Entrepreneurship and Self-employment in Developing Countries: Evidence From Indonesia

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Abstract

I use the Indonesia Family Life Survey to study selection into entrepreneurship as well as the returns to such activity. I first distinguish between entrepreneurs–those who are employers of permanent workers–and other self-employed. I find that both entrepreneurs and wage workers are positively selected in terms of education and cognitive skills relative to the self-employed. I also find that entrepreneurs score higher on "openness" and "extraversion" on the Big Five Personality Traits when compared to wage workers. The panel data also allows me to focus on the transition into entrepreneurship. Those who enter entrepreneurship are more likely to be open, and interestingly, less likely to be conscientious than wage workers. For each percentile of the earning distribution, employers always earn more than wage workers and non-employers, and non-employers earn the least beyond the first quintile. Transitions from wage workers to non-employers are related to a substantial earning loss, and transitions to employers are related to an insignificant earning premium. My research shows that individual traits are important factors in explaining entrepreneurship even in developing economies where liquidity and institutional barriers are presumed to play a large role.

Keywords: Self-employment, Entrepreneurship, Big Five Personality

JEL classification: O1, L2

1 Introduction

Entrepreneurship is usually viewed as crucial to economic growth, and governments often tailor policies to encourage self-employment and to support businesses.[1]. Nevertheless, while the self-employment rates in high-income countries stand at about 10-15%, the self-employed workers make up more than 30% of the total workers in middle and low income countries.[2] This gap in self-employment rates between high and low income countries poses a puzzle if we equate self-employment as entrepreneurship and job creation. The literature has pointed out that self-employment in developing countries is heterogeneous.[3] For example, de Mel et al. (2010) look into differences between employers and own-account self-employed workers in Sri Lanka, showing that employers have better cognitive abilities, come from better family backgrounds, and possess higher entrepreneurial attitudes. Examining the returns of microfinance, Banerjee et al. (2017) define "gung-ho entrepreneurs"—those who already owned a business prior to the microfinance intervention and other "reluctant entrepreneurs"—those who entered self-employment with microfinance access. They find that after six years, the former perform significantly better in terms of business outcomes. It is clear that among the self-employed, a group of people with better abilities has higher potential to succeed.

In this study, I investigate the characteristics associated with selection into different types of self-employment. Using panel data from Indonesia Family Life Survey (IFLS), I decompose self-employment into "employers" (defined as self-employment with permanent workers) and "non-employers" (defined as self-employment with temporary workers, unpaid family workers, or own-account self-employment). I look at not only how cognitive abilities are associated with selection, measured by years of schooling, but also non-cognitive abilities, measured by Big Five Personality traits. I first pool all individuals to look at all workers' selection. The results show that without disaggregating self-employment, selection into self-employment is associated with less education, and higher openness comparing with selecting into wage workers. However, when decomposing self-

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[1]Acs and Szerb (2007)

[2]World Bank ILO database: `https://data.worldbank.org/indicator/SL.EMP.SELF.ZS`

[3]See, for example, Schoar (2010).

employment into employers and non-employers, selection into employers is associated with higher openness *and* extraversion, while selection into non-employers is associated with less education and higher openness comparing with selecting into wage workers. The results indicate that failure to disaggregating self-employment can be misleading: Self-employment seems to have a negative sorting in education, while it is driven by the characteristics of non-employers. Moreover, without decomposing self-employment, we may overlook the importance of certain non-cognitive abilities, such as extraversion.

On the other hand, we also care about the transition of wage workers into self-employment: Policies encouraging non-self-employed workers to start a business rarely distinguish between different types of self-employment, and it is not obvious that the characteristics of "switchers" are necessarily similar than those who are always employers or non-employers. With the longitudinal dataset, I am able to look at the characteristics associated with transition of wage workers into employers and non-employers. The results of education associated with selection into different types of self-employment have a similar pattern: Education is insignificantly associated with selecting into employers when comparing with wage workers, and is negative related to selection into non-employers. Despite being imprecisely estimated, the magnitude of openness and extraversion associated with selecting into employers are similar. Moreover, transition from wage workers into employers appears to be associated with lower conscientiousness.

Next, I look into if the earnings are differentiated among employment types. When pooling all self-employment together, the median earning is about $48 less than wage workers annually. When decomposing self-employment into employers and non-employers, employers' median earning is $241 more than wage workers, while non-employers' median earning is $64 less than wage workers. Furthermore, for all earning percentile, employers earn more than wage workers and non-employers. On the other hand,non-employers have similar earnings to wage workers for the first quintile, and earn less than wage workers beyond the first quintile. When looking into those who were wage workers, transition into employers is associated with an increase in median earnings by $900, comparing with those who transition into non-employers.

This paper adds to the literature in two-fold. First, few studies have investigated the association of personality and selection into self-employment in developing countries. By looking into how big five personality traits are related to the sorting different types of self-employment, I show the importance of openness and extraversion on predicting a more successful type of self-employment in Indonesia, which is similar to the findings in the U.S. Second, using the panel data, I am able to show that transition from wage workers to different types of self-employment exists similar patterns. Moreover, I observe the change in earnings after the transition.

The rest of paper is arranged as follows. Section two reviews the literature of selection into entrepreneurship and the importance of personality traits. Section three describes the data used and the summary statistics. Section four presents the results of characteristics related to the selection into different employment types. Section five analyzes the earning distribution by employment types. Section six provides additional information regarding the life cycle path of employment types. Section seven discusses the limitations and concludes the paper.

2 Literature Review

2.1 Selection into Entrepreneurship

The literature suggests two types of constraints on entrepreneurship: liquidity constraints and human capital constraints. Liquidity constraints prevent individuals with high entrepreneurial ability from starting their own businesses (Evans and Jovanovic, 1989; Holtz-Eakin et al., 1994; Lindh and Ohlsson, 1996). Governments and activists over the past three decades have tried to relax the liquidity constraints and to increase credit access to the poor. For example, the foundation of microfinance institution (MFI) is based on the belief that poor households do not have access to traditional commercial banks, and thus cannot start or expand their businesses. On the other hand, other empirical work emphasize the importance of human capital for the formation and performance of firms (Dunn and Holtz-Eakin, 2000; Acs and Armington, 2004; Colombo and Grilli, 2005). In the context of microfinance experiments, recent studies also show that interventions which include

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business consulting and mentors improve the performance of businesses (Lafortune et al., 2018; Brooks et al., 2018). In addition to credit access and human capital, Hamilton (2000) has discussed the importance of non-pecuniary utility contributing to the sorting into self-employment.

2.2 Entrepreneurship and Personality Traits

The literature has studied how personality traits affect economic decisions and occupational choice (Heckman et al., 2006; Almlund et al., 2011) Studies have shown that personality traits are predictive on the labor market outcomes in Germany and UK, (Heineck, 2011; Groves, 2005), and are also predictive on economic preferences such as credit score and job persistence in the U.S. (Rustichini et al., 2016).

Entry into entrepreneurship has been shown to be related to illicit behaviors and optimism (Fairlie, 2002; Levine and Rubinstein, 2017; Puri and Robinson, 2007, 2013). Big Five Personality traits, openness (to new experience), conscientiousness, extraversion, agreeableness, neuroticism, are also shown to be relevant to the entry, exit, and performance of self-employment (Caliendo et al., 2014; Hamilton et al., 2018). Among the five traits, openness and extraversion are related to higher risk tolerance, while neuroticism is related to lower risk tolerance Dohmen et al. (2010); Oehler and Wedlich (2018).

Most of the studies regarding entrepreneurship and personality traits, however, are in high-income countries, little is known regarding the relevance of personality traits on entrepreneurship in developing countries. Given the under-developed institutions in low-income countries, personality traits may not play a significant role: Financial development, capital and credit access are usually considered the main constraints of entrepreneurship (King and Levine, 1993; Evans and Jovanovic, 1989; de Mel et al., 2008). Nevertheless, a growing literature has been studying the importance of non-cognitive skills in developing countries (de Mel et al., 2010; Laajaj and Macours, 2018). Using the data from Indonesia, this paper contributes to the understanding of the correlation between personality traits and entrepreneurship in developing countries.

3 Data and Summary Statistics

Indonesia is the fourth populous country in the world, and has been steadily growing since Asian Financial Crisis in 1997-1998.[4] The GDP per capita has grown from $780 in 2000 to more than $3000 in 2010.[5] In 2003, World Bank changed Indonesia's classification from low income country (GNI per capita less than $765) to lower-middle income country (GNI per capita $766-$3,050). The poverty rate has reduced from 40% of the population in 2000 to 7% in 2015.[6] However, around 20% of the population are still vulnerable of economic condition, and more than 10% of the GDP is contributed by agriculture sector.[7]

3.1 Indonesia Family Life Survey

This paper uses Indonesia Family Life Survey (IFLS) to understand the choice of employment types in developing countries. IFLS is a longitudinal survey initiated in 1993, the sample is representative of 83% of Indonesian population to study socioeconomic and health characteristics of households.[8] The original sample included 7,224 households, more than 22,000 individuals.[9] The subsequent waves in 1997, 2000, 2007, and 2014 track the original 1993 households, and follow their split-off households. Due to the conformity of questionnaire, I use only the data from the last three waves (2000, 2007, and 2014). The workers analyzed in this study are aged 20-60 males who work in non-agricultural sector. As pointed out by Parker (2018) and Blanchflower (2000), agricultural sector usually is excluded in many studies of entrepreneurship, as self-reported self-employed workers in agricultural sector are sometimes unpaid family worker, and agricultural sector shrinks as an economy developed.

IFLS defines the employment types in details, which are the same as the census of Indonesia.

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[4]World Bank Overview: `https://www.worldbank.org/en/country/indonesia/overview`

[5]World Bank national accounts data: `https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ID`

[6]World Bank Data: `https://data.worldbank.org/indicator/SI.POV.DDAY?locations=ID`

[7]World Bank national accounts data: `https://data.worldbank.org/indicator/NV.AGR.TOTL.ZS?locations=ID`

[8]The original sample only covered 13 of 27 provinces in Indonesia due to the higher cost of more remote provinces, and Aceh province was also excluded due to the political unrest.

[9]The sampling scheme was based on the enumeration areas (EAs) from the National Socioeconomic Survey (SUSENAS), where each EA usually consists of 200 to 300 households. IFLS randomly selected 321 EAs from the 13 provinces; 20 households were randomly chosen from urban EAs, and 30 households from rural EAs.

Specifically, individuals aged 15 or more are asked about the primary job that consumes the most of their time, what sector is the job in, and the employment types: "Which category best describes the work that you do?" The respondents then answered one of the following: (i) Self-employed (without help), (ii) self-employed with unpaid family worker/temporary worker, (iii) self-employed with permanent worker, (iv) government worker, (v) private worker, (vi) casual worker in agriculture, (vii) casual worker not in agriculture, (viii) unpaid family worker. I group the self-employment into two types: "Non-employers", who are self-employed without help and self-employment with temporary workers/unpaid family workers together, and "Employers", who are self-employed with permanent workers.

I categorize the the self-employed with temporary workers/unpaid family workers into "Non-employers" based on two reasons: First, temporary workers are those work for wages "based on the length of time working or on a work output volume basis." On the other hand, permanent workers "receive salary/wages in cash and in goods permanently, regardless of the availability of economic output/activity."[10] Having permanent workers is distinct from having temporary workers in terms of liability: employers of permanent workers are committed to the payroll regardless of the business risks. Second, about 37% of self-employed with temporary/unpaid family workers have a secondary job, while 32% of self-employed without help and 23% of self-employed with permanent workers have a secondary job. Having a secondary job may be indicative the insufficient income from the primary job to support the household, and thus the higher rate of secondary job may imply less successful self-employment.

Followed by the employment type question, wage workers are asked about their last year salary/wage, including the value of all benefits. Wages of unpaid family workers are assume to be zero because their salary/wage is not asked. Additionally, I also include the amount of year-end-bonus or other bonuses received into the earnings. On the other hand, individuals who are self-employed are asked about the approximate net profit gained from the business last year, taking

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[10]Translated survey manual from IPUMS-International: `https://international.ipums.org/international-action/source_documents/enum_instruct_id2000a_tag.xml`

out all business expenses.

To measure the household wealth that may be relevant to the choice of employment types, I use questions regarding the ownership of assets owned by the household, as shown in A2. Some assets, however, can be noisy to understand the meaningful wealth owned by the household. For example, home ownership in rural areas can be qualitatively inferior and have little monetary value comparing with home ownership in urban areas. Therefore, I weigh the binary asset ownership variables using the first component generated by principal-component analysis, and standardize the asset index into a continuous variable.

Table 1 summarizes the characteristics by each employment type. When all self-employed workers are pooled together, they constitute around 32% of all workers. However, when breaking down to employers and non-employers, employers only make up to 3.2% out of all workers, while non-employers are 90% of self-employment. When looking at the characteristics of wage workers and pooled self-employment, self-employment seems to be inferior: they are about two years less educated, own less household asset, work about similar hours as wage workers but earn less median income, and are more likely to have a secondary job. Nevertheless, when the self-employment is disintegrate into employers and non-employers, employers have similar education as wage workers, work longer hours and earn more than the wage workers in both mean and median income; while self-employment workers are less educated, earn less median income and are more likely to have a secondary job. Table A3 summarizes the proportion of sector by each employment type. The largest sectors are social services, such as educational and health services, followed by wholesale, retail and hospitality sector, and manufacturing sector. The plurality of employers and non-employers are both in wholesale, retail and hospitality sector, the second largest sector for employers is manufacturing, while for non-employers is social services. In addition, about 13% of non-employers are in transportation, storage and communication sector, such as transport equipment operators and freight operators, while only 2% of employers in this sector.

To address the sampling concerns that IFLS only sampled from 83% of Indonesia population in the initial wave, I also look into Indonesia census in 2000, which is a representative sample of the

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entire population. As shown in Table A4, wage workers make up to 62.62% of all workers, employers 2.09%, and non-employers 35.29%. When comparing with the census sampling, wage workers and employers are oversampled in IFLS. The demographic characteristics across employment types are however similar: Average age of workers is around 36, about 80% workers are married, and 67% living in the urban areas while non-employersis the least likely to live in the urban areas. Wage workers are more educated than pooled self-employment: around 50% wage workers are high school graduates, while about 60% of self-employment workers are only elementary and junior high school graduates. Nevertheless, when decomposing self-employment into employers and non-employers, educational profile of employers are similar to wage workers: 46% of employers are high school graduates, while 26% of non-employers are high school graduates.

3.2 Big Five Personality Traits

To explore the importance of personality traits on entrepreneurship, I use a new module included by IFLS in 2014 where Big Five Personality traits were measured. By the definition of American Psychological Association (APA) dictionary, Big Five Personality is "a model of the primary dimensions of individual differences in personality." The dimensions are usually labeled as: Openness to new experiences, conscientiousness, extraversion, agreeableness, and neuroticism. The contents of five personality traits are summarized in Table A1. IFLS adopted a short version of the questionnaire to measured the big five personality traits, where each trait consists of three relevant questions. The effective assessment of a short version is proven by Lang et al. (2011) using the German Socio-Economic Panel (SOEP). Because IFLS only incorporates the module since 2014, a caveat to use the measure in this study is to assume that the personality traits do not change over time. As shown by Cobb-Clark and Schurer (2012), Big Five Personality traits tend to stay stable for the working-age adults, and adverse events are in general unrelated to within-person changes. Hence, the restriction to workers aged 20-60 may mitigate the concerns of changes in Big Five Personality over time.

Figure 1 shows the standardized Big Five Personality traits by employment types. When pooled

self-employment all together, we only observe extraversion is significantly different between pooled self-employment and wage workers. However, when decomposing into employers and non-employers, employers have significantly higher openness and extraversion, while non-employers have similar level of openness and extraversion as wage workers. Table A6 describes the correlation of Big Five Personality traits, years of schooling and asset index. As shown in the table, neuroticism is negatively correlated with conscientiousness and extraversion, and all other Big Five Personality traits are positively correlated. Other than neuroticism, all Big Five Personality traits are positively correlated with years of schooling and asset index. To further explore the possibility of collinearity among Big Five Personality traits, Table A7 test the variance inflation factors (VIF) of the five dimensions of personality. By the rule of thumb, since the mean VIF is less than 30, it is likely no high collinearity present.

4 Who Becomes Entrepreneurs? Selection Into Different Employment Types

To understand the selection into employment types, I estimate a multinomial logit probability model as follows:

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ln\frac{P_{ijt}}{P_{iwt}} = \beta_{0,j} + \beta_{1,j}\text{Education}_{i,t} + \beta_{2,j}\text{Asset Index}_{i,t}
$$

$$
(1) \qquad + \sum_{k=1}^{5} \beta_{3,k,j}\text{Personality}_{k,i} + \beta_{4,j}f(age)_{i,t} + X'_{i,t}\Gamma_{X,j}
$$

where P_{ijt} is the probability of person i being $j \in \{\text{Employer}, \text{Non-employer}\}$ at wave t; P_{iwt} is the probability of person i being a wage worker at wave t; Education is measured in years of schooling; Asset Index is the asset index imputed by a series of question about household asset ownership; Personality is Big 5 personality indexes; $f(age)_{i,t}$ is a quadratic age function; $X_{i,t}$ is a vector of controls: dummies for married and Muslim, aggregate sector, region-urban fixed effect, survey year fixed effects, and standard errors are clustered at village level.

For the estimation results, both log odds ratios and marginal effects are presented. The former shows how the probabilities selecting into employers and non-employers relative to the probability selecting into wage workers, and the latter shows the magnitude of characteristics related to selection probabilities.

4.1 Entry Into Different Self-employment Types: Pooled All Panel Individuals

Table 2 shows the log odds ratios relative to wage workers from equation 1. In column (1) and (3), self-employment is pooled, where the estimation is logit probability model. From column (1), selection into pooled self-employment is associated with less education and higher household asset relative to wage workers. However, when decomposing self-employment into employers and non-employers in column (2), lower education related to the sorting into self-employment is driven by the type of non-employers relative to wage workers, and higher household asset is driven by the type of employers, although it is also significantly associated with the sorting into non-employers relative to wage workers. In column (3), when Big Five Personality traits are included, selection into pooled self-employment is associated with even less education and household asset become less important comparing with selection into wage workers. Among Big Five Personality traits, openness is positively associated with selection into pooled self-employment, extraversion and neuroticism are marginally associated with the selection, while conscientiousness and agreeableness are insignificantly negatively related to the selection relative to selection into wage workers. When decomposing self-employment in column (4), both openness and extraversion are significantly positively related to sorting into employers relative to wage workers, while only openness is significantly positively associated with selection into non-employers.

Table 3 presents the marginal effects of these characteristics. The marginal effects of years of schooling and asset index do not vary much when Big Five Personality traits are included in column (3) and (4). In column (4), years of schooling is insignificantly related to sorting into employers, and asset index is significantly positively related. Specifically, an increase of one standard deviation in asset index is associated with 56% increase in selecting into employers ($0.018/0.032 \approx$

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56%). In contrast, years of schooling is significantly related to sorting into non-employers, and insignificantly related. Considering an increase of half of the standard deviation in years of schooling, which is about the difference of average years of schooling between employers and non-employers, it is associated with 10% decrease in selecting into non-employers. Table 4 further disintegrates education into five highest levels: less than elementary school, elementary graduate, junior high school graduate, high school graduate, and some college education. As shown in the last column, the negative association of education and selection into non-employers is driven non-linearly by higher educational level: Higher the education level is related to lower probability selecting into non-employers, while no significant difference has found between less than elementary education and completion of elementary education.

Among Big Five personality traits, openness and extraversion are strong predictors related to selection into employers. One standard deviation increase in openness is associated with 25% increase in selecting into employers; one standard deviation increase in extraversion is associated with 18.8% increase in selecting into employers. On the other hand, one standard deviation increase of openness has a similar magnitude as one year decrease of schooling in association of sorting into non-employers. A standard deviation increase of openness is related to about 5% increase sorting into non-employers.

To sum up, when pooling all self-employment together, self-employment appears to be associated with lower education, higher openness, and more household asset relative to wage workers. Nevertheless, when disintegrating into employers and non-employers, selection of employers are related to more household asset, higher openness *and* extraversion, while selection of non-employers are related to lower education and higher openness. The significant marginal effects of asset index for employers but not for non-employers could be indicative of the differences of entrepreneurship and subsistence self-employment: Entrepreneurs demand more capital to build a business, while subsistence self-employment requires little capital to start a business. On the other hand, the importance of Big Five Personality traits in selection into different employment types in Indonesia appears to be similar to the results in the U.S. Hamilton et al. (2018) find openness is significantly related to

selection into self-employment, while extraversion is the factor that related to being profitable.

4.2 Entry Into Different Self-employment Types: Transitional From Wage Workers

It is common to assume that employment types are determined ex ante and do not change over time in economic models (Evans and Jovanovic, 1989). However, transitions among different employment types could be prevalent in reality, especially when poor households in low-income countries usually have a "portfolio of work" (Blattman and Ralston, 2015). Therefore, we would wonder if the previous results are driven by the "always stayers", those who enter a particular type of employment and do not switch at all could have the most persistent wealth and also score the highest in personality traits. Thus, it is not obvious the "switchers" would have the same pattern of characteristics related to the selection into employers and non-employers. Using the panel data of IFLS, I am able to trace the transitions among different employment types.

Table 5 shows the transition proportion between waves, i.e. the 7-year transitions. The column labels the employment type from the last wave, and the row labels the employment type of the current wave. Each column sums up to one. The diagonal represents the proportion of workers staying for the same type: 92% of wage workers stay as wage workers, about 46% employers stay as employers and the same for non-employers. It is not surprising that wage workers are the most stable type, while transitions from employers to wage workers and to non-employers are similar in proportion, and transitions from non-employers to wage workers are two times of transitions to employers. I focus on the transition from wage workers for two reasons. First, despite of being stable, transitions from wage workers are the largest: the total number of transitions from employers and non-employers are 194, while the total number of transitions from wage workers are 205. Second, policies encouraging the entry into entrepreneurship nudges at the extensive margins, that is, encouraging wage workers to enter self-employment. Therefore, looking at the transition from wage workers is useful to understand the type of wage workers switching to employers and non-employers.

Table 6 shows the log odds ratio of transition from wage workers. Transition into pooled self-

employment, again, is related to lower education which is driven by non-employers, and higher asset index from last wave which is driven by employers, although imprecisely estimated. While higher openness remains positively related to the selection into both employers and non-employers, extraversion is positively related to selection into employers and is negatively related to selection into non-employers, despite being insignificant. The imprecise estimates may be due to the small sample size: Transition from wage workers to employers only makes up to 43 observations.

Interestingly, higher conscientiousness is significantly associated with *lower* probability of sorting into employers. As pointed out in Costa et al. (1991); De Hoogh et al. (2005), conscientiousness is the tendency to be responsible and hardworking, but "conscientiousness also reflects the tendency to be cautious, thoughtful and a strict adherence to standards of conduct", which could be a constraint under a highly-challenging, fast-paced working environment. Moreover, Moutafi et al. (2004) find that conscientiousness is negatively correlated with fluid intelligence, which measures the cognitive ability of abstract reasoning and applying logic to solve problem. Thus, higher conscientiousness may not always be an appealing trait for an entrepreneur.

5 Which Type Pays More? Earning Distributions

The results of characteristics related to the selection into employment types have shown that pre-determined factors such as education and personality traits are distinct between employers and non-employers. Using employers as a proxy of entrepreneurs, I first look into the earning distribution and percentile by employment type. As shown in Table 1, employers have the highest median earning, followed by wage workers and then non-employers. However, non-employers have higher average earning than wage workers, which are driven by some outliers. Therefore, I exclude the earning observations of top and bottom one percentile for each employment type. Figure 2 plots the earning density function by employment type. While earning distribution of all employment types are right-skewed, employers' earning distribution has the longest right tail. Figure 3 graphs the earning percentile by employment type. For all percentile, employers always earn the most, while

non-employers earn similarly as wage workers in the first quintile but earn less than wage workers beyond the first quintile.

Table 8 estimates OLS regression of earnings on employment types, education, asset index, Big Five Personality, and controls stated in equation 1. First four columns show the results from pooling all panel individuals. When pooling all self-employment together, the mean earning difference between wage workers and self-employed workers is insignificant. When decomposing self-employment into employers and non-employers, employers earn $1438 more than wage workers, and non-employers earn $199 less than wage worekers. When Big Five Personality traits are included, we see that extraversion is positively related to earnings, and neuroticism is negatively related to earnings (i.e. being more neurotic is related to lower earnings).

Column (5) and (6) are the first-difference OLS estimation for those who transition from wage workers. Again, when we pool all self-employment transitioning from wage workers, no earing premium has found. However, when decomposing into employers and non-employers, employers gain $1266 in mean earnings comparing with the earnings when they were wage workers, while non-employers bear $560 loss in mean earnings comparing with their previous wage earnings.

Despite excluding the top and bottom one percentile earning observations, the OLS results can still be driven by extreme values of top percentiles. Thus, Table 9 estimates median regression of earnings. The median earning of employers is $236-$241 higher than wage workers, the median earning of non-employer is $64-$66 less than wage workers. While conscientiousness is negatively related to earnings and extraversion is positively related to earnings when pooling self-employment, these two traits lose significance when decomposing self-employment into employers and non-employers. Neuroticism, however, is still significantly negatively correlated with earnings. When focusing on the earning gains for those who transitioned from wage workers, employers gain $364 more than those who remained as wage workers, although imprecisely estimated. Non-employers, on the other hand, earn $533 less comparing with their wage earnings.

6 Employment Types over the Life Cycle

To further understand the transition among employment types, I utilize the retrospective employment information in IFLS, where the labor force participation and employment type are asked between the two survey waves for individuals who are above age 15. For example, if the survey was conducted in 2014, the individuals would be asked if they worked in year of 2013; if they did, what was their employment type. Next, in year 2012, if they worked and what was their employment type, and traced all years back to 2007, the previous survey wave. By using these questions, I am able to track working histories and construct a profile of life-cycle employment type.

Table 10 shows the proportion of transitions conditional on last year's employment type. Each column represents the employment type from last year, and the row represents the proportion that transition to another employment type in the current year. For example, the first cell, 0.910, means that for individuals who were a wage worker last year, 91% stay as wage workers in the current year. The cell below, 0.003, means that for individuals who were a wage worker last year, 0.3% transition to employers in the current year. Therefore, the diagonal is the proportion of staying in the same employment type. As shown in the table, except for non-workers, employment types are quite stable: around or more than 85% stay in the same employment type.

Figure 4 graphs the person-age by cohort and employment type. The younger cohorts enter labor market around 20 to 24 years old, and the older cohorts exits the labor market around 56 and above. Agriculture workers have a clear cohort effect: the proportion in agriculture sector decreases from older cohort to younger cohort. However, it still makes up more than 20% of all workers. While around 35-45% of workers enter the labor market as wage workers, employers and non-employers at a young age seems to be less common: Only 6-12% of workers enter the labor market as non-employers before aged 25, and less than 1% of workers are employers. The proportion of non-employers increases to more than 15% before age 30, and remains relatively stable between age 40 to 50. On the other hand, only until age of 30 to 40 years old, the proportion of employers increases to 2-3%, and it volatiles more than the proportion of non-employers. This may suggest

that most workers still start as wage workers, and engage in non-employers and employers after age of 30. Moreover, because employers are a riskier employment type, the proportion also fluctuates more.

7   Conclusion

In this paper, I use the dataset from Indonesia to study the heterogeneity within self-employment. By separating self-employment into employers and non-employers, I find that employers are more likely to be a better proxy of entrepreneurs: They are more educated than non-employers and have higher household asset, and also experience earning gains rather than losses when transitioning from wage workers. Moreover, employers score higher on both openness and extraversion comparing with wage workers, while non-employers score higher only on openness.

Given the results presented, it is worth noting that this paper does not intend to infer any causal effect. The emphasis is on a better proxy of entrepreneurs when looking into self-employment in developing countries, and on understanding the predictive power of personality traits on the selection. However, one caveat is that the stability of Big Five Personality related to the employment type is unobservable due to data availability. Future work may collect panel data to explore the potential change in Big Five Personality related to selection of employment type.

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Figures

Figure 1: Big Five Personality Traits (Standardized)
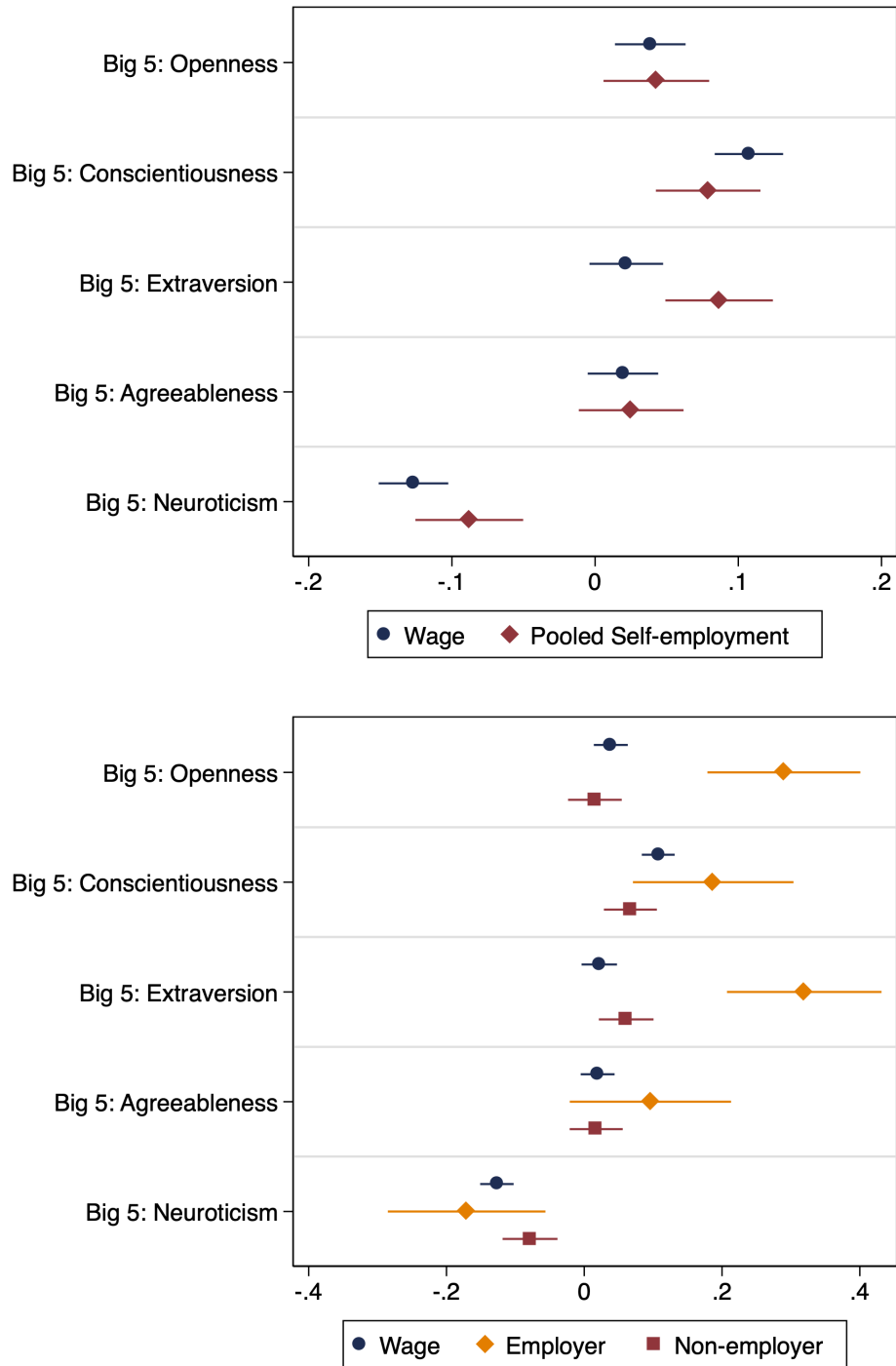
Earning Distribution by Employment Type
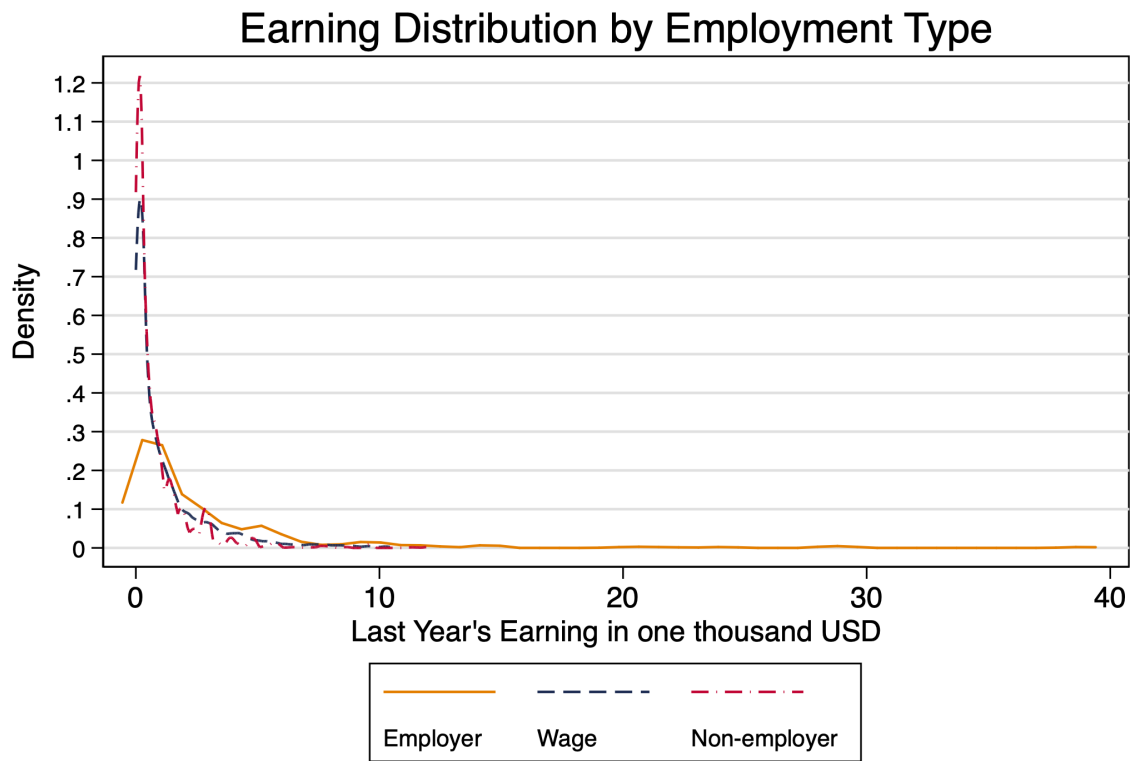
Note: For each employment type, top 1% and bottom 1% are excluded.

Earning Distribution by Employment Type

Earning Distribution by Employment Type: Below Median
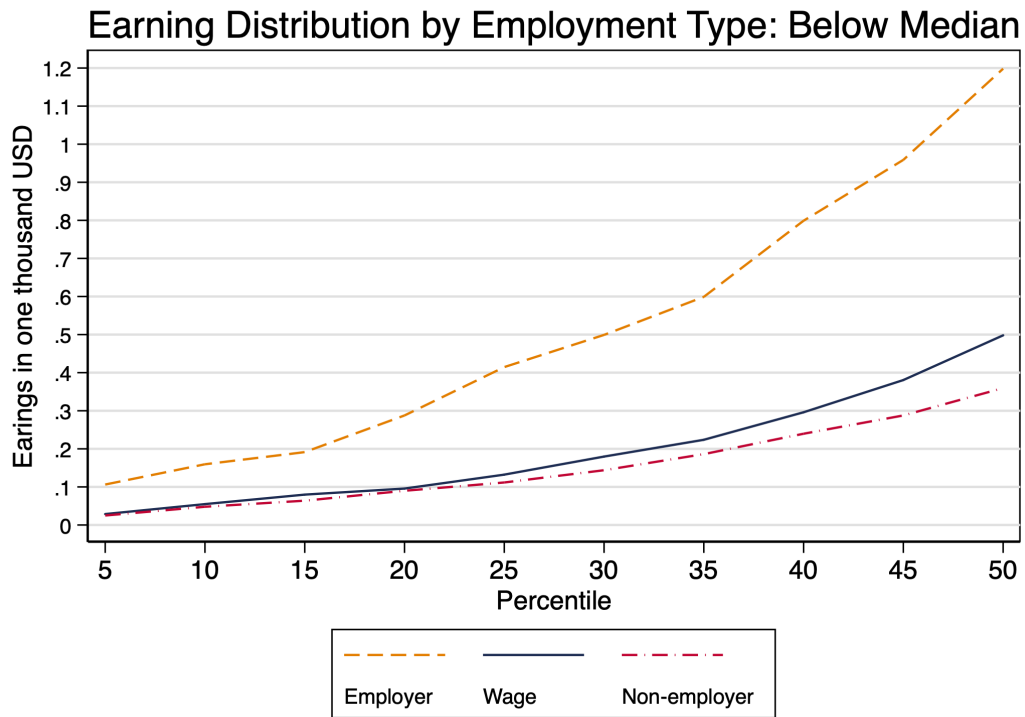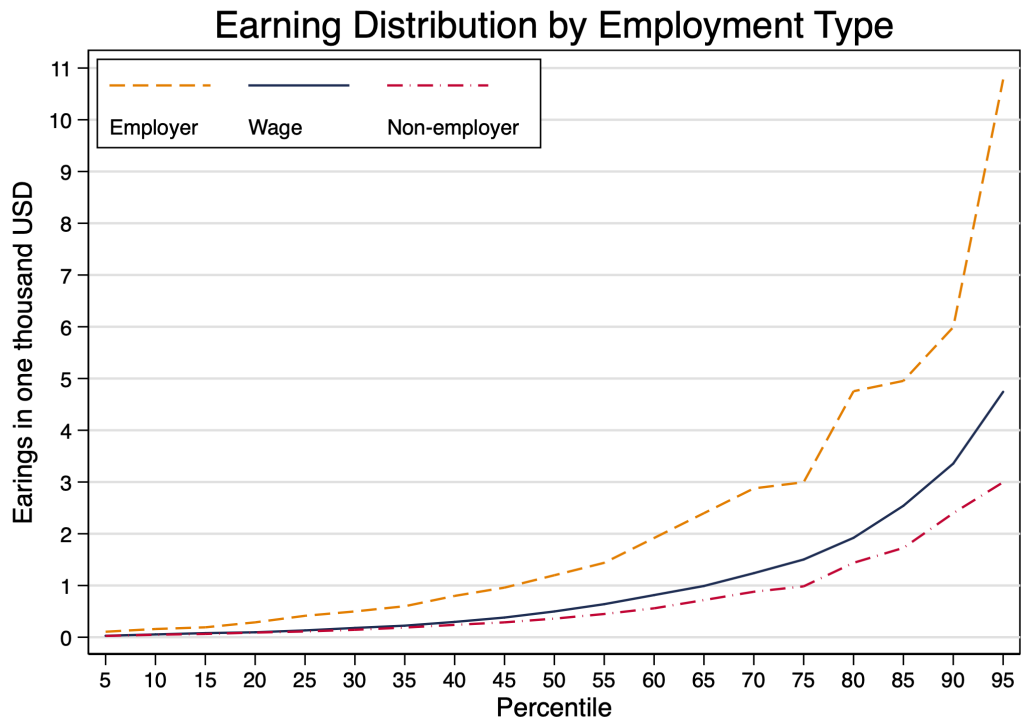
Figure 4: Proportion of Employment Types By Birth Cohort

Proportion of Wage By Birth Cohort

Proportion of Employer By Birth Cohort

1940 1950 1960 1970 1980

Proportion of Non-employer By Birth Cohort

Proportion of Agriculture By Birth Cohort

1940 1950 1960 1970 1980
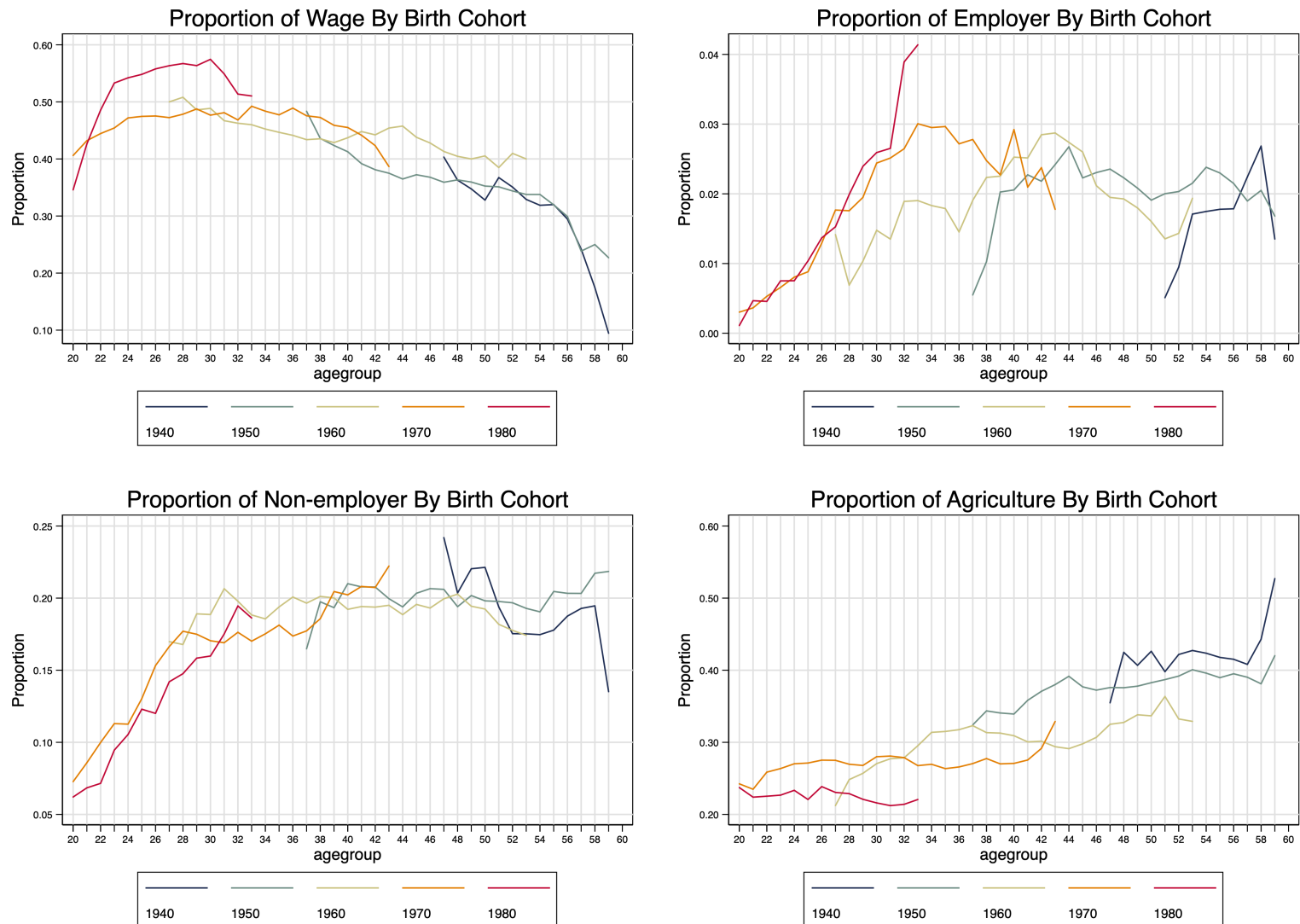
Tables

Table 1: Employment Types Summary Statistics

	All Workers	Wage Workers	Pooled Self-employment	Self-employment	
				Employer	Non-employers
	(1)	(2)	(3)	(4)	(5)
Age	37.47	36.76	38.93	39.94	38.82
	(9.40)	(9.33)	(9.36)	(8.81)	(9.41)
Years of schooling	9.61	10.15	8.49	10.42	8.29
	(4.36)	(4.31)	(4.26)	(4.37)	(4.20)
Asset Index	0.14	0.14	0.16	0.73	0.10
	(0.97)	(0.96)	(0.98)	(0.98)	(0.96)
Married	0.87	0.84	0.91	0.94	0.91
	(0.34)	(0.37)	(0.28)	(0.24)	(0.28)
Muslim	0.92	0.92	0.94	0.90	0.95
	(0.26)	(0.28)	(0.23)	(0.30)	(0.22)
Urban	0.63	0.66	0.57	0.70	0.55
	(0.48)	(0.47)	(0.50)	(0.46)	(0.50)
Total working hours last week	44.75	44.57	45.11	46.59	44.96
	(21.93)	(18.81)	(27.25)	(25.26)	(27.45)
	[8621]	[5886]	[2735]	[272]	[2463]
Mean Earnings Last Year (USD)	1684	1291	2506	3828	2371
Median Earnings Last Year (USD)	452	479	400	1198	359
	[8530]	[5848]	[2682]	[263]	[2419]
Having secondary job	0.28	0.25	0.33	0.23	0.34
	(0.45)	(0.43)	(0.47)	(0.42)	(0.47)
Unique persons	4500	3455	1828	232	1721
Observations	8632	5889	2743	273	2470
	100%	68.2%	31.8%	3.2%	28.6%

Note: 1) The sample is restrict to aged 20 to 60 male workers, excluding agricultural sector. 2) Standard deviations are shown in parentheses. Observations are shown in brackets if they are different from others.

Table 2: Estimation Results of Pooling All Panel Individuals:
Log Odds Ratio Relative to Wage Workers

| | (1) | (2) | | (3) | (4) | |
	Pooled Self-employment	Employer	Non employer	Pooled Self-employment	Employer	Non employer
Years of schooling	-0.079*** (0.009)	-0.025 (0.021)	-0.086*** (0.009)	-0.084*** (0.009)	-0.038* (0.022)	-0.090*** (0.009)
Asset Index	0.136*** (0.034)	0.674*** (0.093)	0.071** (0.034)	0.129*** (0.034)	0.652*** (0.095)	0.067** (0.034)
Big 5: Openness				0.126*** (0.038)	0.313*** (0.105)	0.107*** (0.038)
Big 5: Conscientiousness				-0.016 (0.038)	-0.050 (0.100)	-0.013 (0.040)
Big 5: Extraversion				0.057* (0.033)	0.218*** (0.072)	0.037 (0.034)
Big 5: Agreeableness				-0.008 (0.038)	-0.055 (0.085)	-0.003 (0.039)
Big 5: Neuroticism				0.026 (0.037)	0.015 (0.081)	0.028 (0.038)
Observations	8632	8632		8632	8632	

Notes: 1) The sample is restrict to aged 20 to 60 male workers, excluding agricultural sector. 2) All columns include controls for quadratic age function, married, Muslim, survey year, sector, and region-urban dummies. Standard errors are clustered at sub-district level. 3) Significant level: *0.10**0.05***0.01.

Table 3: Estimation Results of Pooling All Panel Individuals: Marginal Effects

	(1)	(2)		(3)	(4)	
	Pooled Self-employment	Employer	Non employer	Pooled Self-employment	Employer	Non employer
Years of schooling	-0.013***	0.000	-0.014***	-0.014***	-0.000	-0.014***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Asset Index	0.023***	0.019***	0.004	0.022***	0.018***	0.004
	(0.006)	(0.003)	(0.005)	(0.006)	(0.003)	(0.005)
Big 5: Openness				0.021***	0.008***	0.014**
				(0.006)	(0.003)	(0.006)
Big 5: Conscientiousness				-0.003	-0.001	-0.002
				(0.006)	(0.003)	(0.006)
Big 5: Extraversion				0.010*	0.006***	0.004
				(0.006)	(0.002)	(0.005)
Big 5: Agreeableness				-0.001	-0.002	0.000
				(0.006)	(0.002)	(0.006)
Big 5: Neuroticism				0.004	0.000	0.004
				(0.006)	(0.002)	(0.006)
Observations	8632	8632		8632	8632	

Notes: 1) The sample is restrict to aged 20 to 60 male workers, excluding agricultural sector. 2) All columns include controls for quadratic age function, married, Muslim, survey year, sector, and region-urban dummies. Standard errors are clustered at sub-district level. 3) Significant level: *0.10**0.05***0.01.

Table 4: Estimation Results of Pooling All Panel Individuals: Marginal Effects

	(1)	(2)		(3)	(4)	
	Pooled Self-employment	Employer	Non employer	Pooled Self-employment	Employer	Non employer
elementary graduate	-0.028	0.002	-0.028	-0.033*	-0.000	-0.031
	(0.019)	(0.008)	(0.019)	(0.019)	(0.008)	(0.019)
junior high school graduate	-0.059***	0.003	-0.060***	-0.065***	0.001	-0.064***
	(0.022)	(0.009)	(0.022)	(0.022)	(0.010)	(0.022)
high school graduate	-0.131***	-0.000	-0.128***	-0.141***	-0.004	-0.134***
	(0.021)	(0.007)	(0.020)	(0.022)	(0.008)	(0.021)
some college	-0.181***	0.005	-0.189***	-0.194***	-0.000	-0.196***
	(0.023)	(0.009)	(0.022)	(0.023)	(0.010)	(0.022)
Asset Index	0.024***	0.019***	0.006	0.023***	0.018***	0.005
	(0.006)	(0.003)	(0.005)	(0.006)	(0.003)	(0.005)
Big 5: Openness				0.022***	0.008***	0.014**
				(0.006)	(0.003)	(0.006)
Big 5: Conscientiousness				-0.003	-0.001	-0.002
				(0.006)	(0.003)	(0.006)
Big 5: Extraversion				0.010*	0.006***	0.004
				(0.006)	(0.002)	(0.005)
Big 5: Agreeableness				-0.002	-0.002	-0.000
				(0.007)	(0.002)	(0.006)
Big 5: Neuroticism				0.004	0.000	0.004
				(0.006)	(0.002)	(0.006)
Observations	8632	8632		8632	8632	

Notes: 1) The sample is restrict to aged 20 to 60 male workers, excluding agricultural sector. 2) All columns include controls for quadratic age function, married, Muslim, survey year, sector, and region-urban dummies. Standard errors are clustered at sub-district level. 3) Significant level: *0.10**0.05***0.01.

Table 5: Employment Transitions

Wave t Employment Type	Transition Proportions Conditional On Wave $t-1$ Employment Type		
	Wage worker	Employer	Non-employer
Wage worker	0.919 [2333]	0.250 [20]	0.381 [106]
Employer	0.017 [43]	0.463 [37]	0.162 [45]
Non-employer	0.064 [162]	0.288 [23]	0.457 [127]
Observations	2538	80	278

Notes: 1) This table presents the 7-year transition proportions among wage workers, employers and non-employers. Each column sums up to one, where the column labels are the employment types from last wave, and the row labels are the employment types of current wave. 2) Observations in brackets.

Table 6: Estimation Results Restricting to Wage Workers at $(t-1)$:
Log Odds Ratio Relative to Wage Workers

| | (1) | (2) | | (3) | (4) | |
	Pooled Self-employment	Employer	Non employer	Pooled Self-employment	Employer	Non employer
Years of schooling	-0.043*	-0.035	-0.044*	-0.052**	-0.051	-0.052**
	(0.024)	(0.047)	(0.025)	(0.024)	(0.048)	(0.026)
Asset index last wave	0.194**	0.305	0.164	0.176*	0.298	0.141
	(0.098)	(0.217)	(0.105)	(0.100)	(0.216)	(0.106)
Big 5: Openness				0.383***	0.556**	0.349***
				(0.107)	(0.248)	(0.112)
Big 5: Conscientiousness				-0.169	-0.470**	-0.083
				(0.111)	(0.234)	(0.116)
Big 5: Extraversion				-0.043	0.273	-0.132
				(0.092)	(0.235)	(0.099)
Big 5: Agreeableness				-0.115	-0.156	-0.113
				(0.099)	(0.167)	(0.113)
Big 5: Neuroticism				-0.088	-0.150	-0.072
				(0.096)	(0.207)	(0.105)
Observations	2538	2538		2538	2538	

Notes: 1) The sample is restrict to aged 20 to 60 male workers who were non-agricultural wage workers from last wave. 2) All columns include controls for quadratic age function, married, Muslim, survey year, current job's sector, last wave job's and last wave's region-urban dummies. Standard errors are clustered at sub-district level. 3) Significant level: *0.10**0.05***0.01.

Table 7: Estimation Results Restricting to Wage Workers at $(t-1)$: Marginal Effects

	(1)	(2)		(3)	(4)	
	Pooled Self-employment	Employer	Non employer	Pooled Self-employment	Employer	Non employer
Years of schooling	-0.003*	-0.001	-0.002*	-0.004**	-0.001	-0.003*
	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Asset index last wave	0.014*	0.005	0.009	0.012*	0.005	0.007
	(0.007)	(0.004)	(0.006)	(0.007)	(0.004)	(0.006)
Big 5: Openness				0.027***	0.009*	0.019***
				(0.008)	(0.005)	(0.006)
Big 5: Conscientiousness				-0.012	-0.008*	-0.004
				(0.008)	(0.004)	(0.006)
Big 5: Extraversion				-0.003	0.005	-0.008
				(0.006)	(0.004)	(0.006)
Big 5: Agreeableness				-0.008	-0.002	-0.006
				(0.007)	(0.003)	(0.006)
Big 5: Neuroticism				-0.006	-0.002	-0.004
				(0.007)	(0.004)	(0.006)
Observations	2538	2538		2538	2538	

Notes: 1) The sample is restrict to aged 20 to 60 male workers who were non-agricultural wage workers from last wave. 2) All columns include controls for quadratic age function, married, Muslim, survey year, current job's sector, last wave job's and last wave's region-urban dummies. Standard errors are clustered at sub-district level. 3) Significant level: *0.10**0.05***0.01.

Table 8: OLS Regression of Earnings (in USD)

	(1) Earnings	(2) Earnings	(3) Earnings	(4) Earnings	(5) ΔEarnings	(6) ΔEarnings
Pooled Self-employed	-22.72 (45.51)		-26.26 (45.11)			
Employer		1437.57*** (337.34)		1424.41*** (336.87)		
Non-employer		-198.61*** (36.37)		-199.58*** (36.41)		
ΔPooled Self-employed					-179.46 (157.94)	
ΔEmployer						1265.61** (551.40)
ΔNon-employer						-560.29*** (119.43)
Years of schooling	86.30*** (5.40)	83.14*** (5.29)	84.08*** (5.32)	81.42*** (5.23)		
Asset Index	251.38*** (24.62)	226.02*** (21.26)	246.93*** (24.73)	222.55*** (21.46)		
ΔAsset index					43.25 (32.62)	38.23 (32.76)
Big 5: Openness			15.94 (19.09)	8.59 (18.54)		
Big 5: Conscientiousness			-6.99 (18.06)	-5.36 (18.09)		
Big 5: Extraversion			47.42*** (16.54)	38.43** (16.03)		
Big 5: Agreeableness			0.66 (17.50)	0.99 (17.40)		
Big 5: Neuroticism			-36.60** (15.59)	-34.56** (15.53)		
Observations	8243	8243	8243	8243	2823	2823
First Difference	No	No	No	No	Yes	Yes

Notes: 1) For column (1) to (4), the sample is restrict to aged 20 to 60 non-agriculture male workers. OLS regressions include controls for quadratic age function, married, Muslim, survey year, sector, region-urban dummies. 2) For column (5) and (6), change in earnings is regressed on change in transition from wage workers to employers (ΔEmployer) or to non-employers (ΔNon-employer), and change of asset index is also included. The base group is those who stayed as wage workers. 3) Significant level: *0.10**0.05***0.01.

Table 9: Median Regression of Earnings (in USD)

	(1) Earnings	(2) Earnings	(3) Earnings	(4) Earnings	(5) ΔEarnings	(6) ΔEarnings
Pooled Self-employed	-50.29*** (5.34)		-47.86*** (5.21)			
Employer		235.58** (116.66)		241.38** (105.07)		
Non-employer		-66.49*** (6.20)		-64.34*** (7.58)		
ΔPooled Self-employed					-413.77*** (89.26)	
ΔEmployer						363.84 (427.74)
ΔNon-employer						-533.10*** (64.31)
Years of schooling	21.15*** (0.95)	21.54*** (1.11)	21.14*** (1.02)	21.52*** (1.17)		
Asset Index	55.97*** (2.80)	54.63*** (3.63)	55.53*** (2.78)	53.70*** (3.94)		
ΔAsset index					35.96 (26.54)	32.27 (24.96)
Big 5: Openness			1.83 (2.66)	3.10 (3.33)		
Big 5: Conscientiousness			-4.02** (1.88)	-5.97 (3.78)		
Big 5: Extraversion			7.11*** (2.64)	5.28 (3.52)		
Big 5: Agreeableness			1.47 (2.36)	1.33 (3.78)		
Big 5: Neuroticism			-6.87** (2.82)	-7.05** (3.28)		
Observations	8243	8243	8243	8243	2823	2823
First Difference	No	No	No	No	Yes	Yes

Notes: 1) For column (1) to (4), the sample is restrict to aged 20 to 60 non-agriculture male workers. Median regressions include controls for quadratic age function, married, Muslim, survey year, sector, region-urban dummies. 2) For column (5) and (6), change in earnings is regressed on change in transition from wage workers to employers (ΔEmployer) or to non-employers (ΔNon-employer), and change of asset index is also included. The base group is those who stayed as wage workers. 3) Significant level: *0.10**0.05***0.01.

Table 10: Retrospective Employment Type Transitions

Employment Type in Current Year	Transition Proportion Conditional On Last Year's Employment Type				
	Wage worker	Employer	Non-employer	Agriculture	Non-worker
Wage worker	0.910	0.040	0.051	0.036	0.236
Employer	0.003	0.868	0.008	0.001	0.004
Non-employer	0.030	0.055	0.887	0.017	0.064
Agriculture	0.026	0.017	0.033	0.935	0.076
Non-worker	0.032	0.020	0.021	0.011	0.620
Observations	43457	1879	17051	30211	8522

Notes: 1) This table presents year-to-year transition proportions among wage workers, employers, non-employers, agriculture workers and non-workers. Each column sums up to one, where the column labels are the employment types from last year, and the row labels are the employment types of current year.

A   Appendices

Table A1: Big 5 Personality Traits

Dimensions	The tendency to be
Openness	Open to new aesthetic, cultural, or intellectual experiences; curious, imaginative
Conscientiousness	Organized, responsible, thorough, not careless
Extraversion	Outgoing, talkative, sociable, adventurous, not reserved
Agreeableness	Cooperative, unselfish, forgiving, not rude
Neuroticism	Worried, moody, nervous, not relaxed

Source: APA Dictionary of Psychology and John, O. P., & Srivastava, S. (1999)

Table A2: Employment Types Summary Statistics: Ownership of Household Assets

	Wage Workers	Pooled Self-employment	Self-employment Employer	Self-employment Non-employers
	(1)	(2)	(3)	(4)
Home ownership	0.66	0.73	0.74	0.73
	(0.47)	(0.44)	(0.44)	(0.44)
Other house/building ownership	0.12	0.12	0.23	0.11
	(0.32)	(0.32)	(0.42)	(0.31)
Land ownership (not for business)	0.13	0.14	0.21	0.13
	(0.34)	(0.34)	(0.41)	(0.34)
Vehicles (cars, boats, bicycles, motorbikes)	0.74	0.63	0.78	0.61
	(0.44)	(0.48)	(0.42)	(0.49)
Household appliances	0.93	0.93	0.99	0.93
	(0.26)	(0.25)	(0.10)	(0.26)
Savings/certificate of deposit/stocks	0.34	0.34	0.54	0.32
	(0.47)	(0.47)	(0.50)	(0.47)
Receivables	0.12	0.19	0.32	0.18
	(0.32)	(0.39)	(0.47)	(0.38)
Jewelry	0.56	0.57	0.69	0.56
	(0.50)	(0.50)	(0.46)	(0.50)
Household furniture and utensils	0.96	0.98	0.99	0.98
	(0.19)	(0.14)	(0.11)	(0.14)
Observations	5889	2743	273	2470

Table A3: Employment Types Summary Statistics: Sectors

	Wage Workers	Pooled Self-employment	Self-employment Employer	Self-employment Non-employers
	(1)	(2)	(3)	(4)
2 Mining and quarrying	1.80	1.23	0.68	1.28
3 Manufacturing	22.36	12.95	24.53	11.75
4 Electricity, gas, water	1.00	0.19	0.00	0.21
5 Construction	15.07	3.23	6.33	2.90
6 Wholesale, retail, restaurants and hotels	13.03	49.03	42.99	49.66
7 Transportation, storage and communications	5.82	11.81	2.33	12.80
8 Finance, insurance, real estate and business service	3.66	0.75	1.84	0.63
9 Social services	36.64	19.49	20.52	19.38
10 Activities that cannot be classified	0.62	1.32	0.78	1.37
Total	100.00	100.00	100.00	100.00
Observations	5889	2743	273	2470

Table A4: Employment Types Summary Statistics From Indonesia 2000 Census

	All Workers	Wage Workers	Pooled Self-employment	Self-employment	
				Employer	Non-employers
Highest Education (%)					
less than elementary	8.61	6.22	12.62	6.63	12.98
elementary graduate	32.01	26.50	41.24	28.62	41.99
junior high graduate	17.60	17.32	18.07	17.99	18.07
high school graduate	32.52	37.86	23.59	33.76	22.98
some college	9.25	12.10	4.48	13.00	3.98
Age	35.71	34.77	37.30	38.42	37.23
	(10.06)	(9.89)	(10.16)	(9.92)	(10.17)
Married	0.80	0.76	0.87	0.88	0.87
	(0.40)	(0.42)	(0.34)	(0.32)	(0.34)
Muslim	0.90	0.89	0.91	0.83	0.91
	(0.31)	(0.32)	(0.29)	(0.38)	(0.28)
Urban	0.67	0.71	0.60	0.69	0.59
	(0.47)	(0.45)	(0.49)	(0.46)	(0.49)
Observations	2559374	1602914	956460	53505	902955
	100%	62.62%	37.38%	2.09%	35.29%

Table A5: Indonesia 2000 Census Cross-sectional Selection:
Log Odds Ratio Relative To Wage Workers

	(1)	
	Employer	Non-employer
elementary graduate	0.138***	-0.202***
	(0.031)	(0.023)
junior high graduate	0.214***	-0.533***
	(0.043)	(0.034)
high school graduate	0.069	-1.083***
	(0.057)	(0.047)
some college	0.101	-1.865***
	(0.068)	(0.046)
married	0.443***	0.435***
	(0.027)	(0.013)
muslim	-0.636***	0.030
	(0.067)	(0.038)
Observations	2559374	

Table A6: Big Five Personality Pairwise Correlation

	Big 5: O	Big 5: C	Big 5: E	Big 5: A	Big 5: N	Years of schooling	Asset Index
Big 5: Openness	1						
Big 5: Conscientiousness	0.383***	1					
Big 5: Extraversion	0.198***	0.164***	1				
Big 5: Agreeableness	0.380***	0.407***	0.218***	1			
Big 5: Neuroticism	0.0616***	-0.0738***	-0.0823***	0.0263*	1		
Years of schooling	0.236***	0.112***	0.0908***	0.0771***	-0.0942***	1	
Asset Index	0.141***	0.0868***	0.0729***	0.0458***	-0.0648***	0.336***	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A7: Big Five Personality Variance Inflation Factors

Variable	VIF	1/VIF
Big 5: Agreeableness	1.32	0.757637
Big 5: Conscientiousness	1.32	0.758802
Big 5: Openness	1.29	0.776242
Big 5: Extraversion	1.09	0.915071
Big 5: Neuroticism	1.04	0.958888
intercept	1.02	0.977405
Mean VIF	1.18	