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 entrepreneurial activity. I first distinguish between entrepreneurs — the self-employed who hire permanent workers — and the necessity self-employed. I find that both entrepreneurs and wage workers are positively selected in terms of education and cognitive skills relative to the necessity 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, entrepreneurs always earn more than wage workers and the necessity self-employed, and the necessity self-employed earn the least beyond the first quintile. 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: Entrepreneurship, Necessity Self-employment, Development, Big Five Personality

JEL classification: O1, L2

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1 Introduction

Entrepreneurship is usually viewed as crucial to economic growth, and governments often tailor policies to encourage self-employment and to support businesses (Acs and Szerb, 2007; Acs et al., 2008). It is difficult, however, to define and measure entrepreneurship. If one uses the most often-used definition — self-employment — one is left with a puzzle. Self-employed rates in high-income countries stand at about 10-15%, while self-employment is more than 30% in middle and low income countries.[1] Under this metrics, entrepreneurial activities are higher in low-income countries. The literature has pointed out that self-employment in developing countries is a broad category consisting of heterogeneous types (Schoar, 2010). For example, de Mel et al. (2010) look into differences between employers and own-account self-employed workers in Sri Lanka, and show that employers have better cognitive abilities, come from better family backgrounds, and possess higher entrepreneurial attitudes. Banerjee et al. (2017) distinguish between "gung-ho entrepreneurs" who had already owned businesses prior to the microfinance intervention and other "reluctant entrepreneurs" who have no such experience. They find that the former perform significantly better. It is clear that self-employment is a heterogeneous pool where some have better abilities and higher potential to succeed.

In this study, I investigate the characteristics associated with selection into different types of self-employment. Using panel data from the Indonesia Family Life Survey (IFLS), I distinguish between "entrepreneurs" (the self-employed with permanent workers) and "necessity self-employed" (the self-employed who are own-account or with temporary/unpaid workers). I look at not only how cognitive abilities, measured by years of schooling, are associated with selection into entrepreneurship but also the role of non-cognitive abilities measured by Big Five Personality traits. Big Five Personality is a factor model developed by psychology literature to study different dimensions of the

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

human personality. The five traits are openness (to new experience), conscientiousness, extraversion, agreeableness, and neuroticism, and each trait consists of several facets (see Table 1). As shown in Cobb-Clark and Schurer (2012), personality traits appear to stay stable among the working-age adults, and thus I restrict the analysis sample to males aged 20-60. The results show that without disaggregating self-employment, selection into self-employment is associated with less education and higher openness compared to wage workers. However, when I disaggregate self-employment, I find that entrepreneurs have similar cognitive skills but higher scores on openness and extraversion relative to wage workers. The necessity self-employed also have higher scores on openness but have less education and cognitive skills compared to wage workers. The results indicate that failure to distinguish across the different types of the self-employment can be misleading.

In addition to examining traits associated with different employment types, it is of interest to look at entrants — those who switch from wage work to entrepreneurship or necessity self-employment. Policies are often set up to encourage individuals to start a business. What are the characteristics of those who start a business? With the longitudinal dataset, I am able to look at the characteristics associated with entry from wage work into entrepreneurship. I find that entrants have similar levels of education as wage workers so cognitive skills are not the distinguishing characteristic of entrants into entrepreneurship, but openness and extraversion are. While somewhat imprecisely estimated, I find the magnitude of the coefficients on openness and extraversion are similar in the entry equations. Interestingly, entrants score somewhat below wage workers in terms of "conscientiousness." These results echo the findings in developed economies such as Levine and Rubinstein (2017) which show that entrepreneurs are not only smart but also risk takers and rule-breakers. On the other hand, as expected, individuals who transition from wage work to necessity self-employment are negatively selected in terms of education.

A common question in the literature is whether entrepreneurship has a return. Give that it is a

risky enterprise and requires equal amounts of cognitive ability, it would be puzzling if there was no return. I show that it is crucial to distinguish between the two types of self-employment to answer this question. When pooling all self-employment together, the median earnings are about $50 less than wage workers annually. However when I distinguish between the entrepreneurs and the other self-employed, I find that median earnings of entrepreneurs is $236 more than wage workers, while median earnings of the necessity self-employed are $65 less than wage workers. Furthermore, for all earning percentiles, entrepreneurs earn more than wage workers and necessity self-employment types. Focusing on those who transition into entrepreneurship from wage work, I find that median earnings increase by $644 while those who transition from wage work to necessity self-employment lose about $573.

This paper adds to the literature in several ways. First, I show that it is important to distinguish between different types of self-employment—those who are entrepreneurs and those who for the most employ just themselves. The distinction reveals that the entrepreneurs are more educated and have higher cognitive scores relative to the necessity self-employed. Second, to the best of my knowledge, this is the first paper to show that individual personality traits, in addition to cognitive ability, play an important role in the selection into entrepreneurship in developing countries. I show that entrepreneurs score higher on "openness" and "extraversion" than wage workers and those who transition from wage work to entrepreneurship are less "conscientious" than those who stay in wage work—a finding similar to what others have found in the U.S. Finally, I am able to exploit a large panel dataset to show that returns to entrepreneurship is substantial in developing economies. Those who enter entrepreneurship from wage work experience almost $1600 gain in mean earnings. If we pool all self-employment, there is essentially zero gain in earnings. These results again point to the importance of distinguishing between the types of self-employment in developing country context.

The rest of paper is organized as follows. Section 2 reviews the literature on selection into entrepreneurship and the importance of personality traits. Section 3 describes the data used and the summary statistics. Section 4 presents the results of characteristics related to entry into entrepreneurship. Section 5 analyzes the earning distribution by employment types. Section 6 provides additional information regarding the life cycle path of employment types. Section 7 shows the robustness checks. Section 8 concludes.

2 Literature Review

2.1 Selection into Entrepreneurship

The literature suggests two types of constraints on entry into 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 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 Big Five Personality Traits

The literature has studied how personality traits affect economic decisions and occupational choice (Heckman et al., 2006; Almlund et al., 2011) In particular, Big Five Personality traits (openness, conscientiousness, extraversion, agreeableness, neuroticism) have been shown predictive on the labor market outcomes in Germany and UK, but have heterogeneous effects on men and women. For example, (Heineck, 2011) find that openness is positively related to hourly wage for women, but negatively related for men. Extraversion and aggreableness are negatively related to wage for women, positively and insignificantly related for men. Rustichini et al. (2016) show that U.S. truck drivers who score higher on extraversion and conscientiousness have lower credit score, and those who score higher on openness and agreeableness are less likely to smoke. Using IFLS, Adhitya et al. (2019) shows that extraversion is a strong predictor of higher wage for both men and women in Indonesia.

Entry into entrepreneurship has been shown to be related to soft skills and social emotions, such as illicit behaviors and optimism (Fairlie, 2002; Levine and Rubinstein, 2017; Puri and Robinson, 2007, 2013). Big Five Personality traits are also shown to be relevant to the entry, exit, and performance of self-employment. Using German Socio-Economic Panel (GSEOP), Caliendo et al. (2014) find that out of the five traits, openness and extraversion are predictive of entry into self-employment, and agreeableness is predictive of exit. Similarly, using the National Survey of Midlife Development in the United States (MIDUS), Hamilton et al. (2018) show that while both openness and extraversion are predictive of entry into self-employment, only extraversion is predictive of being profitable. 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. One of the reasons is the difficulty in measuring Big Five Personality. Laajaj

and Macours (2018) and Laajaj et al. (2019) point out that the existing questions measuring Big Five Personality are designed and developed in developed countries, and may not be applicable to low-income agricultural population and different cultural contexts. However, the common attenuation problem resulting from measurement errors does not nullify the effects of Big Five Personality Traits in this study. 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, using the data from Indonesia, this study show that personality traits do play a role in selection into entrepreneurship. Moreover, the patterns are similar to the developed countries.

Big Five Personality traits are shown to be relatively stable in adulthood. Using the panel study of the Household, Income and Labour Dynamics in Australia (HILDA), Cobb-Clark and Schurer (2012) show that Big Five Personality traits tend to stay stable for the working-age adults, and adverse events are in general unrelated to within-person changes. Hamilton et al. (2018) also find that self-employment, asset and earnings are not predictive of future Big Five Personality traits. Studies on the stability of personality traits following the unemployment episodes generally show modest effects. Replicating the results of Boyce et al. (2015), Gnambs and Stiglbauer (2019) find no effect on Big Five Personality traits after unemployed episodes using data from GSOEP. Using data from the Longitudinal Internet Studies for the Social Sciences in the Netherlands, Denissen et al. (2019) also find no effect on personality traits after unemployment. Anger et al. (2017) use GSOEP to examine the effect of involuntary job loss on workers' personality traits. Using plant closures as an exogenous shock, they find an increase in workers' openness, driven entirely by workers with a college degree who immediately transitioned to another employed job, and find no effect on other personality traits. Since I focus on workers and do not account for unemployed episodes in this

study, the complications of unemployment spells may have limited effect on my analysis.

3 Data and Summary Statistics

Indonesia is the fourth most populous country in the world, and has been steadily growing since the Asian Financial Crisis in 1997-1998.[2] The GDP per capita has grown from $780 in 2000 to more than $3000 in 2010.[3] 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.[4] However, around 20% of the population are considered vulnerable in economic conditions because of their borderline poor status, and more than 10% of the GDP is contributed by the agricultural sector.[5]

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 and conducted by RAND in 1993. The sample is representative of 83% of Indonesian population and is designed to study socioeconomic and health characteristics of households.[6] The original sample included 7,224 households, more than 22,000 individuals.[7] 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

[2]World Bank Overview: https://www.worldbank.org/en/country/indonesia/overview
[3]World Bank national accounts data: https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ID
[4]World Bank Data: https://data.worldbank.org/indicator/SI.POV.DDAY?locations=ID
[5]World Bank national accounts data: https://data.worldbank.org/indicator/NV.AGR.TOTL.ZS?locations=ID
[6]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.
[7]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.

Blanchflower (2000), agricultural sector usually is excluded in many studies of entrepreneurship, given the difficulty to distinguish self-reported self-employed workers in agriculture from unpaid family workers.

IFLS defines different employment types in detail, similar to the categories in the Indonesian Census. Specifically, individuals aged 15 or more are asked about the primary job which 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 workers/temporary workers, (iii) self-employed with permanent workers, (iv) government worker, (v) private worker, (vi) casual worker in agriculture, (vii) casual worker not in agriculture, (viii) unpaid family worker. I group self-employed workers into two types: "Entrepreneurs", who are self-employed with permanent workers, and "Self-employed", who are self-employed without help or with temporary workers/unpaid family workers.

I categorize the the self-employed with temporary workers/unpaid family workers as "necessity self-employed" 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."[8] 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 only 23% of self-employed with permanent workers have a secondary job.

Following the employment type question, wage workers are asked about their last year's salary/wage

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

including the value of all benefits. Wages of unpaid family workers are assumed to be zero since they are not asked about their salary/wage. Additionally, I also include the amount of year-end-bonuses and other bonuses in calculating earnings. Individuals who are self-employed are asked about approximate net profits gained from the business last year, taking out all business expenses.

Because household wealth is relevant to the choice of employment types, I use questions regarding the ownership of assets owned by the household to measure household wealth (see the detailed categories in A1). Nevertheless, the ownership of household asset is not a perfect mapping to the value of wealth. For example, home ownership in rural areas can be qualitatively inferior and have little monetary value comparing with home ownership in urban areas. I thus weight the binary asset ownership variables using the first component generated by principal-component analysis, and standardize the asset index into a continuous variable. The interpretation of the asset index still requires caution, and should not be confused as the actual value of wealth.

Table 2 summarizes the characteristics by each employment type. When all the self-employed are pooled together, they constitute around 32% of all workers. However, when breaking down to entrepreneurs and the necessity self-employed, entrepreneurs only make up 3.2% of all workers, while the necessity self-employed 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 disaggregated into entrepreneurs and the necessity self-employed, entrepreneurs have similar education as wage workers, work longer hours and earn more than the wage workers in both mean and median income; while the necessity self-employed are less educated, earn less median income and are more likely to have a secondary job. Table 3 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 entrepreneurs and the necessity self-employed are both in wholesale, retail and hospitality sector. The second largest sector for entrepreneurs is manufacturing, while for the necessity self-employed is social services. In addition, about 13% of the necessity self-employed are in transportation, storage and communication sector, such as transport equipment operators and freight operators, while only 2% of entrepreneurs in this sector.

To address concerns that IFLS only sampled 83% of the Indonesia population in the initial wave, I also use the 2000 Indonesia Census which is a representative sample of the entire population. Fortunately, the categories of employment types are the same in the Census so that I again define entrepreneurs as those who are self-employed with permanent workers, and categorize all other self-employed as necessity self-employment. As shown in Table 4, wage workers make up to 62.62% of all workers, entrepreneurs 2.09%, and the necessity self-employed 35.29%. In the Census the fraction who are wage workers and entrepreneurs are somewhat lower than in the IFLS. However, the demographic characteristics across employment types are similar: the average age of workers is around 36, about 80% workers are married, and 67% live in urban areas while the other types of the self-employed are the least likely to live in urban areas. Wage workers are more educated than the pooled self-employed: around 50% of the wage workers are high school graduates, while about 60% of the pooled self-employed are elementary and junior high school graduates. Nevertheless, when I disaggregate self-employment into entrepreneurs and the necessity self-employed, the educational profile of entrepreneurs are similar to wage workers: 46% of the entrepreneurs are high school graduates, while only 26% of the necessity self-employed 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 the Big Five Personality traits were measured. By the definition of the 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 each personality traits are summarized in Table 1. 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 Study (GSOEP). 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. However, Cobb-Clark and Schurer (2012) find that Big Five Personality traits appear to be 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 also mitigate the concerns of changes in Big Five Personality over time.

Figure 1 shows the standardized Big Five Personality traits by employment types. When pooling all self-employment, only extraversion is significantly different between pooled self-employment and wage workers. However, when I disaggregate into entrepreneurs and the necessity self-employed, entrepreneurs have significantly higher openness and extraversion, while the necessity self-employed have similar levels of openness and extraversion as wage workers.[9]

[9]Table A3 describes the correlation among 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 A4 test the variance inflation factors (VIF) of the five dimensions of personality. Variance inflation factors (VIF) are used to detect the likely multicollinearity among the explanatory variables. Suppose there are k explanatory variables, $X_1, \dots X_k$. VIF is defined as

$$VIF_i = \frac{1}{1 - R_i^2}$$

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:

$$
\begin{aligned}
ln\frac{P_{ijt}}{P_{iwt}} &= \beta_{0,j} + \beta_{1,j}\text{Education}_{i,t} + \beta_{2,j}\text{Asset Index}_{i,t} \\
&+ \sum_{k=\{O,C,E,A,N\}} \beta_{k,j}\text{Personality}_{k,i} + \beta_{3,j}f(age)_{i,t} + X_{i,t}^{'}\Gamma_{X,j} + \varepsilon_{i,j,t}
\end{aligned} \tag{1}
$$

where P_{ijt} is the probability of person i being $j \in \{\text{Entrepreneur}, \text{Necessity Self-employed}\}$ 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 sub-district level.

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

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where R_i^2 is derived from the regression of X_i on $\mathbf{X_{-i}}$

$$X_i = \alpha_0 + \alpha_1 X_1 + \cdots + \alpha_{i-1}X_{i-1} + \alpha_{i+1}X_{i+1} + \cdots + \alpha_k X_k + e$$

Therefore, a greater VIF indicates a severer multicollinearity. The rule of thumb suggests that VIF greater than 10 indicates high multicollinearity (O'brien, 2007). Since all VIFs of Big Five Personality traits are much less than 10, no evidence of high collinearity presents among the personality traits.

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

Table 5 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 distinguishing self-employment between entrepreneurs and the necessity self-employed in column (2), lower education related to the sorting into self-employment is driven by the type of the necessity self-employed relative to wage workers, and higher household asset index is driven by the type of entrepreneurs, although it is also significantly associated with the sorting into the necessity self-employed 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 work. When disaggregating self-employment in column (4), both openness and extraversion are significantly positively related to sorting into entrepreneurship relative to wage work, while only openness is significantly positively associated with selection into the necessity self-employment.

Table 6 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 entrepreneurship, and asset index is significantly positively related to sorting into entrepreneurship. Specifically, an increase of one standard deviation in asset index is associated with 56% increase in selecting into entrepreneurship ($0.018/0.032 \approx 56\%$). In contrast, years of schooling is significantly related

to sorting into the necessity self-employed, and insignificantly related to sorting into the necessity self-employed. Considering an increase of half of the standard deviation in years of schooling, which is about the difference of average years of schooling between entrepreneurs and the necessity self-employed, it is associated with 10% decrease in selecting into the necessity self-employment. Table 7 further disaggregate 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 the necessity self-employment is driven non-linearly by higher educational level: Higher the education level is related to lower probability selecting into the necessity self-employed, 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 entrepreneurship. One standard deviation increase in openness is associated with 25% increase in selecting into entrepreneurship; one standard deviation increase in extraversion is associated with 18.8% increase in selecting into entrepreneurship. 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 the self-employed. A standard deviation increase in openness is related to about 5% increase sorting into the necessity self-employment.

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 disaggregating into entrepreneurs and the necessity self-employed, selection of entrepreneurship are related to more household asset, higher openness *and* extraversion, while selection into necessity self-employment is related to lower education and higher openness. The significant marginal effects of asset index for entrepreneurs, but not for the necessity self-employed, could be indicative of the differences of entrepreneurship and subsistence self-employment: Entrepreneurs

demand more capital to build a business, while necessity 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: Transition From Wage Work

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, it is natural to 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 entrepreneurs and the self-employed. Using the panel data of IFLS, I am able to trace the transitions among different employment types.

Table 8 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% entrepreneurs stay as entrepreneurs and the same for the necessity self-employed. It is not surprising that wage workers are the most stable type, while transitions from entrepreneurs to wage workers and to the self-employed are similar in proportion, and transitions from the self-employed to wage workers are two times of transitions to entrepreneurs. I focus on the transition from wage workers for two

reasons. First, although wage work is persistent, transitions from wage workers are the largest: the total number of transitions from entrepreneurs and the necessity self-employed 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 entrepreneurs and the necessity self-employed.

Table 9 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 the necessity self-employed, and higher asset index from last wave which is driven by entrepreneurs, although imprecisely estimated. While higher openness remains positively related to the selection into both entrepreneurs and the necessity self-employed, extraversion is positively related to selection into entrepreneurship and is negatively related to selection into necessity self-employment, despite being insignificant. The imprecise estimates may be due to the small sample size: Transition from wage workers to entrepreneurs only makes up to 43 observations.

Interestingly, higher conscientiousness is significantly associated with *lower* probability of sorting into entrepreneurship. As pointed out in Costa et al. (1991) and 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 Is There a Return to Entrepreneurship? Employment Type and Earnings

Having shown predetermined factors such as education and personality traits are related to the selection into entrepreneurship, I turn to examine earnings in each employment type. As shown in Table 2, entrepreneurs have the highest median earning, followed by wage workers and then the self-employed. However, the self-employed 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. I first look into the earning distribution and percentile by employment type. Figure 2 plots the earning density function by employment type. While earning distribution of all employment types are right-skewed, entrepreneurs' earning distribution has the longest right tail. Figure 3 graphs the earning percentile by employment type. When pooling all self-employment together, the earnings in the bottom 30th percentiles seem to be similar to wage workers, and less than wage workers beyond the 30th percentile. However, if I distinguish entrepreneurs from the necessity self-employed, for all percentiles, entrepreneurs always earn the most, while the necessity self-employed earn similarly as wage workers in the first quintile but earn less than wage workers beyond the first quintile.

Table 11 show the OLS regressions of earnings on employment types, education, asset index, Big Five Personality, and controls stated in equation 1. The 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 the self-employed is insignificant. When distinguishing self-employment between entrepreneurs and the necessity self-employed, entrepreneurs earn $1438 more than wage workers, and the necessity self-employed earn $199 less than wage worekers. When Big Five Personality traits are included, I find 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 estimates for those who transition from wage workers. Again, when I pool all self-employment transitioning from wage workers, no earing premium has found. However, when distinguishing between entrepreneurs and the necessity self-employed, entrepreneurs gain $1599 in mean earnings compared with the earnings when they were wage workers, while the necessity self-employed a bear $560 loss in mean earnings compared 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, I estimate median regressions for earnings in Table 12. The median earnings of entrepreneurs are $236-$241 higher than wage workers, while the median earnings of the necessity self-employed are $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 entrepreneurs and the necessity self-employed. Neuroticism, however, is still significantly negatively correlated with earnings. When focusing on the earning gains for those who transitioned from wage workers, entrepreneurs gain $364 more than those who remained as wage workers, although imprecisely estimated. Those who transitioned to the necessity self-employed, on the other hand, earn $533 less compared with those stayed as wage workers.

6 Employment Types over the Life Cycle

To further understand the transition among employment types, I utilize the retrospective employment information in IFLS, where information regarding labor force participation and employment types are elicited for years in between the waves for individuals who are 15 and older. 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 year of previous survey wave. By using these questions, I am able to construct work histories and construct a profile of life-cycle employment type.

Table 13 shows the proportion of transitions conditional on last year's employment type. Columns show the employment type in the previous year while rows show the proportions in each 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 entrepreneurs in the current year. Therefore, the diagonal reports the proportion of staying in the same employment type. As shown in the table, except for non-workers, employment types are quite stable: approximately 85% or more stay in the same employment type.

Figure 4 graphs the person-age by cohort and employment type. The younger cohorts enter the labor market when they are around 20 to 24 years old, and the older cohorts exit the labor market whey they are approximately 56 and above. There are clear cohort effects in agricultural work: the proportion in the agriculture sector decreases from older cohorts to younger cohorts. However, it still makes up more than 20% of all workers. While around 35-45% of workers enter the labor market as wage workers, entrepreneurs and the necessity self-employed at young ages seem less common: Only 6-12% of workers enter the labor market as the necessity self-employed before age 25, and less than 1% of workers are entrepreneurs. The proportion of the necessity self-employed increases to more than 15% before age 30, and remains relatively stable between age 40 to 50. On the other hand, the proportion of entrepreneurs increases to 2-3% only at ages 30-40 years old, and it is fairly volatile.

7 Robustness Checks

7.1 Cognitive Capacity

In 2014, a new module was incorporated in IFLS which measured cognitive ability for all respondents age 15 or above. A series of numbers with a blank cell are shown, and respondents should use the logic based on the pattern of numbers displayed to fill in the blank cell. Three starting questions are answered by all respondents, and based on the number of correct answers, different sets of another three questions are shown and answered. I estimate again the selection into entrepreneurship from equation 1, and incorporate the cognitive ability using panel individuals in 2014. Table 14 column (1) shows the results of only include education, years of schooling, where I find a similar pattern as shown in Table 5: Years of schooling is insignificantly related to selection into entrepreneurship, but is significantly negatively related to selection into necessity self-employment. Table 14 column (2) uses only cognitive ability, where the similar pattern appears again: Higher cognitive ability is associated with lower log odds ratio selecting into necessity self-employment. Table 14 column (3) incorporates both years of schooling and cognitive ability. The magnitude of years of schooling remains similar as column (1), while the significance of cognitive ability has disappeared, indicating the highly correlation between years of schooling and cognitive ability. Column (3) implies that even though years of education may not be a perfect proxy for cognitive ability, the magnitude and interpretation for selecting into employment types remain important.

7.2 Big Five Personality Traits: Using Ordinal Measure

To address the concern that Big Five Personality traits may not be robust in terms of five-level of cardinal measure, I generate dummies for each personality traits, where value 1 represents the individual having the personality trait above the average within the sample, and 0 is below the average. Table 15 Column (1) and (2) repeat the exercise in 5, where I find that the patterns of Big

Five Personality traits remain the same for selection into entrepreneurship, while the significance disappears for the necessity self-employed. Table 15 Column (3) and (4) repeat the exercise in 9. For selection into entrepreneurship, the magnitude of openness has increased, and the significance of conscientiouseness has disappeared. However, the overall patterns of Big Five Personality traits remain similar.

7.3 Transition From Wage Work and Risk Tolerance

In the fourth and fifth waves (2007 and 2014), a new module measuring risk aversion is included for all respondents aged 15 or above. A series of questions are asked regarding their preferences between two lotteries. Table 16 shows the results when pooling all panel individuals in 2007 and 2014. For the current risk attitude, the risk aversion is significantly negatively related to selection into both entrepreneurship and necessity self-employment. Moreover, the risk aversion from 7 years ago is also significantly negatively related to selection into entrepreneurship, but insignificant for the selection into necessity self-employment. The patterns of education, asset index and Big Five Personality traits remain similar.

Table 17 shows the results restricting individuals who were wage workers in 2007, and their transition into different types of employment in 2014. While I find in Column (1) and (3) that the risk aversion is significantly negatively related to the transition from wage worker to entrepreneurship, other factors such as education, asset index last wave and Big Five Personality traits become statistically insignificant. The imprecise estimates likely result from the much smaller sample who can be incorporated in this estimation.

7.4 Using Asset Index from Last Wave in Estimation Pooling All Panel Individuals

Instead of using the contemporaneous asset index as in Table 5 and Table 7, Table 18 estimates the log-odds ratio using asset index from 7 years ago. Compared to Table 5 and Table 7 Column (3) and (4), first, the magnitudes of contemporaneous asset index and asset index from 7 years ago appear to be very similar. Second, the magnitudes and precision of openness on the sorting into entrepreneurs and the necessity self-employed go down, while the magnitudes of extraversion on the sorting into entrepreneurs becomes larger. Third, the patterns of how education is related to the sorting into entrepreneurship and necessity self-employment remain the same. Therefore, even after controlling for the asset index at the baseline, the interpretation that education and personality traits are distinct for sorting into entrepreneurship and necessity self-employment remain robust.

8 Conclusion

In this paper, I use data from Indonesia to study heterogeneity in self-employment in a developing country context. Separating out different types of self-employment, I find that entrepreneurs, defined as employers who hire permanent employees, are distinct from the other self-employed. Sorting into entrepreneurship and necessity self-employment are distinct not only on the aspect of cognitive abilities, but also on the non-cognitive aspects. An increase of one standard deviation in years of schooling is associated with 56% increase in selecting into entrepreneurship. Moreover, entrepreneurs score higher on both openness and extraversion compared to wage workers. Specifically, one standard deviation increase in openness is associated with 25% increase in sorting into entrepreneurship, and one standard deviation increase in extraversion is associated with 18.8% increase in selecting into entrepreneurship. One the other hand, those who transitioned from wage work to entrepreneurship

score higher on openness and *lower* on conscientiousness. Entrepreneurs also experience earnings gains rather than losses when they transition from wage worker compared to the necessity self-employed. These results point to the importance of individual traits—both cognitive ability and personality traits in selection into entrepreneurship.

Many policies encouraging entrepreneurship are based on the notion that access to credit is the primary obstacle to entry into entrepreneurship, and provision of liquidity will encourage business ownership and a path out of poverty. My research shows that these interventions are more likely to be impactful when we understand the individual traits associated with entrepreneurship.

References

Acs, Zoltan J. and Catherine Armington, "The impact of geographic differences in human capital on service firm formation rates," *Journal of Urban Economics*, 2004, *56* (2), 244 – 278.

__ and Laszlo Szerb, "Entrepreneurship, Economic Growth and Public Policy," *Small Business Economics*, Mar 2007, *28* (2), 109–122.

__ , Sameeksha Desai, and Jolanda Hessels, "Entrepreneurship, economic development and institutions," *Small Business Economics*, Oct 2008, *31* (3), 219–234.

Adhitya, Dhian, Tri Mulyaningsih, and Bhimo Rizky Samudro, "The Role of Cognitive and Non-Cognitive Skills on Labour Market Outcomes in Indonesia," *Malaysian Journal of Economics*, 2019, *53* (1), 3–16.

Almlund, Mathilde, Angela Lee Duckworth, James Heckman, and Tim Kautz, "Personality Psychology and Economics," in Eric A. Hanushek, Stephen Machin, and Ludger Woessmann, eds., *Handbook of The Economics of Education*, Vol. 4 of *Handbook of the Economics of Education*, Elsevier, 2011, pp. 1 – 181.

Anger, Silke, Georg Camehl, and Frauke Peter, "Involuntary job loss and changes in personality traits," *Journal of Economic Psychology*, 2017, *60*, 71 – 91. Stability of Preferences.

Banerjee, Abhijit V., Emily Breza, Esther Duflo, and Cynthia Kinnan, "Do Credit Constraints Limit Entrepreneurship? Heterogeneity in the Returns to Microfinance," *Buffett Institute Global Poverty Research Lab Working Paper*, 2017, (No. 17-104).

Blanchflower, David G., "Self-employment in OECD countries," *Labour Economics*, 2000, *7* (5), 471 – 505.

Blattman, Christopher and Laura Ralston, "Generating Employment in Poor and Fragile States: Evidence from Labor Market and Entrepreneurship Programs," *SSRN*, July 2015.

Boyce, Christopher J, Alex M Wood, Michael Daly, and Constantine Sedikides, "Personality change following unemployment," *The Journal of Applied Psychology*, Jul 2015, *100* (4), 991–1011.

Brooks, Wyatt, Kevin Donovan, and Terence R. Johnson, "Mentors or Teachers? Microenterprise Training in Kenya," *American Economic Journal: Applied Economics*, October 2018, *10* (4), 196–221.

Caliendo, Marco, Frank Fossen, and Alexander S. Kritikos, "Personality characteristics and the decisions to become and stay self-employed," *Small Business Economics*, Apr 2014, *42* (4), 787–814.

Cobb-Clark, Deborah A. and Stefanie Schurer, "The stability of big-five personality traits," *Economics Letters*, 2012, *115* (1), 11 – 15.

Colombo, Massimo G. and Luca Grilli, "Founders' human capital and the growth of new technology-based firms: A competence-based view," *Research Policy*, 2005, *34* (6), 795 – 816.

Costa, Paul T., Robert R. McCrae, and David A. Dye, "Facet Scales for Agreeableness and Conscientiousness: A Revision of the NEO Personality Inventory," *Personality and Individual Differences*, 1991, *12* (9), 887 – 898.

de Mel, Suresh, David McKenzie, and Christopher Woodruff, "Returns to Capital in Microenterprises: Evidence from a Field Experiment," *The Quarterly Journal of Economics*, 11 2008, *123* (4), 1329–1372.

_ , _ , and _ , "Who are the Microenterprise Owners? Evidence from Sri Lanka on Tokman versus De Soto," *National Bureau of Economic Research*, May 2010, pp. 63–87.

Denissen, Jaap J. A., Maike Luhmann, Joanne M. Chung, and Wiebke Bleidorn, "Transactions between life events and personality traits across the adult lifespan.," *Journal of Personality and Social Psychology*, 2019, *116* (4), 612 – 633.

Dohmen, Thomas, Armin Falk, David Huffman, and Uwe Sunde, "Are Risk Aversion and Impatience Related to Cognitive Ability?," *American Economic Review*, June 2010, *100* (3), 1238–60.

Dunn, Thomas and Douglas Holtz-Eakin, "Financial Capital, Human Capital, and the Transition to Self-Employment: Evidence from Intergenerational Links," *Journal of Labor Economics*, 2000, *18* (2), 282–305.

Evans, David S. and Boyan Jovanovic, "An Estimated Model of Entrepreneurial Choice under Liquidity Constraints," *Journal of Political Economy*, 1989, *97* (4), 808–827.

Fairlie, Robert W., "Drug Dealing and Legitimate Self-Employment," *Journal of Labor Economics*, 2002, *20* (3), 538–537.

Gnambs, Timo and Barbara Stiglbauer, "No personality change following unemployment: A registered replication of Boyce, Wood, Daly, and Sedikides (2015)," *Journal of Research in Personality*, 2019, *81*, 195 – 206.

Hamilton, Barton H., "Does Entrepreneurship Pay? An Empirical Analysis of the Returns to Self-Employment," *Journal of Political Economy*, 2000, *108* (3), 604–631.

Hamilton, Barton H, Nicholas W Papageorge, and Nidhi Pande, "The Right Stuff? Personality and Entrepreneurship," *National Bureau of Economic Research*, September 2018, (25006).

Heckman, James J., Jora Stixrud, and Sergio Urzua, "The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior," *Journal of Labor Economics*, 2006, *24* (3), 411–482.

Heineck, Guido, "Does It Pay To Be Nice? Personality And Earnings In The United Kingdom," *Industrial and Labor Relations Review*, 2011, *64* (5), 1020–1038.

Holtz-Eakin, Douglas, David Joulfaian, and Harvey S. Rosen, "Sticking it Out: Entrepreneurial Survival and Liquidity Constraints," *Journal of Political Economy*, 1994, *102* (1), 53–75.

Hoogh, Annebel H. B. De, Deanne N. Den Hartog, and Paul L. Koopman, "Linking the Big Five-Factors of personality to charismatic and transactional leadership; perceived dynamic work environment as a moderator," *Journal of Organizational Behavior*, 2005, *26* (7), 839–865.

King, Robert G. and Ross Levine, "Finance and Growth: Schumpeter Might Be Right," *The Quarterly Journal of Economics*, 08 1993, *108* (3), 717–737.

Laajaj, Rachid and Karen Macours, "Measuring Skills in Developing Countries," *C.E.P.R. Discussion Papers*, October 2018, (13271).

_ , _ , Daniel Alejandro Pinzon Hernandez, Omar Arias, Samuel D. Gosling, Jeff Potter, Marta Rubio-Codina, and Renos Vakis, "Challenges to capture the big five personality traits in non-WEIRD populations," *Science Advances*, 2019, *5* (7).

Lafortune, Jeanne, Julio Riutort, and José Tessada, "Role Models or Individual Consulting: The Impact of Personalizing Micro-entrepreneurship Training," *American Economic Journal: Applied Economics*, October 2018, *10* (4), 222–45.

Lang, Frieder R., Dennis John, Oliver Lüdtke, Jürgen Schupp, and Gert G. Wagner, "Short Assessment of the Big Five: Robust Across Survey Methods Except Telephone Interviewing," *Behavior Research Methods*, June 2011, *43* (2), 548–567. Additional information: This article is published with open access at Springerlink.com: doi:10.3758/s13428-011-0066-z.

Levine, Ross and Yona Rubinstein, "Smart and Illicit: Who Becomes an Entrepreneur and Do They Earn More?," *The Quarterly Journal of Economics*, 2017, *132* (2), 963–1018.

Lindh, Thomas and Henry Ohlsson, "Self-Employment and Windfall Gains: Evidence from the Swedish Lottery," *The Economic Journal*, 1996, *106* (439), 1515–1526.

Moutafi, Joanna, Adrian Furnham, and Laurence Paltiel, "Why is Conscientiousness negatively correlated with intelligence?," *Personality and Individual Differences*, 2004, *37* (5), 1013 – 1022.

O'brien, Robert, "A Caution Regarding Rules of Thumb for Variance Inflation Factors," *Quality & Quantity*, 2007, *41* (5), 673,690.

Oehler, Andreas and Florian Wedlich, "The relationship of extraversion and neuroticism with risk attitude, risk perception, and return expectations.," *Journal of Neuroscience, Psychology, and Economics*, 2018, *11* (2), 63 – 92.

Parker, Simon C, "Entrepreneurship and economic theory," *Oxford Review of Economic Policy*, 09 2018, *34* (4), 540–564.

Puri, Manju and David T. Robinson, "Optimism and economic choice," *Journal of Financial Economics*, 2007, *86* (1), 71 – 99.

_ and _ , "The Economic Psychology of Entrepreneurship and Family Business," *Journal of Economics & Management Strategy*, 2013, *22* (2), 423–444.

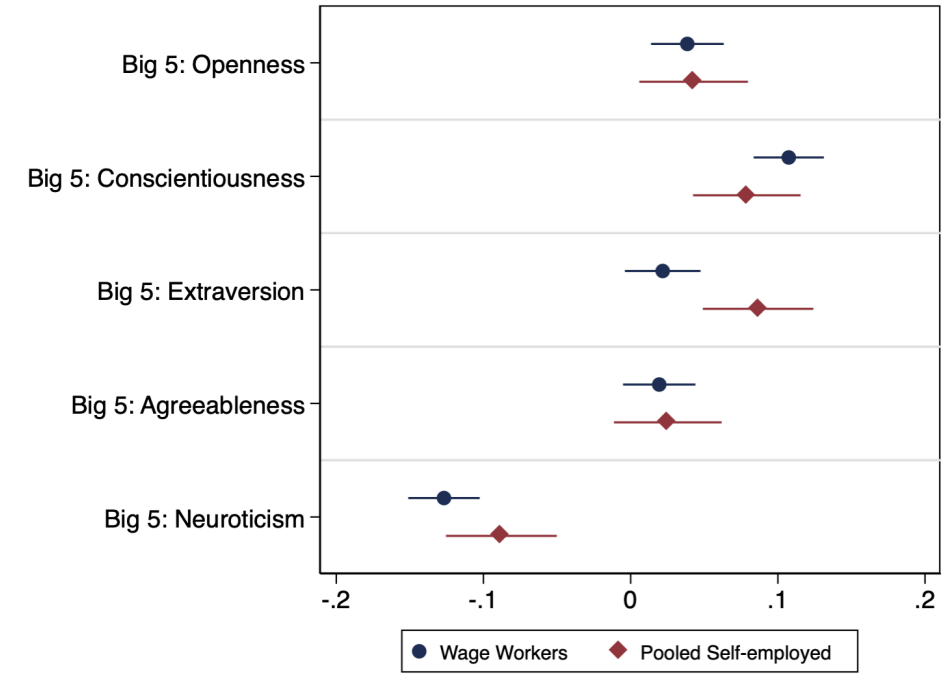
Rustichini, Aldo, Colin G DeYoung, Jon E. Anderson, and Stephen V. Burks, "Toward the integration of personality theory and decision theory in explaining economic behavior: An experimental investigation," *Journal of Behavioral and Experimental Economics*, 10 2016, *64*, 122–137.

Schoar, Antoinette, "The Divide between Subsistence and Transformational Entrepreneurship," in Josh Lerner and Scott Stern, eds., *Innovation Policy and the Economy*, Vol. 10, University of Chicago Press, February 2010, chapter 3, pp. 57–81.

Specht, Jule, Boris Egloff, and Stefan C Schmukle, "Stability and change of personality across the life course: the impact of age and major life events on mean-level and rank-order stability of the Big Five.," *Journal of Personality and Social Psychology*, Oct 2011, *101* (4), 862–882.

Figures

Figure 1: Big Five Personality Traits (Standardized)



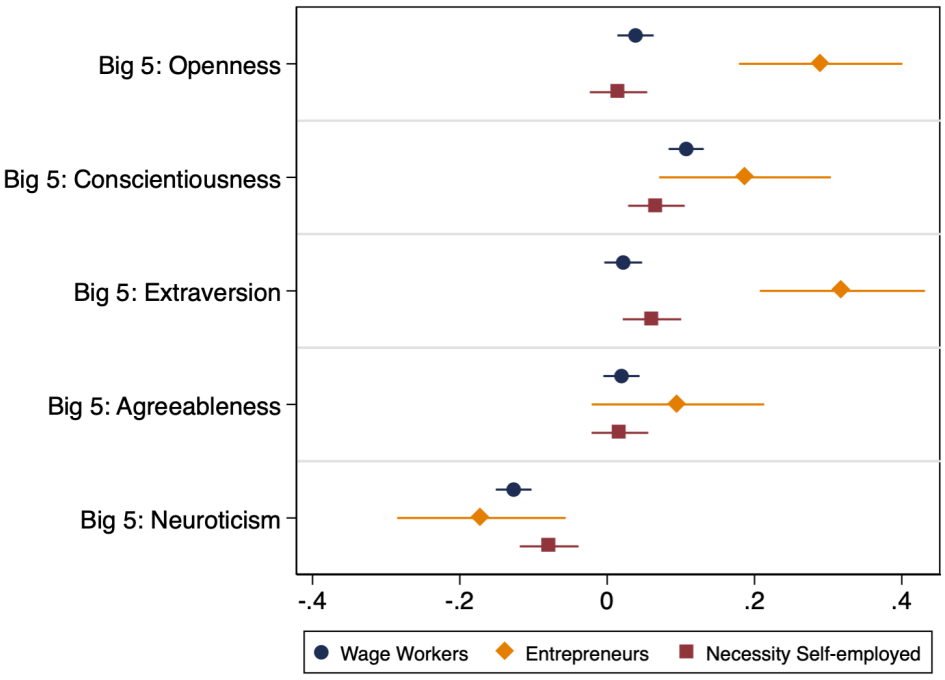
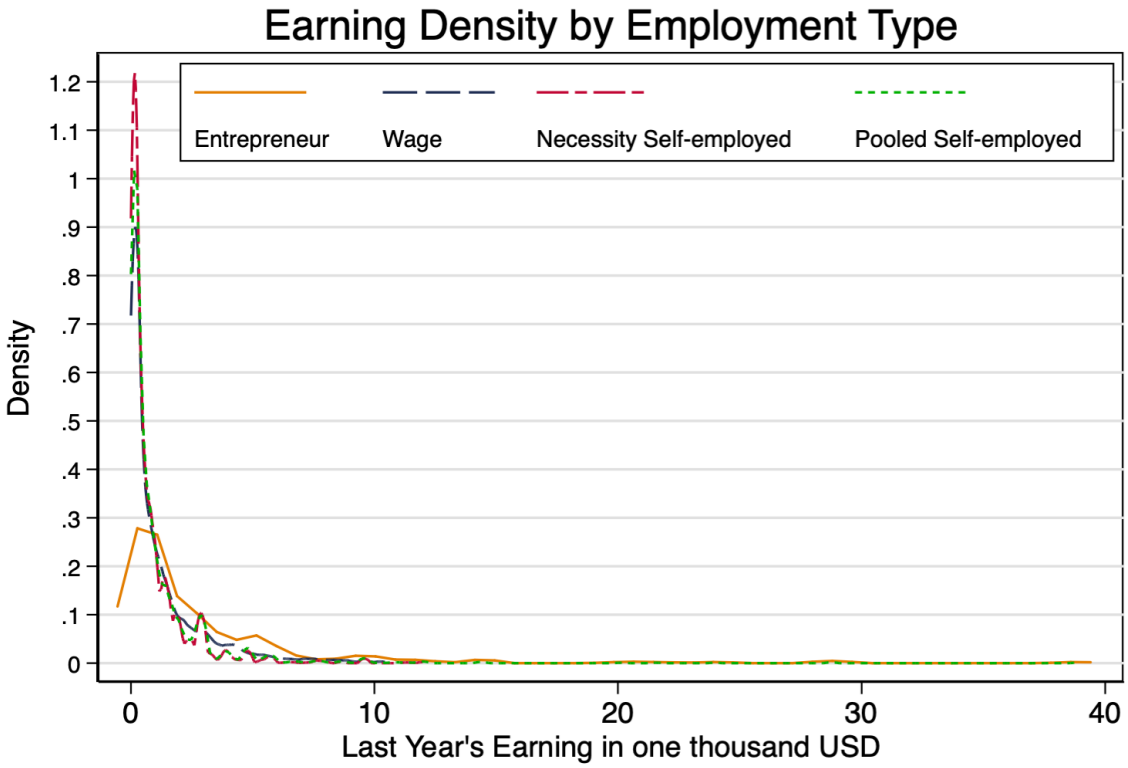


Figure 2: Earning Distribution By Types: Density



Note: For each employment type, top 1% and bottom 1% are excluded.

Figure 3: Earning Distribution By Types: All Percentile

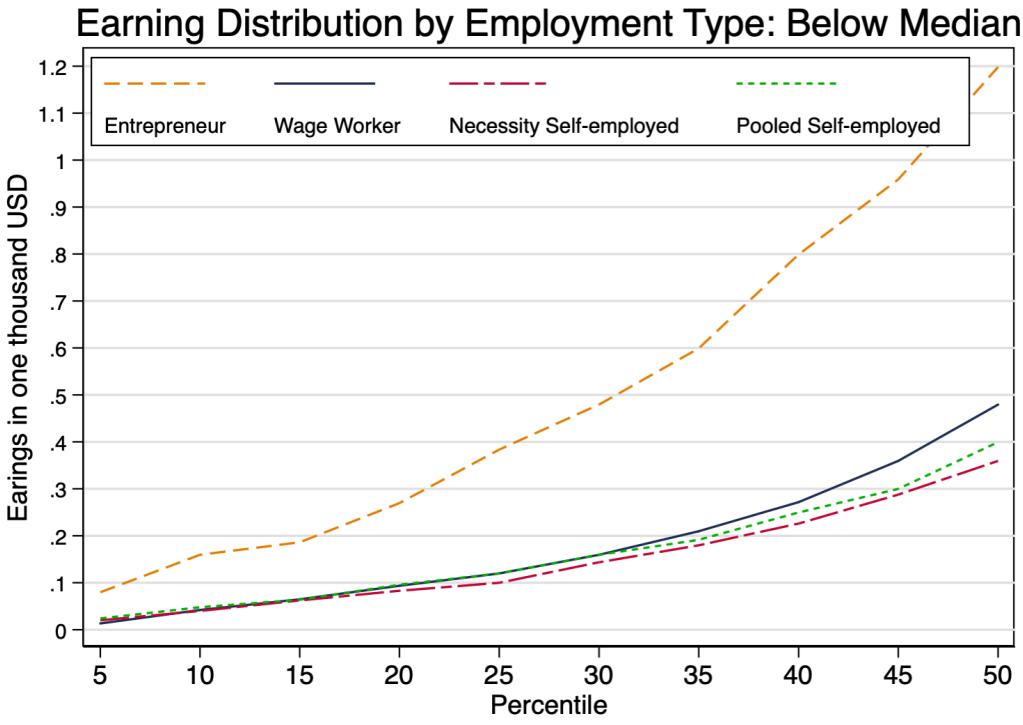
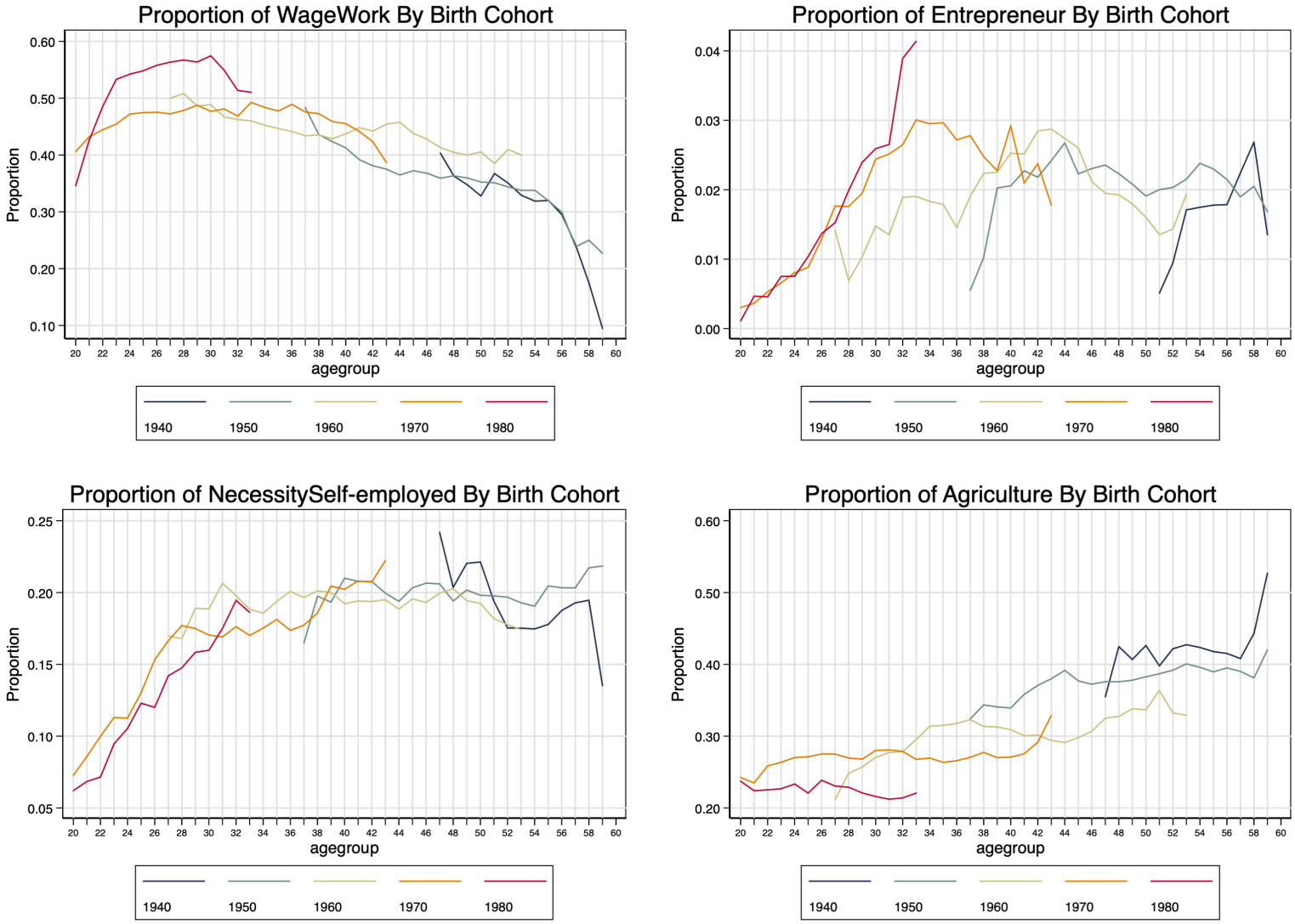


Figure 4: Proportion of Employment Types By Birth Cohort



Tables

Table 1: 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 2: Employment Types Summary Statistics

	All Workers			All Self-employment	
		Wage Workers	Pooled Self-employed	Entrepreneurs	Necessity Self-employed
	(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 3: Employment Types Summary Statistics: Sectors

			All Self-employment	
	Wage Workers	Pooled Self-employed	Entrepreneurs	Necessity Self-employed
	(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 4: Employment Types Summary Statistics From Indonesia 2000 Census

	All Workers			All Self-employment	
		Wage Workers	Pooled Self-employed	Entrepreneurs	Necessity Self-employed
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%

Note: 1) Data of Indonesia 2000 Census come from the IPUMS International. The categories of employment types are defined in the same format as in the IFLS. 2) The sample is restrict to aged 20 to 60 male workers, excluding agricultural sector. 3) Standard deviations are shown in parentheses.

Table 5: Estimation Results of Pooling All Panel Individuals:
Log Odds Ratio Relative to Wage Workers

	(1)	(2)		(3)	(4)	
	Pooled Self-employed	Entrepreneurs	Nessecity Self-employed	Pooled Self-employed	Entrepreneurs	Nessecity Self-employed
Years of schooling	-0.079***	-0.025	-0.086***	-0.084***	-0.038*	-0.090***
	(0.009)	(0.021)	(0.009)	(0.009)	(0.022)	(0.009)
Asset Index	0.136***	0.674***	0.071**	0.129***	0.652***	0.067**
	(0.034)	(0.093)	(0.034)	(0.034)	(0.095)	(0.034)
Big 5: Openness				0.126***	0.313***	0.107***
				(0.038)	(0.105)	(0.038)
Big 5: Conscientiousness				-0.016	-0.050	-0.013
				(0.038)	(0.100)	(0.040)
Big 5: Extraversion				0.057*	0.218***	0.037
				(0.033)	(0.072)	(0.034)
Big 5: Agreeableness				-0.008	-0.055	-0.003
				(0.038)	(0.085)	(0.039)
Big 5: Neuroticism				0.026	0.015	0.028
				(0.037)	(0.081)	(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 6: Estimation Results of Pooling All Panel Individuals: Marginal Effects

	(1)	(2)		(3)	(4)	
	Pooled Self-employed	Entrepreneurs	Nessecity Self-employed	Pooled Self-employed	Entrepreneurs	Nessecity Self-employed
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 7: Estimation Results of Pooling All Panel Individuals: Marginal Effects

	(1)	(2)		(3)	(4)	
	Pooled Self-employed	Entrepreneurs	Nessecity Self-employed	Pooled Self-employed	Entrepreneurs	Nessecity Self-employed
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 8: Employment Transitions

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

Notes: 1) This table presents the 7-year transition proportions among wage workers, self-employed and entrepreneurs. 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) Number of observations in brackets.

Table 9: Estimation Results Restricting to Wage Workers at $(t-1)$:
Log Odds Ratio Relative to Wage Workers

	(1)	(2)		(3)	(4)	
	Pooled Self-employed	Entrepreneurs	Nessecity Self-employed	Pooled Self-employed	Entrepreneurs	Nessecity Self-employed
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 10: Estimation Results Restricting to Wage Workers at $(t-1)$: Marginal Effects

	(1)	(2)		(3)	(4)	
	Pooled Self-employed	Entrepreneurs	Nessecity Self-employed	Pooled Self-employed	Entrepreneurs	Nessecity Self-employed
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 11: OLS Regression of Earnings (in USD)

	(1) Earnings	(2) Earnings	(3) Earnings	(4) Earnings	(5) ΔEarnings	(6) ΔEarnings
Pooled Self-employed	-22.72		-26.26			
	(45.51)		(45.11)			
Entrepreneur		1437.57***		1424.41***		
		(337.34)		(336.87)		
Necessity Self-employed		-198.61***		-199.58***		
		(36.37)		(36.41)		
ΔPooled Self-employed					-114.91	
					(183.38)	
ΔEntrepreneur						1598.65**
						(629.77)
ΔNecessity Self-employed						-569.62***
						(137.62)
Years of schooling	86.30***	83.14***	84.08***	81.42***		
	(5.40)	(5.29)	(5.32)	(5.23)		
Asset Index	251.38***	226.02***	246.93***	222.55***		
	(24.62)	(21.26)	(24.73)	(21.46)		
ΔAsset index					44.48	38.69
					(36.58)	(36.73)
Big 5: Openness			15.94	8.59		
			(19.09)	(18.54)		
Big 5: Conscientiousness			-6.99	-5.36		
			(18.06)	(18.09)		
Big 5: Extraversion			47.42***	38.43**		
			(16.54)	(16.03)		
Big 5: Agreeableness			0.66	0.99		
			(17.50)	(17.40)		
Big 5: Neuroticism			-36.60**	-34.56**		
			(15.59)	(15.53)		
Observations	8243	8243	8243	8243	2409	2409
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 on earnings exclude the top and bottom one percent for each employment type. 2) All regressions include controls for quadratic age function, married, Muslim, survey year, sector, region-urban dummies. 3) For column (5) and (6), change in earnings is regressed on change in transition from wage workers to entrepreneurs (ΔEntrepreneur) or to the self-employed (ΔThe self-employed), and change of asset index is also included. The base group is those who stayed as wage workers. 4) Significant level: *0.10**0.05***0.01.

Table 12: Median Regression of Earnings (in USD)

	(1) Earnings	(2) Earnings	(3) Earnings	(4) Earnings	(5) ΔEarnings	(6) ΔEarnings
Pooled Self-employed	-50.29***		-47.86***			
	(5.34)		(5.21)			
Entrepreneur		235.58**		241.38**		
		(116.66)		(105.07)		
Necessity Self-employed		-66.49***		-64.34***		
		(6.20)		(7.58)		
ΔPooled Self-employed					-388.05***	
					(114.69)	
ΔEntrepreneur						644.17
						(549.38)
ΔNecessity Self-employed						-572.56***
						(87.45)
Years of schooling	21.15***	21.54***	21.14***	21.52***		
	(0.95)	(1.11)	(1.02)	(1.17)		
Asset Index	55.97***	54.63***	55.53***	53.70***		
	(2.80)	(3.63)	(2.78)	(3.94)		
ΔAsset index					40.02	40.02
					(32.23)	(31.12)
Big 5: Openness			1.83	3.10		
			(2.66)	(3.33)		
Big 5: Conscientiousness			-4.02**	-5.97		
			(1.88)	(3.78)		
Big 5: Extraversion			7.11***	5.28		
			(2.64)	(3.52)		
Big 5: Agreeableness			1.47	1.33		
			(2.36)	(3.78)		
Big 5: Neuroticism			-6.87**	-7.05**		
			(2.82)	(3.28)		
Observations	8243	8243	8243	8243	2409	2409
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 entrepreneurs (ΔEntrepreneur) or to the self-employed (ΔThe self-employed), 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 13: Retrospective Employment Type Transitions

Employment Type in Current Year	Transition Proportion Conditional On Last Year's Employment Type				
	Wage worker	Entrepreneur	Necessity Self-employed	Agriculture	Non-worker
Wage worker	0.910 [43091]	0.040 [84]	0.051 [990]	0.036 [1312]	0.236 [2336]
Entrepreneur	0.003 [154]	0.868 [1802]	0.008 [163]	0.001 [37]	0.004 [39]
Necessity Self-employed	0.030 [1418]	0.055 [115]	0.887 [17189]	0.017 [599]	0.064 [629]
Agriculture	0.026 [1208]	0.017 [35]	0.033 [636]	0.935 [33830]	0.076 [751]
Non-worker	0.032 [1498]	0.020 [42]	0.021 [404]	0.011 [387]	0.620 [6127]

Notes: 1) This table presents year-to-year transition proportions among wage workers, entrepreneurs, the self-employed, 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. 2) Number of wighted observations in brackets.

Table 14: Using Cognitive Capacity measured in 2014 (Log Odds Ratio relative to wage worker)

	(1)		(2)		(3)	
	Entrepreneurs	Necessity Self-employed	Entrepreneurs	Necessity Self-employed	Entrepreneurs	Necessity Self-employed
Years of schooling	-0.009	-0.084***			-0.014	-0.082***
	(0.029)	(0.012)			(0.033)	(0.013)
Cognitive capacity			0.045	-0.132***	0.064	-0.019
			(0.111)	(0.047)	(0.124)	(0.050)
Asset Index	0.514***	0.053	0.497***	-0.023	0.512***	0.054
	(0.115)	(0.048)	(0.114)	(0.047)	(0.115)	(0.048)
Big 5: Openness	0.309**	0.111**	0.302**	0.068	0.310**	0.111**
	(0.139)	(0.051)	(0.133)	(0.051)	(0.139)	(0.051)
Big 5: Conscientiousness	0.031	-0.108**	0.040	-0.110**	0.035	-0.108**
	(0.149)	(0.050)	(0.149)	(0.050)	(0.149)	(0.050)
Big 5: Extraversion	0.325***	0.008	0.317***	0.010	0.323***	0.008
	(0.105)	(0.045)	(0.105)	(0.044)	(0.106)	(0.045)
Big 5: Agreeableness	-0.117	0.079	-0.117	0.077	-0.116	0.079
	(0.110)	(0.050)	(0.111)	(0.050)	(0.111)	(0.050)
Big 5: Neuroticism	0.078	-0.002	0.088	0.020	0.083	-0.004
	(0.105)	(0.050)	(0.100)	(0.050)	(0.103)	(0.050)
Observations	3717		3717		3717	

Notes: 1) In 2014, a new module measuring cognitive ability is included for all respondents aged 15 or above. A series of numbers with a blank cell are shown, and respondents should use the logic based on the pattern of numbers displayed to fill in the blank cell. Three starting questions are answered, and based on the number of correct answers, different sets of another three questions are shown and answered. 2) The sample is restrict to aged 20 to 60 male workers in 2014, excluding agricultural sector. 3) 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. 4) Significant level: *0.10**0.05***0.01.

Table 15: Estimation Results: Log Odds Ratio Relative to Wage Workers

	Pooling Panel Individuals			**Transition of Wage Workers** Restrict to Wage Workers at $(t-1)$		
	(1)	(2)		(3)	(4)	
	Pooled Self-employed	Entrepreneurs	Nessecity Self-employed	Pooled Self-employed	Entrepreneurs	Nessecity Self-employed
Years of schooling	-0.083***	-0.038*	-0.088***	-0.055**	-0.056	-0.054**
	(0.009)	(0.022)	(0.009)	(0.025)	(0.049)	(0.026)
Asset Index	0.130***	0.651***	0.068**			
	(0.034)	(0.095)	(0.034)			
Asset index last wave				0.179*	0.275	0.152
				(0.098)	(0.211)	(0.105)
Openness above average	0.136*	0.375**	0.107	0.553***	0.930**	0.472**
	(0.072)	(0.178)	(0.075)	(0.174)	(0.408)	(0.189)
Conscientiouseness above average	0.042	0.129	0.031	-0.123	-0.219	-0.099
	(0.071)	(0.201)	(0.072)	(0.190)	(0.377)	(0.208)
Extraversion above average	0.165**	0.598***	0.109	0.002	0.352	-0.105
	(0.071)	(0.177)	(0.072)	(0.178)	(0.429)	(0.190)
Agreeableness above average	-0.010	0.028	-0.016	0.015	0.058	0.001
	(0.068)	(0.161)	(0.069)	(0.182)	(0.407)	(0.191)
Neuroticism above average	0.022	-0.004	0.025	-0.231	-0.344	-0.192
	(0.067)	(0.152)	(0.068)	(0.173)	(0.349)	(0.191)
Observations	8632	8632		2538	2538	

Notes: 1) Each Big Five Personality is a dummy with value 1 if above the average, 0 below the average. 2) The sample is restrict to aged 20 to 60 male workers, excluding agricultural sector. 3) Column (1) and (2) include controls for quadratic age function, married, Muslim, survey year, sector, and region-urban dummies. Standard errors are clustered at sub-district level. 4) Column (3) and (4) include controls for quadratic age function, married, Muslim, survey year, sector of current job and last wave's job, and last wave's region-urban FE. Standard errors are clustered at sub-district level. 5) Significant level: *0.10**0.05***0.01.

Table 16: Risk Aversion: Pooling All Panel Individuals in 2007 and 2014 (Log Odds Ratio Relative to Wage Workers)

	(1)		(2)		(3)		(4)	
	Entrepreneurs	Necessity Self-employed	Entrepreneurs	Necessity Self-employed	Entrepreneurs	Necessity Self-employed	Entrepreneurs	Necessity Self-employed
Years of schooling	-0.021	-0.081***	-0.041*	-0.104***	0.000	-0.095***	-0.008	-0.108***
	(0.027)	(0.011)	(0.025)	(0.011)	(0.044)	(0.019)	(0.041)	(0.016)
Asset Index	0.596***	0.012	0.636***	-0.004	0.493***	0.102	0.622***	0.115*
	(0.099)	(0.048)	(0.111)	(0.042)	(0.158)	(0.080)	(0.154)	(0.068)
Risk Aversion	-0.408***	-0.180***						
	(0.085)	(0.038)						
Risk Aversion (loss)			-0.330***	-0.148***				
			(0.064)	(0.039)				
Risk Aversion last wave					-0.371**	-0.073		
					(0.149)	(0.078)		
Risk Aversion last wave (loss)							-0.245**	-0.069
							(0.120)	(0.059)
Big 5: Openness	0.337**	0.112**	0.259*	0.096**	0.582***	0.147*	0.735***	0.153**
	(0.151)	(0.052)	(0.137)	(0.049)	(0.194)	(0.084)	(0.192)	(0.072)
Big 5: Conscientiousness	-0.066	-0.108**	-0.016	-0.078*	-0.082	-0.121	-0.143	-0.152**
	(0.122)	(0.051)	(0.142)	(0.047)	(0.197)	(0.081)	(0.174)	(0.073)
Big 5: Extraversion	0.236**	0.017	0.209**	0.004	0.368***	-0.024	0.260**	0.017
	(0.096)	(0.045)	(0.086)	(0.044)	(0.139)	(0.072)	(0.115)	(0.059)
Big 5: Agreeableness	-0.038	0.081*	-0.049	0.042	-0.063	0.118	-0.217	0.097
	(0.110)	(0.049)	(0.106)	(0.047)	(0.209)	(0.081)	(0.171)	(0.065)
Big 5: Neuroticism	0.061	0.028	0.092	0.003	0.014	0.016	-0.053	0.062
	(0.100)	(0.051)	(0.096)	(0.047)	(0.136)	(0.079)	(0.125)	(0.066)
Observations	4329		5334		1610		2190	

Notes: 1) In the fourth and fifth waves (2007 and 2014), a new module measuring risk aversion is included for all respondents aged 15 or above. Respondents are asked a series of questions regarding their preferences between two lotteries. Risk aversion variables are standardized, the larger the more risk averse. 2) The sample is restrict to aged 20 to 60 male wage workers in 2007, excluding agricultural sector. 3) 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. 4) Significant level: *0.10**0.05***0.01.

Table 17: Risk Aversion: Restrict to Wage Workers in 2007 (Log Odds Ratio Relative to Wage Workers)

	(1)		(2)		(3)		(4)	
	Entrepreneurs	Necessity Self-employed	Entrepreneurs	Necessity Self-employed	Entrepreneurs	Necessity Self-employed	Entrepreneurs	Necessity Self-employed
Years of schooling	0.002	-0.019	0.014	-0.032	-0.026	-0.020	-0.008	-0.034
	(0.055)	(0.051)	(0.047)	(0.042)	(0.055)	(0.051)	(0.047)	(0.043)
Asset index last wave	0.138	0.280	0.229	0.200	0.222	0.296	0.295	0.206
	(0.242)	(0.229)	(0.248)	(0.171)	(0.239)	(0.236)	(0.245)	(0.174)
Risk Aversion last wave	-0.450**	-0.066			-0.437**	-0.065		
	(0.215)	(0.164)			(0.216)	(0.169)		
Risk Aversion last wave (loss)			-0.169	0.150			-0.155	0.166
			(0.206)	(0.189)			(0.216)	(0.179)
Big 5: Openness					0.319	0.244	0.314	0.328*
					(0.238)	(0.203)	(0.286)	(0.173)
Big 5: Conscientiousness					-0.637*	-0.227	-0.536	-0.270
					(0.372)	(0.240)	(0.360)	(0.176)
Big 5: Extraversion					0.136	-0.159	0.308	-0.291*
					(0.320)	(0.212)	(0.311)	(0.153)
Big 5: Agreeableness					0.211	-0.044	0.283	-0.028
					(0.389)	(0.264)	(0.391)	(0.191)
Big 5: Neuroticism					-0.165	-0.008	-0.116	-0.001
					(0.221)	(0.238)	(0.223)	(0.158)
Observations	833		1124		833		1124	

Notes: 1) In the fourth and fifth waves (2007 and 2014), a new module measuring risk aversion is included for all respondents aged 15 or above. Respondents are asked a series of questions regarding their preferences between two lotteries. Risk aversion variables are standardized, the larger the more risk averse. 2) The sample is restrict to aged 20 to 60 male wage workers in 2007, excluding agricultural sector. 3) All columns include controls for quadratic age function, married, Muslim, survey year, sector of current job and last wave's job, and last wave's region-urban FE. Standard errors are clustered at sub-district level. 4) Significant level: *0.10**0.05***0.01.

Table 18: Estimation Results of Pooling All Panel Individuals:
Log Odds Ratio Relative to Wage Workers (Control for Asset Index Last Wave)

	(1)	(2)		(3)	(4)	
	Pooled Self-employed	Entrepreneurs	Nessecity Self-employed	Pooled Self-employed	Entrepreneurs	Nessecity Self-employed
Years of schooling	-0.080***	0.009	-0.093***			
	(0.010)	(0.025)	(0.011)			
elementary graduate				-0.086	0.247	-0.102
				(0.133)	(0.339)	(0.136)
junior high school graduate				-0.312**	0.108	-0.339**
				(0.147)	(0.418)	(0.152)
high school graduate				-0.643***	0.056	-0.705***
				(0.139)	(0.341)	(0.142)
some college				-1.075***	0.218	-1.278***
				(0.163)	(0.383)	(0.169)
Asset index last wave	0.143***	0.331***	0.117***	0.148***	0.335***	0.123***
	(0.042)	(0.104)	(0.042)	(0.042)	(0.104)	(0.043)
Big 5: Openness	0.126***	0.257*	0.109**	0.127***	0.263**	0.110**
	(0.047)	(0.134)	(0.046)	(0.047)	(0.133)	(0.047)
Big 5: Conscientiousness	-0.075	-0.056	-0.079	-0.078	-0.053	-0.083*
	(0.047)	(0.124)	(0.049)	(0.047)	(0.123)	(0.049)
Big 5: Extraversion	0.068*	0.317***	0.032	0.068*	0.311***	0.032
	(0.040)	(0.087)	(0.042)	(0.040)	(0.087)	(0.042)
Big 5: Agreeableness	0.037	-0.046	0.048	0.035	-0.049	0.046
	(0.043)	(0.100)	(0.045)	(0.044)	(0.101)	(0.045)
Big 5: Neuroticism	0.030	0.071	0.024	0.024	0.066	0.018
	(0.044)	(0.093)	(0.046)	(0.045)	(0.094)	(0.046)
Observations	5185	5185		5185	5185	

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.

A Appendices

Table A1: Employment Types Summary Statistics: Ownership of Household Assets

			All Self-employment	
	Wage Workers	Pooled Self-employed	Entrepreneurs	Necessity Self-employed
	(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 A2: Indonesia 2000 Census Cross-sectional Selection:
Log Odds Ratio Relative To Wage Workers

	(1)	
	Entrepreneur	Necessity Self-employed
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 A3: 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 A4: 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	