a vector of covariates consisting of individual *i*'s age, years of schooling, cognitive and maths skills, height, residential location, parental education, whether individual *i* lives in an urban or rural area, and additional controls for public services in the district (schools, health centre, and road facilities), all at time *t*. Cognitive and maths test scores as well as heights are standardized. Parental education consists of two dummy variables: whether father has more than six years of education (Yes=1) and whether mother has more than six years

of education (Yes=1). Schools, health facilities, and roads are measured at district level. The vector of covariates also includes year, wave, and island fixed effects to control for trends in macroeconomic and regional differences that could affect the earnings. Lastly, ε_{it} is the error term that can be decomposed into three components:

$$\varepsilon_{it} = \theta_i + \alpha_i(t) + \varphi_{it} \quad (2)$$

where θ_i is the individual-specific and time-invariant component, $\alpha_i(t)$ is the time-varying individual influences, and φ_{it} is the individual-time shock to earnings. When excluding individual effects from equation (1), the estimated β_1, β_2, and β_3 parameters provide unbiased measures of the differences in residual earnings for individuals in HTI, LTF, or HTF jobs relative to LTI workers with similar traits included in X_{it}. When we include individual effects, we remove individual time-invariant unobserved heterogeneity and individual-level trend into the choice of job type. Therefore, the estimates for β_1, β_2, and β_3 yield unbiased estimates of the differences in residual earnings for individuals working in HTI, LTF, or HTF jobs relative to when they were an LTI worker. To obtain a clearer picture of these differences in residual earnings, we compare these estimated differences in earnings with the average earnings of LTI workers and provide the percentage difference to examine whether workers earn more when switching to HTI, LTF, or HTF work. We estimate the model using least squares and median regressions.

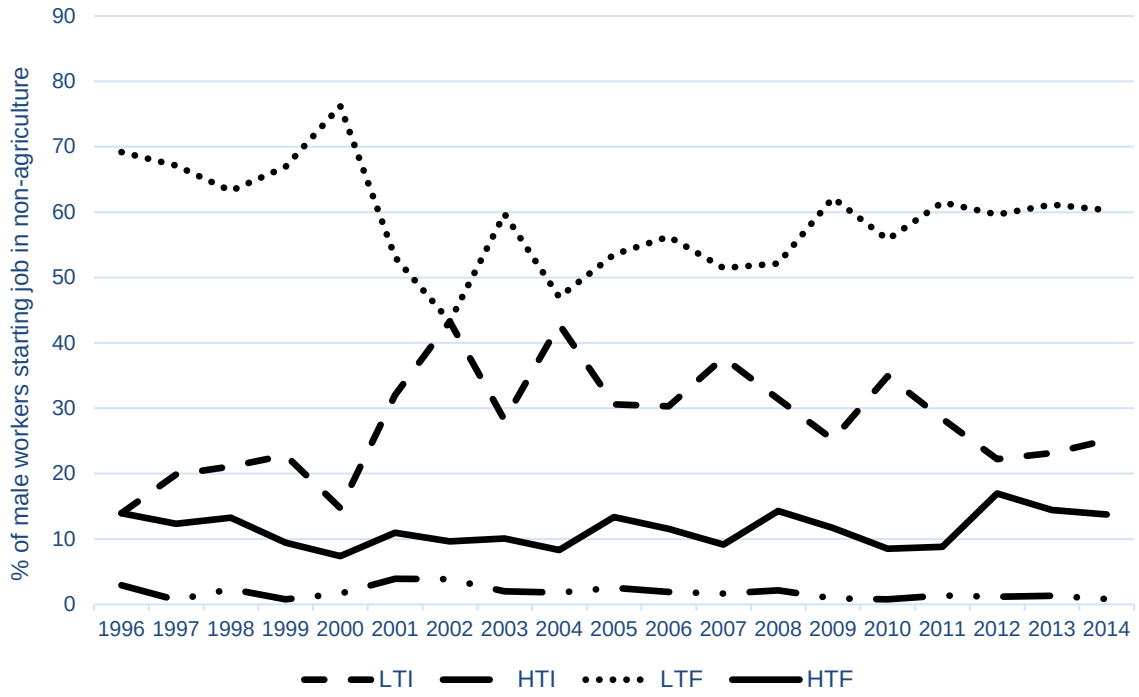
5 Results

5.1 First job informality

To address the first and second research questions, Figure 1 shows the proportions of male workers, limited to those who worked in non-agricultural sectors, by the types of (in)formality of their first jobs and year of starting their first job. The figure clearly shows that, in non-agricultural sectors, the first jobs of male workers are predominantly LTF, i.e. 70 per cent in 1996, significantly declining to 40 per cent in 2001, and stabilizing at around 60 per cent between 2009 and 2014. The decline in 2001 is most likely explained by the AFC. Among the remaining workers, the proportion whose first job was LTI was 15 per cent in 1996, more than doubling to 40 per cent in 2001, before following a fluctuating pattern between 2001 and 2014. The rate was at 27 per cent in 2014. The trend of first job as HTF was roughly consistent at around 10–13 per cent over the period. Finally, only around 1–2 per cent of workers' first jobs were HTI.

Looking at the 19-year trend, there is some evidence that the informal sector has declined as Indonesia's economy has grown. But the decline has been very slow. The share of workers whose first job was LTI increased by 80 per cent proportionally over the period that we observe. The impact of the 1998 AFC, which more than doubled the share of LTI first jobs, had yet to disappear by 2014. Over the period, the proportion of workers whose first job was LTF declined by 13.5 per cent proportionally. On the other hand, the share of workers whose first job was HTF increased by only 13 per cent. This trend is evidence that even if the informal sector appears to become smaller as an economy grows, the decline is very small and can be rapidly overturned by an economic crisis.

Figure 1: Proportion of male workers starting jobs in non-agriculture in 1996–2014 by types of job



Note: number of observations: 3025.

Source: authors' construction based on data from IFLS 2000, 2007, and 2014.

5.2 Sorting into first job types

We compare the characteristics of workers with different first jobs. Table 2 shows the mean characteristics, combining IFLS3, 4, and 5 (so covering first jobs from 1996 to 2014). On average, these workers started work when they were 22–26 years old. The average starting age of those who started as low-tier workers, either formal or informal, is similar. Those who started working as high-tier workers tended to start at slightly older ages, reflecting the fact that they remained in school about three years longer.

The cognitive and mathematics scores of those who started as low-tier workers, either informal or formal, are similar. Those who started as HTI or HTF workers also have similar mathematics and cognitive scores. Overall, those who started as HTI workers have the highest cognitive score, while those who started as HTF have the highest mathematics score. Comparing the formal and informal sectors as a whole, we find that those who started work in the formal sector have slightly higher cognitive and maths scores.

Using height as an indicator of early childhood health levels, we find that individuals who started as LTI workers are the shortest, by almost 1 centimetre. This information shows that those who begin as LTI workers have already faced worse conditions even from early in life.

The pattern in years of schooling of workers is also reflected in the patterns in their parents' years of schooling. High-tier workers, whether informal or formal, have the most educated parents. LTI workers have the least educated parents, on average by two years. Overall, the parents of these workers have only between two and four years of education, and the workers themselves have an average of nine years of schooling. Incidentally, the large intergenerational increase in educational attainment shows the Indonesian government's success in increasing access to education.

Table 2: Mean characteristics of workers in the first job sample

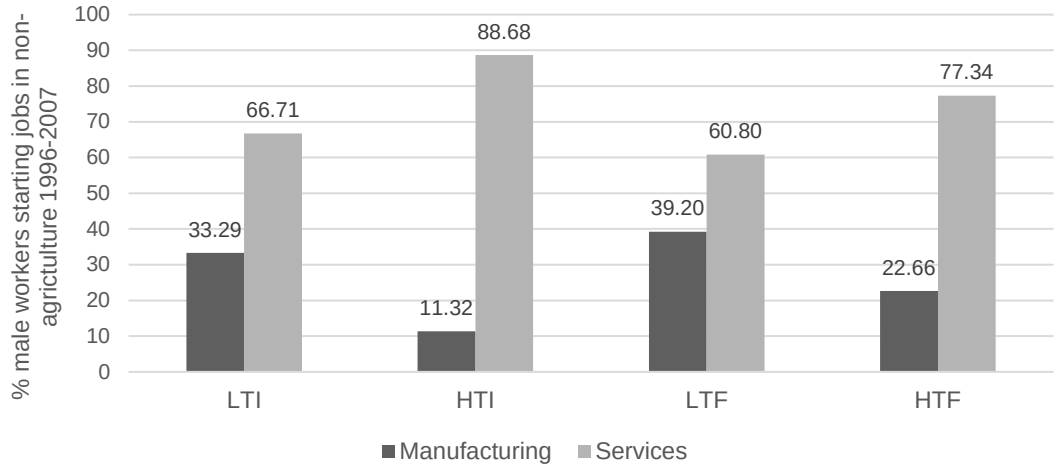
	Informal		Total informal	Formal		Total formal	Total
	Low-tier	**High-tier**		**Low-tier**	**High-tier**		
Observations	841	53	894	1778	353	2141	3025
	27.80%	1.75%	29.55%	58.78%	11.67%	70.45%	100.00%
Age	22.49	26.30	22.72	22.71	25.24	23.13	23.01
Years of schooling	9.25	12.08	9.41	10.10	12.89	10.56	10.22
Cognitive score	5.86	6.35	5.88	6.00	6.24	6.04	5.99
Maths score	1.90	2.19	1.91	2.00	2.39	2.06	2.01
Height (in cm)	162.65	163.25	162.69	163.48	164.04	163.57	163.31
Father's years of schooling	3.34	6.06	3.50	3.87	6.01	4.22	4.01
Mother's years of schooling	2.81	4.85	2.93	3.11	4.64	3.36	3.23
Urban	0.58	0.75	0.59	0.64	0.66	0.65	0.63
By district:							
Number of SD in village	4.37	4.82	4.40	4.81	5.11	4.86	4.72
Number of SMP in sub-district	11.65	11.47	11.64	12.51	13.22	12.63	12.34
Number of SMA in district	77.54	67.83	76.97	81.05	83.92	81.53	80.18
% villages in the district with:							
Health centre	0.18	0.21	0.18	0.22	0.24	0.23	0.21
Year-round roads	0.74	0.74	0.74	0.81	0.81	0.81	0.79

Note: the sample is restricted to male workers in non-agricultural sectors who started their first job in 1996–2014 and answered questions on their first job in IFLS 2000, 2007, and 2014.

Source: authors' construction based on data from IFLS 2000, 2007, and 2014. Variables on public services (schools, health, and road facilities) are derived from Podes data in 2000, 2008, and 2014.

Figure 2 shows the sector that these workers started in. About 33–39 per cent of low-tier workers started work in manufacturing, the rest in services. In contrast, a large majority of high-tier workers began in the services sector. Among HTI workers, 87 per cent started in services. Comparing these figures, we see again that the main cleavage between workers is not between informal and formal, but between low-tier and high-tier.

Figure 2: Proportion of male workers starting jobs in 1996–2014 by industry and type of job



Note: number of observations: 841 (LTI); 53 (HTI); 1778 (LTF); 353 (HTF).

Source: authors' construction based on data from IFLS 2000, 2007, and 2014.

Next, we use a multinomial logit regression to examine whether individuals with different characteristics are more likely to enter the work force as LTI, HTI, LTF, or HTF workers. We assess the sorting into first job types using IFLS3, 4, and 5 for individuals who started work in 1996–2000, 2001–07, and 2008–14, respectively. The independent variables are listed in Table 2.

Table 3 shows the marginal effects at mean. First, older individuals are slightly more likely to have an HTF first job. An additional year of schooling is correlated with a 0.2 to 2.6 percentage point higher probability of working as a high-tier worker. Finally, having a more educated father is correlated with a 4.3 percentage point higher probability of starting as an HTF worker. Given that only 11 per cent of workers started in this category (Table 2), the benefit of having a more educated father is very large. This could be related to connections in employment, or it could be that having a more educated father is a proxy for higher socioeconomic status. Taller men are less likely to start as LTI workers. At 1.51 percentage points, however, the effect is relatively small. Workers with a higher cognitive score have a greater chance of starting work in LTF jobs, and a smaller chance of starting in LTI jobs. Finally, a higher mathematics score increases the probability of starting in the HTF sector by 2 percentage points, and reduces the probability of starting in the LTI sector by 2.2 percentage points.

Table 3: Selection into types of first job, IFLS3, 4, and 5

	Informal		**Formal**	
	Low-tier	**High-tier**	**Low-tier**	**High-tier**
	(1)	**(2)**	**(3)**	**(4)**
Age	-0.0027	-0.0002	0.0009	0.0020**
	(0.00169)	(0.00036)	(0.00161)	(0.00084)
Years of schooling	-0.0229***	0.0023***	-0.0056	0.0262***
	(0.00455)	(0.00048)	(0.00509)	(0.00430)
Cognitive score (standardized)	-0.0242**	-0.0000	0.0245**	-0.0003
	(0.01216)	(0.00392)	(0.01231)	(0.00772)
Maths score (standardized)	0.0019	-0.0001	-0.0222**	0.0205***
	(0.00887)	(0.00315)	(0.00955)	(0.00740)
Height (standardized)	-0.0151***	0.0001	0.0147	0.0003
	(0.00576)	(0.00120)	(0.01220)	(0.01139)
Urban (Yes=1)	0.0106	0.0026	0.0243	-0.0375***
	(0.02084)	(0.00641)	(0.02645)	(0.01128)
Father has more than six years of education (Yes=1)	-0.0238	-0.0055	-0.0136	0.0429***
	(0.02901)	(0.00566)	(0.02515)	(0.01474)
Mother has more than six years of education (Yes=1)	0.0188	0.0088*	-0.0288	0.0012
	(0.02832)	(0.00493)	(0.03014)	(0.02105)
By district:				
Number of SD	0.0082	0.0008	-0.0135**	0.0045*
	(0.00936)	(0.00179)	(0.00765)	(0.00260)
Number of SMP	0.0038	-0.0001	-0.0037	-0.0001
	(0.00342)	(0.00071)	(0.00326)	(0.00186)
Number of SMA	-0.0000	-0.0001	0.0004**	-0.0000
	(0.00024)	(0.00008)	(0.00020)	(0.00006)
% village with health centre	-0.3055**	0.0054	0.3125***	-0.0124
	(0.13664)	(0.01529)	(0.10626)	(0.05286)
% village with year-round roads	-0.0269	-0.0206	0.1205***	-0.0730
	(0.11729)	(0.02071)	(0.18875)	(0.13249)
Observations	2148			
Pseudo R-squared	0.0909			

Note: sample is male workers in non-agricultural sectors who started working in 1996–2014. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Coefficients come from a multinomial logit regression to estimate the probability of an individual working as LTI, HTI, LTF, or HTF. Estimations include year dummies on the first job, wave, and island fixed effects. Standard errors are in parentheses, clustered at province level.

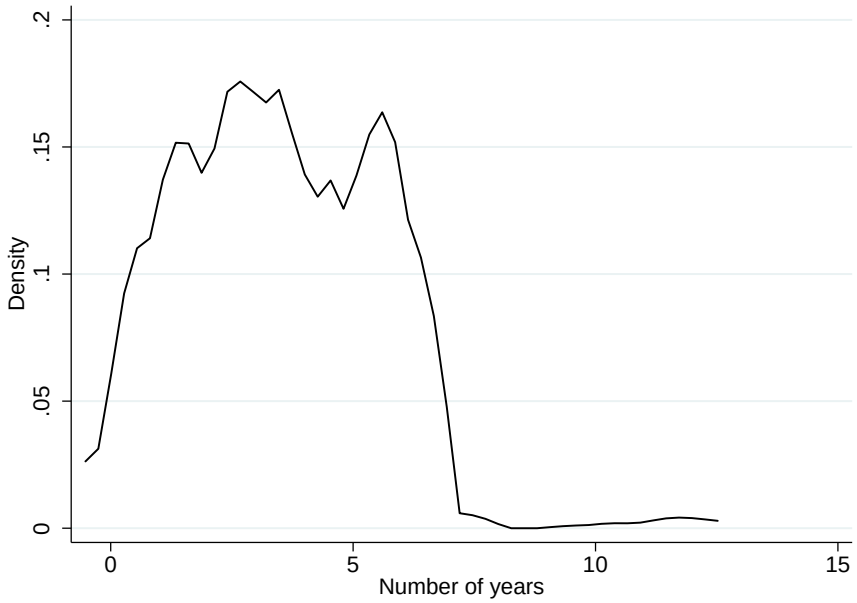
Source: authors' construction based on data from IFLS 2000, 2007, and 2014.

Overall, the strong message from these estimates is that workers in LTI jobs are negatively selected. More favourable conditions increase the probability of working in the formal sector.

5.3 The extent of job switching

In this section, we observe the labour outcomes of workers who began working from 1996 to 2007. Among individuals whose first job was as an LTI worker, we find that 46 per cent remained as LTI workers through the next 8 to 19 years. About 7 per cent became HTI workers for at least one year, 37 per cent became LTF workers for at least one year, and 8 per cent became HTF workers for at least one year. These numbers show that switching out of LTI work happened about 50 per cent of the time, but the majority of those switches were to LTF work. High-tier work appears to have a high entry barrier for those who started as LTI workers.

Figure 3: Duration to switch of LTI first job workers



Note: number of observations: 529.

Source: authors' construction based on data from IFLS 2000, 2007, and 2014.

Among the 54 per cent who switched to a different job type for at least one period, the mean duration spent as an HTI worker is 0.46 years. The mean duration spent as an LTF worker is 3.48 years, and the mean as an HTF worker is 0.37 years. Given that we are observing a career of between 8 and 19 years, these means indicate a relatively short stint as a high-tier worker, either informal or formal. Figure 3 also shows that switches occur mostly in the first seven years of an individual's career.

When we look at the number of times these workers switch between types, we find that, on average, they switch three times. The average job spell (i.e. continuous number of years in a particular job type) is only 0.16 years as an HTI worker, 1.48 years as LTF, and 0.14 years as HTF. The switchers still have their longest job spell as LTI workers, with an average of 3.99 years.

Of the switchers who became a formal worker for at least one period, only 4.3 per cent also experienced working in the HTI sector. Therefore, most men switched from LTI to formal sector work without going through an HTI job. Our data show that most LTI workers, when they switch, become LTF workers. Almost none switch to high-tier work.

We next examine the characteristics of individuals who switch to a different job type for at least one year, compared with those who do not switch. We use the same correlates as in Table 3. Table 4 shows that workers whose fathers are highly educated have a 35.5 to 51.5 percentage points higher probability of switching. Interestingly, height, mathematics skills, cognitive skills, and educational attainment have small correlations with switching. Only height is statistically significant.

Table 4: Hazard ratio of switching from LTI work (IFLS3 and IFLS4)

	Switching (Yes=1)		
	Weibull	**Exponential**	**Cox**
	(2)	**(3)**	**(4)**
Age	0.9756	0.9815	0.9771
	(0.02932)	(0.01565)	(0.02749)
Years of schooling	1.0052	1.0211	1.0059
	(0.03831)	(0.02662)	(0.03480)
Cognitive score (standardized)	1.0483	0.9982	1.0315
	(0.06472)	(0.05253)	(0.05894)
Maths score (standardized)	0.8721	0.9362	0.8992
	(0.08372)	(0.06118)	(0.07609)
Height (standardized)	0.9362**	0.9524**	0.9321**
	(0.02645)	(0.01944)	(0.02447)
Urban (Yes=1)	1.1920	1.1235	1.1689
	(0.15341)	(0.10714)	(0.13724)
Father has more than six years of education (Yes=1)	1.5148***	1.3553***	1.4966***
	(0.2221)	(0.1488)	(0.20554)
Mother has more than six years of education (Yes=1)	0.8341	0.7905	0.8125
	(0.2957)	(0.18889)	(0.2493)
Community characteristics			
Number of SD in village	1.0298	1.0383	1.0392
	(0.06806)	(0.06203)	(0.70738)
Number of SMP in sub-district	1.0449	1.0181	1.0317
	(0.02994)	(0.02207)	(0.02723)
Number of SMA in district	0.9995	1.0011	0.9998
	(0.00139)	(0.00092)	(0.00128)
% village with health centre	0.0883***	0.1510**	0.1126**
	(0.08049)	(0.13272)	(0.10226)
% village with year-round roads	1.9302	1.0265	1.2364
	(4.20054)	(1.11631)	(1.77104)
Observations	299	299	299

Note: sample is male workers in non-agricultural sectors who started working in 1996–2000 and 2001–07. * $p <$ 0.10, ** $p < 0.05$, *** $p < 0.01$. Columns (1)–(3) are hazard ratios to estimate the probability of individuals who started as LTI workers switching jobs. Column (1) is the hazard ratios generated by a survival model with Weibull distribution and Column (2) by a model with exponential distribution. Column (4) is the hazard ratios of the Cox proportional hazard model. The magnitude of the hazard ratio (<1 or >1) indicates whether the probability of switching is decreasing or increasing with the covariates. All regressions include wave and island fixed effects. Additional controls are schooling, health, and infrastructure variables. Standard errors are clustered at province level.

Source: authors' construction based on data from IFLS 2000, 2007, and 2014.

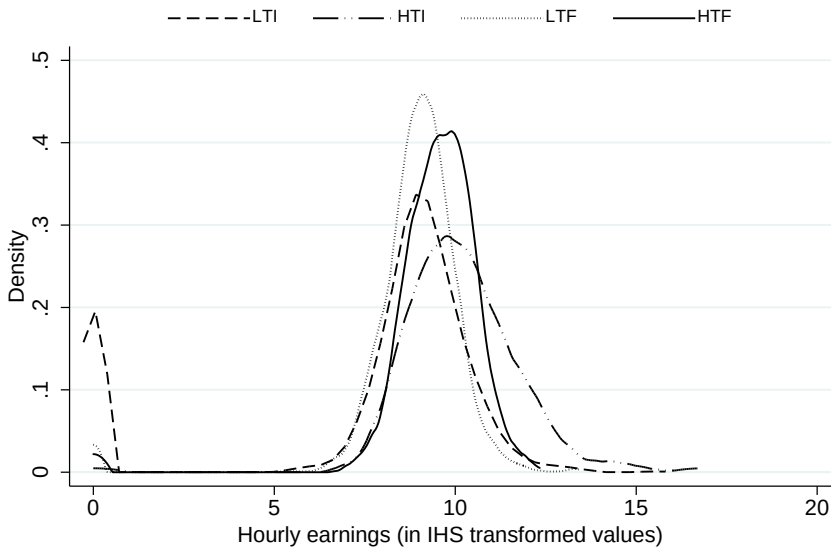
5.4 Wage premium of switching from LTI work

Our results so far show that individuals who start as LTI workers very rarely switch to high-tier work. Of those who manage to switch, most become LTF workers. These results corroborate

previous findings that support the dual economy theory, but with a different nuance. It seems that the dual economy is divided between low-tier and high-tier work, rather than informal and formal work. Individuals who started out as LTI workers can almost never switch to high-tier work, but have a relatively good chance of switching to LTF work. If we consider low-tier as blue collar and high-tier as white collar work, the evidence shows that these sectors are disconnected in the sense that blue-collar workers almost never become white-collar workers.

However, the next question we ask is whether switching out of LTI work carries a wage premium. Figure 4 compares the distribution of hourly earnings by job types. We find that LTI and LTF workers have similar distributions. High-tier workers, in either informal or formal work, also have similar distributions. Similar to previous findings, the distinction appears to be more apparent between low-tier versus high-tier workers than informal versus formal workers.

Figure 4: Distribution of earnings by types of job

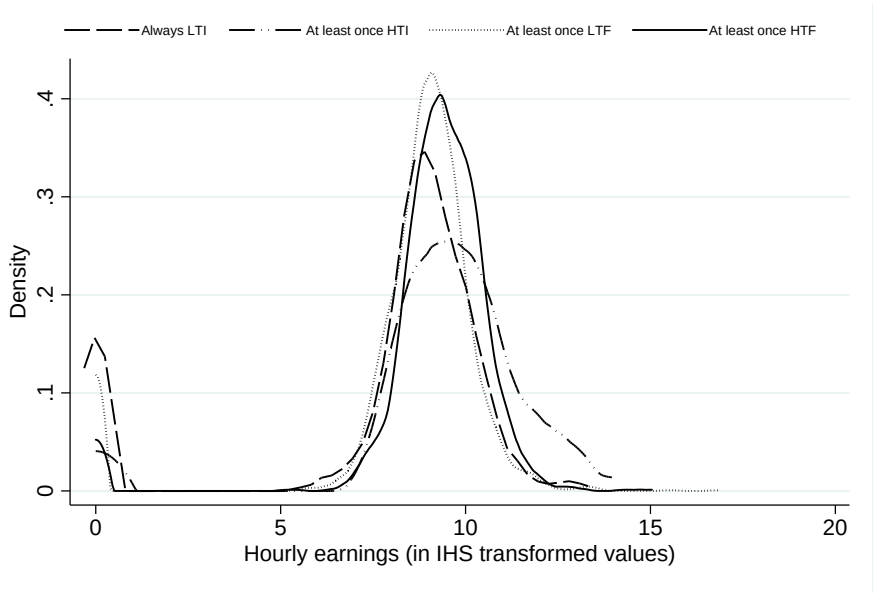


Note: number of observations: 4646.

Source: authors' construction based on data from IFLS 2000, 2007, and 2014.

Figure 5 shows the distribution of earnings of workers based on whether they switch out of LTI work or not. Note that the sample here comes from the IFLS labour market module, rather than the first job module. The mean earnings of the switchers are higher regardless of the type of work they switch to. Also, the right tails of the earnings distributions are thicker. From the figure, it appears that switchers to high-tier work, whether informal or formal, earn the highest premium.

Figure 5: Distribution of earnings by types of switching



Note: number of observations: 4646.

Source: authors' construction based on data from IFLS 2000, 2007, and 2014.

Table 5 shows the estimates. We focus on discussing the results with hourly earnings as the dependent variable. Note that, depending on whether we include individual fixed effects, the results show different contexts. Column 1 shows the estimates without individual fixed effects, which show the differences in earnings for individuals with similar characteristics but different job types. We find that working as a non-LTI worker brings a large and statistically significant earnings premium. The premium is similar for formal jobs, either low-tier or high-tier, at almost 300 per cent. The premium for HTI work reaches 600 per cent.

Table 5: Wage premium of switching from LTI, OLS in levels

	IHS hourly earnings		**IHS annual earnings**	
	Levels		**Levels**	
	(1)	**(2)**	**(3)**	**(4)**
High-tier informal	2.0883***	1.9801***	3.1128***	2.5204***
	(0.26015)	(0.52584)	(0.26602)	(0.81805)
Low-tier formal	1.6099***	1.6767***	3.1996***	3.2817***
	(0.12899)	(0.24220)	(0.22053)	(0.42302)
High-tier formal	1.5612***	1.5791***	2.8499***	3.1535***
	(0.14896)	(0.28523)	(0.25293)	(0.47104)
Individual fixed effects	No	Yes	No	Yes
			% difference from LTI worker	
High-tier informal	607%	524%	2,048%	1,042%
Low-tier formal	300%	335%	2,253%	2,462%
High-tier formal	277%	285%	1,529%	2,142%
Observations	2788	2788	2788	2788
R-squared	0.1977	0.2042	0.2108	0.2247

Note: sample is male workers in non-agricultural sectors starting work in 1996–2007. Observed earnings are from 1996–2000, 2007, and 2014. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Earnings are calculated from wage and profit information and adjusted using the Consumer Price Index (CPI 2012=100) from BPS. For the estimations, real earnings are transformed into IHS to include zero values. All regressions include variables on age, years of schooling, cognitive and maths scores, height, father and mother with more than 6 years' education, urban/rural location, schools, health, and road facilities in the districts, as well as year and island fixed effects.

Source: authors' construction based on data from IFLS 2000, 2007, and 2014.

Column 2 shows the results with individual fixed effects, which now show the earnings premium for individuals of switching from LTI ranging from 285 per cent to 335 per cent for switching to formal work (the difference between LTF and HTF work is not statistically significant) and being 524 per cent for switching to HTI work. Table 6 shows the median regression results.

Table 6: Effects of switching from LTI, median in levels

	IHS hourly earnings		IHS annual earnings	
	Levels		Levels	
	(1)	(2)	(3)	(4)
High-tier informal	0.8750***	1.9621	0.8356***	2.4478
	(0.17537)	(11.96927)	(0.11766)	(5.48840)
Low-tier formal	0.3534***	1.6626	0.5948***	3.2587
	(0.05289)	(4.2423)	(0.06522)	(2.01906)
High-tier formal	0.4165***	1.5615	0.6155***	3.1128
	(0.06542)	(5.53011)	(0.09210)	(2.51514)
Individual fixed effects	No	Yes	No	Yes
			% difference from LTI worker	
High-tier informal	140%	-	131%	-
Low-tier formal	42%	-	81%	-
High-tier formal	52%	-	85%	-
Observations	2788	2788	2788	2788
Pseudo R-squared	0.1182	-	0.1005	-

Note: sample is male workers in non-agricultural sectors starting work in 1996–2007. Observed earnings are from 1996–2000, 2007, and 2014. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Earnings are calculated from wage and profit information and adjusted using the Consumer Price Index (CPI 2012=100) from BPS. For the estimations, real earnings are transformed into IHS to include zero values. All regressions include variables on age, years of schooling, cognitive and maths scores, height, father and mother with more than 6 years' education, urban/rural location, schools, health, and road facilities in the districts, as well as year and island fixed effects.

Source: authors' construction based on data from IFLS 2000, 2007, and 2014.

In contrast to the stark earnings premiums for the average worker, the premiums for the median worker are much smaller. Again, the premium for LTF and HTF work is very similar at 42–52 per cent. The earnings premium for HTI work is about three times the earnings premium for formal work. These median regression results show that the enormous earnings premium shown in Table 5 is driven by outliers. In conclusion, however, it appears that switching out of LTI into LTF work is a feasible way to improve a worker's livelihood. And, evidence shows that the LTF sector is relatively accessible to LTI workers.

6 Conclusion

Like other developing countries, Indonesia has a large informal sector. Of the total 125 million working population, about 57 per cent are informal workers. In the non-agriculture sectors, the proportion of informal workers has been around 50 per cent since 2000.

To understand the core drivers of informal worker dynamics, in this study we focus on male informal workers in non-agricultural sectors and, instead of looking at the whole workforce, we focus on the first jobs of young workers. We also split the workers into low-tier and high-tier, including the latter to capture the fact that some work, either formal or informal, requires high skills and knowledge. Specifically, in this study we measure the proportion of individuals whose first job is low-tier informal, high-tier informal, low-tier formal, and high-tier formal; compare their characteristics; calculate the number of low-tier informal workers who switch to a high-tier

informal or formal job; identify the characteristics of those who switched; and estimate the earnings premium of switching.

We find that in non-agricultural sectors, the first jobs of male workers are predominantly formal, i.e. between 60 and 80 per cent have formal jobs. Among the remaining workers, almost all start as low-tier informal workers. Only 1–2 per cent of workers have high-tier informal first jobs. The results from multinomial logit regression indicate that individuals are negatively selected into low-tier informal work. People who have higher education, have higher cognitive scores, and are taller are all less likely to start as low-tier informal workers.

Examining the trend of first jobs between 1996 and 2014, we find evidence that the informal sector appears to become smaller as an economy grows. However, the decline is very gradual and can be rapidly overturned by an economic crisis.

Among individuals whose first job was as a low-tier informal worker, almost half remained low-tier informal workers through the next 8 to 19 years, about 7 per cent became high-tier informal workers for at least one year, and 45 per cent became formal workers for at least one year, predominantly low-tier formal workers. Among the half who switched to a different job type for at least one period, the mean period spent as a high-tier informal worker is 0.46 years, the mean period as a low-tier formal worker 3.73 years, and as a high-tier formal worker 0.37 years. These indicate a relatively short stint as high-tier informal or formal workers. On average, these workers switch three times between types, the average job spell being similar to the average years employed.

In terms of the switching pattern, most individuals switched from low-tier informal to formal sector work without going through a high-tier informal job. The characteristics of individuals who switched for at least one year indicate that workers whose fathers are highly educated have a significantly higher probability of switching. However, height, mathematics skills, cognitive skills, and education attainment have weak correlations with switching.

We find that the earnings premium that low-tier informal workers could gain by switching is large and statistically significant. Our median regression, which provides a more modest result, shows earnings premiums of between 42 and 52 per cent for observably similar workers in low-tier formal or high-tier formal work. The earnings premium for working in the high-tier informal sector is much higher at 140 per cent, but only about 7 per cent of workers who started out as low-tier informal workers were able to switch to this type of work.

Our findings imply two main points. First, low-tier informal workers are most likely to switch to low-tier formal work. Only a very small proportion are able to upgrade to high-tier informal work, although this is the route that most policymakers in developing countries appear to want low-tier informal workers to follow. Second, the earnings premium of switching to low-tier formal work is as high as 42 per cent. While it is still much lower than the earnings premium of switching to high-tier informal work, it seems that this is a more feasible route to improve the livelihoods of low-tier informal workers. Therefore, rather than creating policies that try to push low-tier informal sector workers to become high-tier informal sector workers, governments would be better advised to create jobs, albeit low-tier ones, that low-tier informal workers can apply for.

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