Occupational Attainment and Earnings in Southeast Asia: The Role of Non-cognitive Skills^{*}

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January 2020

Abstract

The importance of non-cognitive skills for occupational outcomes has been studied extensively in industrialized countries. However, rural labour markets in developing and emerging economies differ from industrialized labour markets. Thus, evidence on the role of non-cognitive skills across labour markets is limited. Using new micro level data from rural Thailand and Vietnam, we provide unique insights into the role of non-cognitive skills in occupational attainment and earnings in rural labour markets. In particular, we use nine measures (Big Five personality traits, Locus of Control, Risk, Trust and Patience) and find that they are important determinants for both occupational attainment and individual earnings. We further find that non-cognitive skills are valued differently in developing and developed countries.

Keywords: Non-cognitive Skills; Personality Traits; Big Five Factor Model; Occupational Attainment; Occupational Earnings; Southeast Asia; TVSEP JEL: D91; O1; R2

^{*}We thank Ulrike Grote, Lukas Menkhoff, Susan Steiner, Stephan Thomsen, Andreas Wagener, and seminar participants in Göttingen and Hannover for their helpful comments. The paper also profited from discussions with workshop and conference participants at the 3rd IZA/HSE Workshop in St. Petersburg and the AASLE 2019 in Singapore. Financial support by the German Research Foundation (DFG) via the Research Training Group 1723 and the Thailand Vietnam Socio Economic Panel (Project No. 283672937) is gratefully acknowledged.

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1 Introduction

Non-cognitive skills, such as personality traits and preferences, play an important role for occupational outcomes.¹ However, existing studies mainly focus on western, educated, industrialized, rich, and democratic (WEIRD) populations, while evidence from non-"WEIRD"² populations is lacking. Labor markets in emerging and developing countries differ substantially from labor markets in industrialized countries. They are characterized as labour intensive, credit constrained, prone to greater earnings instability, and by misallocation of labor in the agricultural sector (Banerjee and Duflo, 2007; Campbell, 2011; Campbell and Ahmed, 2012; Gollin et al., 2014). It is therefore unclear in how far the results from existing studies hold for non-"WEIRD" populations. Since job creation has been identified as the key to alleviating extreme poverty and improving living standards (Van Trotsenburg, 2018), it is vital to understand individual labor market decisions and productivity determinants in these countries.

According to Laajaj et al. (2019), the role of non-cognitive skills can be hypothesized to be even more important as cognitive skills for labour market outcomes in developing countries. Despite this, only a few studies on non-cognitive skills have utilised data from developing regions. For instance, Laajaj and Macours (2017) suggest that selection of higher skilled individuals in non-agricultural jobs could lead to lower agricultural productivity and technology adoption. Both Gertler et al. (2014) and Attanasio et al. (2015) use experiments to find that early childhood interventions focused on non-cognitive skills can lead to increased parental investment and labour market earnings. Furthermore, even though non-farming households tend to be better off than farming-only households (Sohns and Revilla Diez, 2016; Sharma et al., 2016), a majority of households in developing countries rely on income from agriculture and environmental resource extraction (Parvathi and Nguyen, 2018). Since the skill set and the labour market opportunities in these settings are rather homogeneous, non-cognitive skills might explain why some individuals pursue a career other than farming, and, earn higher wages compared to their counterparts engaged in similar occupations.

Against this background, we shed light on the relationship between non-cognitive skills and occupational outcomes using a sample of rural households in two emerging economies.

¹ For an overview of experimental evidence see for example Jencks and Williams (1979); Nyhus and Pons (2005); Wells et al. (2016). For evidence on the importance of personality traits on decision making see Wichert and Pohlmeier (2010); Cobb-Clark and Tan (2011); John and Thomsen (2014). Barrick and Mount (1991) analyse the effect on job performance. For an overview of results related to personality traits and economic outcomes see Piatek and Pinger (2010); Osborne Groves (2003); Mueller and Plug (2006); Heineck and Anger (2010). Additionally, the work of Almlund et al. (2011) and Thiel and Thomsen (2013) provide extensive reviews of measurement, theory, and economic implications of non-cognitive skills.

 $^{^{2}}$ Western, educated, industrialized, rich, and democratic (Heinrich et al., 2010).

In particular, we first analyse the role of non-cognitive skills for occupational attainment; second, we examine how non-cognitive skills affect earnings within different occupation types, since identical personality traits can be valued differently across occupations. In doing so we follow the argumentation of John and Thomsen (2014), who study the relationship between personality traits and occupational attainment and earnings for a sample in Germany. Additionally, we verify our survey measures of non-cognitive skills prior to our analysis, taking into account recent evidence from Laajaj et al. (2019).

Our study contributes to the literature in four ways: First, we provide unique insights into the relationship between non-cognitive skills and occupational attainment as well as earnings for individuals in rural Southeast Asia. To the best of our knowledge, we are the first to do so using a comprehensive range of measures for rural Thailand and Vietnam. Second, we complement existing studies from industrialized populations, by providing evidence for occupations that are specifically important in rural labour markets, such as farming or small-scale businesses. Third, we advance the proposition that the role of non-cognitive skills is context specific as put forth by Laajaj et al. (2019). Lastly, our study adds to the growing literature on developing countries suggesting that the cognitive skill gap solely does not explain earnings differentials, but that non-cognitive skills are important too. Therefore, highlighting the importance to also built structures for the development of non-cognitive skills.

We use a data set for Thailand and Vietnam, collected under the Thailand Vietnam Socio Economic Panel (TVSEP) in 2017. The survey provides information on around 4,000 individuals. A section on measurement of non-cognitive skills was included for the first time in 2017. We can therefore include a range of nine measures that capture an individual's non-cognitive skills: the Big Five model consisting of the factors Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism as well as Locus of Control, Risk, Trust and Patience. The Big Five model and the Locus of Control thereby capture personality traits while Risk, Trust and Patience are considered as preferences (Falk et al., 2018). In addition to our measures on personality and preferences, we capture individuals occupations based on the International Classification of Occupation (ISCO-08) from the International labour Organization. These occupations are used as outcomes in our analysis, where we employ a multinomial probit model as well as mincer-type earnings regression to establish the impact of personality on occupational outcomes. We further add a host of control variables to the analysis and perform a series of robustness checks.

Our results suggest that non-cognitive skills are important predictors for both occupational attainment and earnings of individuals in our rural sample. In particular, Conscientiousness is the most decisive factor for occupational attainment, which is in line with literature utilizing developed country data sets (Barrick and Mount, 1991; John and Thomsen, 2014). Specifically, higher levels of Conscientiousness are important for almost all jobs outside farming. With respect to individual earnings, we find that Neuroticism is a valid determinant. This differs from findings in WEIRD populations, where Conscientiousness and Locus of Control have been found to be predictors of individual earnings (Nyhus and Pons, 2005; Mueller and Plug, 2006; Stuetzer et al., 2018). Amongst preferences, Trust is an important determinant of individual earnings for most occupation types.

The remainder of the paper is organized as follows: Section 2 provides the theoretical framework for our paper as well as a review of important literature. Section 3 introduces the study design and illustrates data collection, measurement of the traits and the econometric models used in our paper. Section 4 presents the results, followed by a conclusion in Section 5.

2 Theoretical Framework

2.1 Occupation and Human Capital

labour market outcomes, such as occupational attainment and earnings, relate to the human capital of the individual. To conceptualize this, we follow the human capital and earnings models that study the behavior of humans in relation to their human capital formation and occupational outcomes (Ben-Porath, 1967, 1970; Mincer, 1970; Heckman, 1976; Cunha et al., 2006). In the simplest setting, we assume that individuals choose their occupation in order to maximize their life-time earnings. Each individual decides on an optimal investment into their human capital that allows them to reach their desired occupation and to maximize their earnings (Blau et al., 1956). Hence, individuals sort themselves in tasks that offer them a higher comparative advantage (Borghans et al., 2008; Heckman et al., 2010; Heckman and Kautz, 2012). Thus, labour market outcomes, such as occupational attainment and earnings, can be depicted as:

$$max \ (LM \ outcome) = f(H) + \epsilon \tag{1}$$

Where ϵ signifies the idiosyncratic difference in labour market outcomes and H the human capital of the individual. Human capital is considered a latent variable as there does not exist one variable that allows us to measure it directly. It is rather a combination of different factors which define it, including individual skills (S) and other individual characteristics (I), socio-economic characteristics related to the family background (F) and other factors, which affect the labour market outcome (X) such as labour market experience, labour market conditions and health (Mincer, 1970, 1974). Therefore, human capital can be formally described as:

$$H = f(S, I, F, X) \tag{2}$$

The individual skill set *S* refers to cognitive and non-cognitive skills, which are key determinants for labour market outcomes of the individual. Cognitive skills, often referred to as education or level of technical skills, are closely associated with the individual's occupational attainment as well as earning differentials (Cawley et al., 2001; Finnie and Meng, 2002; Hanushek and Woessmann, 2008; McIntosh and Vignoles, 2001). In addition to cognitive skills, non-cognitive skills, such as personality traits or interpersonal skills and preferences, relate to labour market outcomes. In particular, empirical evidence suggests that personality traits affect job search behavior, occupational attainment, job satisfaction, work behavior, and income (Almlund et al., 2011; Ones et al., 2003; Judge et al., 2002b,a).

Additionally, other characteristics related to the individual (I) such as gender and age also shape the occupation decision and the earnings potential. In the context of developing countries, gender plays an important role with respect to labour market outcomes as females face different constraints compared to men. Evidence from Schmidt and Strauss (1975) suggests that females are less likely to work in high skilled white collar jobs. Besides those individual characteristics, the socio-economic and family background matters for the formation of human capital and thus labour market outcomes (F). Finally, the general labour market situation and other regional disparities are decisive for the individual decision making and realization from human capital investments (X). In our analysis, we include measures for each facet of human capital described here.

2.2 Non-cognitive Skills - Definitions and Literature Review

As was previously described, personality traits and preferences build a part of the individual's human capital. We consider nine measures to capture these aspects.

Personality Traits We use six measures for personality traits. These include five measures based on the Big Five model and the so called 'Locus of Control'. The Big Five model proposed by McCrae and John (1992); Costa and McCrae (1997) has been validated across different samples (Stuetzer et al., 2018). The factors are relatively stable over an individual's lifetime (Heineck and Anger, 2010) and are considered heritable (Hofstede and McCrae, 2004). The Big Five model includes traits of Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism.³ Openness captures how individuals value

 $[\]overline{}^3$ See Table A.1 in the appendix for an overview.

new experiences and changes (Rolland, 2002). An open person is creative and enthusiastic about complex jobs. Previous research finds that individuals who are more open, opt for self-employment (Obschonka and Stuetzer, 2017; Stuetzer et al., 2018) or prefer professional jobs requiring analytical and creative thinking (Wells et al., 2016; John and Thomsen, 2014). Conscientiousness depicts how an individual handles tasks. Persons displaying high levels of Conscientiousness are responsible, efficient and hardworking, in their own work and the work done for others (Wichert and Pohlmeier, 2010). Extraversion captures the individual's social relationship. A person with a high level of Extraversion seeks to establish contact with others, displays confidence and is positive (Schäfer, 2016; Wichert and Pohlmeier, 2010). Extraverted individuals are expected to choose and perform better in jobs involving social interaction (Barrick and Mount, 1991). Agreeableness refers to the quality of interpersonal relationships of the individual. An agreeable person is caring and selfless. Neuroticism captures how an individual behaves under stressful situations. Scoring high on this factor indicates that the individual is emotionally unstable and does not cope well with stress (Rammstedt, 2007; Schmitt et al., 2008).

Overall, Conscientiousness is considered as the most important predictor of occupational performance (Barrick and Mount, 1991). In case of Openness, there is no consensus on the influence of higher Openness on earnings, with studies demonstrating both positive (Mueller and Plug, 2006) and negative association (Seibert and Kraimer, 2001). An extraverted person earns more and is more successful at work. Agreeableness is also linked positively to the individual's normative commitment (Erdheim et al., 2006). Scoring high on Neuroticism negatively influences earnings and job satisfaction (Nyhus and Pons, 2005). Specifically for entrepreneurship, a successful entrepreneur scores high on Extraversion, Conscientiousness and Openness, and low on Agreeableness and Neuroticism (Stuetzer et al., 2018; Obschonka and Stuetzer, 2017).

Locus of control captures the individual's belief of how much their decisions affects their outcomes (Rotter, 1966). A person with an internal Locus of Control believes that reinforcement in life is contingent on their actions (Piatek and Pinger, 2016). In contrast, a person with an external Locus of Control views their life as being beyond their control and, rather, influenced by external factors such as destiny (Caliendo et al., 2015). Individuals with an internal Locus of Control are more likely to step out of their comfort zone. Hence, this trait might be stronger in entrepreneurs or managers and less visible in professionals (John and Thomsen, 2014). Additionally, it is proposed that individuals with a stronger internal locus tend to invest in themselves, for example in education and training (Piatek and Pinger, 2010) and in their businesses and employees (Sharma and Tarp, 2018). These individuals also engage in high paying jobs and show greater mobility towards higher paying jobs (Schnitzlein and Stephani, 2016). *Preferences* We use three different measures for preferences including Risk, Trust and Patience. There is a rich literature regarding the risk preferences of individuals in terms of labour market participation (e.g. Caliendo et al., 2010). Risk averse individuals prefer more stable job profiles such as permanent employment. On the contrary, a riskloving individual is more likely to engage in self-employment or adopt new technologies (Dustmann et al., 2017; Falk et al., 2018). In terms of earnings, Bonin et al. (2007) find that individuals with higher risk aversion have lower earnings.

Trust is the quality of an individual to rely on others, to trust them and their dealing of strangers (Caliendo et al., 2012). Arrow (1972) in his seminal work acknowledges that "virtually every commercial transaction has within itself an element of trust". Trust can lower transaction costs and the risks associated with entrepreneurship. Caliendo et al. (2014) find that a trustworthy person is more likely to start a business. However, an opposing view is that entrepreneurs tend to be less trusting because they have constant fears of being victimised and scammed de Vries (1985).

Patience refers to the individual's willingness to wait. Patient people are more likely to save and display higher educational attainment (Falk et al., 2018), which might lead to better occupational outcomes. Literature posits that being patient positively influences entrepreneurial decisions (Caliendo et al., 2012). However, Caliendo et al. (2014) find that Patience is collinear with emotional stability or Neuroticism included in the Big Five, and, therefore, would display no effect on the occupational decision.

3 Study Design

3.1 Data and Occupation Types

Household Data We use micro data originating from the Thailand Vietnam Socio Economic Panel (TVSEP).⁴ Thailand and Vietnam are countries, where despite recent growth and increases in overall household wealth, pockets of poverty persist in rural areas (Hardeweg et al., 2013b). The TVSEP survey aims to capture the living circumstances of these rural households. Since 2007, the TVSEP regularly administers surveys among rural households in both countries. Until now, six additional waves have been conducted, in 2008, 2010, 2011, 2013, 2016, and 2017. The Thai data were collected in the provinces Buriram, Nakhon Panom and Ubon Ratchathani and the Vietnamese data in the provinces Thua Thien Hue, Ha Tinh and Dak Lak. Figure A.1 in Appendix A exhibits an overview of the survey region. These provinces were chosen to capture the living conditions of rural

⁴ For more information please refer to the project webpage: https://www.tvsep.de/overview-tvsep. html.

households in Southeast Asia. The survey covers around 4,000 households in 440 villages. The household sample in each province was randomly drawn based on a stratification process considering the heterogeneous agro-ecological conditions within the regions. It is representative of the rural population at the household level.⁵

In both countries, an almost identical household survey is applied. It consists of nine sections covering individual information on household members (e.g. age, education, health, and employment) as well as household-level information on expenditures, shocks, risks, income earning activities such as farming, livestock raising and fishing, household financial situation, housing conditions, transfers received, and assets owned. In the 2017 panel wave of the TVSEP, an additional module is included which asks for the established psychological personality inventories that measure the Big Five. All monetary variables are converted to 2005 Purchasing Power Parity USD (PPP USD) equivalents. In addition to the household survey, a village-level survey is administered to the village chief collecting information on the village location, population, infrastructure, employment, agriculture, and economic conditions.

For the purpose of this study, we use data from the 2017 TVSEP wave. However, we only include 2,466 observations due to the following reasons: First, common survey attrition; second, we have to exclude households that did not answer the required survey items; third, we exclude non-working individuals (those people identify as housewives, taking care of impaired family members, unemployed or unable to work); fourth, we apply an age restriction and only include working-age individuals aged between 15 to 64 years for our analysis. We hereby follow the OECD definition of working-age individuals (OECD, 2019). Questions on personality measures are answered only for and by the respondent. The project aims to interview the household head or his/her spouse. Therefore, our sample of working age individuals is on average ten years older, less educated and more likely to be a women, when compared to the working age population in the overall TVSEP sample. Despite these differences, we see that the occupational composition is similar in both samples with agriculture employing the highest proportions.

Definition and Description of Occupation Types For our analysis, we categorize our sample of working age individuals by occupation type and define eight occupation categories: Subsistence farmers, commercial farmers, professionals, government workers, sales and service workers, craft workers, labourers, and self-employed.⁶ Our occupation types relate to the occupation categories described in the International Classification of Occupation (ISCO-08) from the International labour Organization. However, we adapt the

 $^{^{5}}$ See Hardeweg et al. (2013b) for a detailed overview of the sampling strategy.

⁶ We build the occupation categories based on self reported answers from the respondent about their main occupation.

ISCO-08 to our rural sample population. Firstly, we separate the group of agricultural workers into two groups: subsistence farmers and commercial farmers. This is done to get a more comprehensive understanding of peoples job opportunities in the farming sector. We use an output based index, namely, the Household Commercialization Index (HCI) to distinguish between subsistence and commercial farmers (Von Braun and Kennedy, 1994; Jaleta et al., 2009).⁷ Secondly, we form a group for self-employed individuals. According to the ILO standards, self-employed individuals should be sorted into one of the nine ISCO categories. We, however, think it is appropriate to form a separate group for self-employed individuals for three reasons: (i) Job tasks for self-employed people in our sample are different from other non-self-employed jobs. Grouping those people into one of the ISCO categories would be an over-simplification; (ii) According to behavioural studies self-employed individuals differ in their personality traits from individuals in other jobs (Caliendo et al., 2012; Stuetzer et al., 2018); (iii) Individuals working in self-employment face a higher income uncertainty compared to people working in regular jobs. Lastly, since the survey targets low-income households in rural areas, not all occupation categories described by the ISCO standard can be found in our sample. We therefore cannot form groups for managers, technicians and associated professionals, clerical support workers, plant and machine operators and assemblers, and armed forces.

Table 1 provides a basic overview of the share of people in each occupation. The survey setting is rural areas in Thailand and Vietnam. Naturally, people mainly work in farming. In our sample, about 73% of the respondents report agriculture as their main occupation. Of those, 33.37% are engaged in subsistence farming, meaning that their agricultural output is mainly used for home consumption and not for commercial gain, while 39.33% practice commercial farming.

 7 We calculate the index based on the formula:

$$HCI = \frac{\sum_{k=1}^{K} \overline{P_k} S_{ik}}{\sum_{k=i}^{K} \overline{P_k} Q_{ik}}$$
(3)

where S_{ik} is the quantity of crop k sold by household *i*. $\overline{P_k}$ is the weighted price and Q_k is the total quantity of crop k produced by household *i*. This index aggregates the value of all crops cultivated and sold by the household. Thereafter, we use the definitions from Ruthenberg (1971); Pingali and Rosegrant (1995) to define a threshold of 50 per cent. Households that sell less than 50 per cent of their total production are termed as subsistence farming households while those selling above this threshold are labelled as commercial farming households.

Occupation Type	Frequency	Percentage
Subsistence Farmers	823	33.37%
Commercial Farmers	970	39.33%
Professionals	53	2.15%
Government Workers	69	2.80%
Services and Sales Workers	72	2.92%
Craft Worker	38	1.54%
Labourers	156	6.33%
Self-employed	285	11.56%
Total	2,466	100.00%

Table 1: Overview of Occupations

Note: Own calculations with 2017 TVSEP data.

About 27% of the respondents (673 individuals) work outside farming, with a majority engaged in self-employment and labour. Self-employed respondents run various kinds of businesses, for example retail or small food shops. Respondents working as professionals or government officials have the highest education level on average. The group of professionals mainly constitutes teachers. Table 2 in Section 3.2 provides more descriptive information.

3.2 Measurement of Non-cognitive Skills

We capture the different aspects of personality by using nine distinct measures: the Big Five inventory, Locus of Control, Risk, Trust, and Patience. Apart from the Big Five Inventory, all items have been asked and tested in previous TVSEP survey waves. We provide a detailed descriptive overview of these non-cognitive skills measures and other individual characteristics by occupation at the end of this section (see Table 2). Additionally, Table A.3 in Appendix A provides correlations for all non-cognitive skills.⁸

The Big Five Inventory We follow the Big Five model (Costa and McCrae, 1992, 1997) which has become the standard personality measurement in psychology, described in Section 2.2. The survey questions are based on the Big Five personality inventory questions used in the German Socio Economic Panel (SOEP).⁹ Similar questions are used in the British micro panel survey and World Bank surveys across different countries (Guerra et al., 2016). The respondents are asked how much they agree with different

 $[\]overline{^{8}}$ We observe very low correlations amongst the measures, with all values below 0.3.

⁹ See survey page for details: https://www.diw.de/en/soep.

statements about themselves. They rank their answers on a 7 point Likert scale ranging from 1 to 7, where 1 means "Does not apply to me at all" and 7 means "Applies to me perfectly". In total, respondents are presented with 15 survey questions. Figure A.2 in Appendix A presents an overview of the survey questions. Since the Big Five measures have been implemented in the TVSEP for the first time, we validate our survey measures, before using them for our analysis. We hereby address recent concerns put forth by Laajaj et al. (2019), who highlight that any analysis with newly introduced Big Five measures, must be preceded by a proper validation of those measures. In particular, we check for internal consistency of scales, perform a principal component analysis to verify the five factor model for our sample population and test its robustness by replicating the psychometric indicators suggested by Laajaj et al. (2019) (see Appendix B). A more detailed analysis of the survey measures can be found in Bühler et al. (2019).

Locus of control Existing studies use seven questions to capture the Locus of Control (John and Thomsen, 2014; Piatek and Pinger, 2016). These were not included in our survey. Therefore, we use an item question that asks about the reasons for why people have low incomes. Answers include among others: *pure luck, knowing the right people,* or *hard work good education*. We categorise these answers as being internal or external. We think that the question captures the basic idea of the Locus of Control concept - the extent to which the respondents believe that they have control over their life outcomes, thus, providing a credible proxy measure.

Risk We capture someone's willingness to take risks by using the standard risk measurement item used in many economic studies (Chuang and Schechter, 2015; Vieider et al., 2015). The question asks: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risk? Respondents can rank themselves on a scale from 0 to 10. 0 means Unwilling to take risks and 10 means Fully prepared to take risk. This survey measure has been experimentally validated for the TVSEP data by Hardeweg et al. (2013a).

Trust is measured by a dummy variable, based on the following question: Generally speaking, would you say that most people can be trusted or that you need to be very careful when dealing with people? The variable is 0 if the respondent's answer is Need to be very careful when dealing with people and 1 if the answer is Most people can be trusted. Similar scales have been applied in the German SOEP and validated by Becker et al. (2012); Dohmen et al. (2009). *Patience* We measure a person's patience through the following question: Are you generally a person who is fully prepared to give up something now in order to gain more in the future? Again, respondents rank themselves on a scale from 0 to 10, where 0 means Unwilling to wait and 10 means Fully prepared to wait. Similar questions have been used in other major surveys such as the Global Preference Survey and validated by (Falk et al., 2018, 2016).

Trait	Variable	Subsistence Farmers	Commercial Farmers	Professionals	Government Workers	Service and Sales	Craft Workers	Labourers	Self- employed
	Artistic	4.35	4.17^{*}	4.73	5.16^{**}	4.52	4.54	4.26	4.41
Openness	New ideas	4.57	4.52	5.09	5.03^{*}	4.61	4.70	4.35	4.83^{*}
	Active imagination	4.24	4.10	4.79	4.32	4.16	4.22	3.88^{*}	4.29
	Work thoroughly	5.67	5.58	5.74	5.68	5.36^{*}	5.78	5.72	5.72
Conscientiousness	Efficient	5.68	5.57*	9	6.16^{**}	5.77	6.03	5.73	5.71
	Lazy	2.1	2.04	1.80	1.95	2.52^{*}	1.67	1.92	1.80^{**}
	Talkative	4.76	4.75	5.18	5.08	4.94	4.73	4.54	4.88
Extraversion	Sociable	5.11	4.97	5.35	6***	4.93	5.08	4.77*	4.90
	Reserved	4.28	4.13	4.26	4.84^{*}	4.13	4.90^{*}	4.37	4.28
	Forgiving	5.84	5.77	5.5	5.98	5.81	6.08	5.82	5.77
Agreeableness	Kind	5.92	5.90	6.24	6.09	6.04	5.76	5.78	5.92
)	Rude	2.35	2.21	2.24	2.13	2.59	2	2.40	2.17
	Worries	4.94	4.81	5.18	4.34^{*}	4.18^{**}	5.11	4.72	5.01
Neuroticism	Nervous	4.11	4.09	3.62	3.58^{*}	3.58^{*}	4.14	3.75^{*}	3.96
	Relaxed	4.99	4.99	5.15	5.61^{**}	5.03	5.05	5	5.02
	Locus of control	4.46	4.37	5.29	5.290*	5.17^{*}	4.19	4.32	4.71
	Trust	1.81	1.81	1.82	1.58*	1.62^{*}	1.86	1.75	1.74
	Risk	6.33	6.44	6.32	6.74	6.12	5.97	6.41	6.49
	Patience	6.33	6.54	6.09	6.31	5.68	5.35^{*}	6.51	6.43
	Age	50.36	49.07^{**}	45.68^{**}	49.63	46.26^{***}	42.90^{***}	47.16^{***}	48.71^{**}
	Education	6.33	6.35	15.53^{***}	11.11^{***}	8.35^{***}	6.78	5.88	6.95^{**}
	Religious	0.57	0.59	0.5	0.77^{**}	0.90^{***}	0.70	0.72^{***}	0.59
	Ethnicity	0.86	0.80^{***}	0.97	0.87	0.96*	0.89	0.81	0.97^{***}
	Gender	0.68	0.58^{***}	0.62	0.5^{**}	0.68	0.62	0.52^{***}	0.71
	Ν	823	026	53	69	72	38	156	285
Note: Own calculation	ns with 2017 TVSEP dat	a. Displayed are res	sults from two-sided	ttests. All subgrou	os are tested again	st the group of su	bsistence farmer	s. The table shows	the means for each

variable by occupation type. *, ** and *** denote significance at the 10, 5 and 1 percent levels.

Table 2: Personality Traits by Occupation

3.3 Specification of Econometric Models

In the analysis, we address our research questions in two steps, whereby the human capital approach, described in Section 2.2 is the basis for both the regression models and the variables included.

In the first step, we examine what role non-cognitive skills play for occupational attainment. We estimate the sorting into o = 8 occupations as a multinomial probit model. The probability for each occupation is estimated by:

$$Pr(O_{ir} = o|P_{ir}, I_{ir}, F_{ir}, LM_r) = \frac{exp(P'_{ir}\alpha_o + I'_{ir}\gamma_o + F'_{ir}\delta_o + X'_r\psi_o)}{\sum\limits_{o=1}^8 exp(P'_{ir}\alpha_o + I'_{ir}\gamma_o + F'_{ir}\delta_o + X'_r\psi_o)} + \epsilon_{ir}$$
(4)

Where O_{ir} denotes probability of individual *i* from region *r* to engage in occupation o = 1, ..., 8 given the set of independent variables. The main variables of interest are included in vector P_{ir} capturing the individual's non-cognitive skills. We include the five measures as described above, the Big Five personality traits (Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism), Locus of Control, Patience, Risk and Trust. I_{ir} and F_{ir} are vectors of individual characteristics and family background. Individual characteristics include the cognitive skills of individuals measured as years of schooling, gender, age, marital status, and being active in a political party. F_{ir} controls for household size, ethnicity and religion. Furthermore, we include controls for the labour market situation (X_r) using the share of farmers at the district level and the distance to closest district town.

The regression is estimated as a multinomial probit regression. Following John and Thomsen (2014) we also run a multinomial logit model as a robustness check. However, the Hausman-test and Small-Hsiao-test examining the independence of irrelevant alternatives (IIA) assumption for multinomial logit (McFadden, 1974) show ambiguous results (see Table Table A.4 in Appendix A). While the results of the multinomial probit and logit model are similar, the multinomial probit model relaxes the IIA assumption and is therefore preferable (Greene, 2000). Following Laajaj et al. (2019) we run further robustness checks and correct our Big Five measures for a possible acquiescence bias. We re-run the multinomial probit model with the corrected measures. Acquiescence bias refers to a pattern where the individual persistently agrees or disagrees with the questions.¹⁰

In a second step we estimate individual earnings across occupation types, while controlling for differences in non-cognitive skills. For this part of the analysis, we only include the six non-farm occupations. We require individual earning information for each respondent and it is not possible to disentangle individual earnings for farmers due to the

¹⁰ For more information on the acquiescence bias please refer to McCrae et al. (2001); Laajaj et al. (2019).

construct of the TVSEP data set. Therefore, we have to exclude the subsistence farming and commercial farming occupation types.

The earnings regression takes the following form:

$$ln(E_{ir}) = \beta_0 + \beta_1 P_{ir} + \beta_2 O_{ir} + \beta_3 P_{ir} O_{ir} + \eta_1 I_{ir} + \eta_2 F_{ir} + \eta_3 X_r + \mu_{ijr}$$
(5)

Where E_{ir} denotes the hourly wage of individual *i* from region *r*. P_{ir} captures the effects of the non-cognitive skill measures and O_{ir} controls for differences across the occupation types. The effects of non-cognitive skills per occupation type are captured by the interaction term $P_{ir}O_{ir}$. Control variables for individual characteristics (I_{ir}) , family background (F_{ir}) and labour market conditions (X_r) are the same as in equation 4. In the results, we report the marginal effects of each non-cognitive skill resulting from the OLS regression by occupation type.

Additionally, we perform two tests to check the robustness of our results: First, we re-run the analysis using Big Five measures that are corrected for acquiescence bias, as we do in the first part of the analysis; Second, to account for selection bias in the earnings regression related to choosing a certain occupation and leaving out farmers, we run a two-step Heckman model. Since the OLS regression is more suitable to identify the influence of each trait on specific occupation types, we include the Heckman model only as a robustness check.

4 Results

4.1 Importance of Non-cognitive Skills for Occupational Attainment

Results from the multionomial probit regression are presented in Table 3. The table displays marginal effects for our main variables of interest.¹¹ Using subsistence farming as the baseline occupation, the columns depict marginal effects of one occupation category, each in relation to being a subsistence farmer. Controls for individual characteristics, family background and region-specific labour markets are included.

The results show some heterogeneity across groups. However, Conscientiousness is an important determinant for all occupations, except government workers. If we look at each occupation type, we see that respondents scoring low on Conscientiousness are more likely to take up commercial farming over subsistence farming. More neurotic and conscientious individuals are more likely to be professionals. While we do not see any predictors for

¹¹ Table A.6 in the Appendix includes the output for all covariates.

government workers, we find that respondents who score lower on Conscientiousness are more likely to work in sales and services. Moreover, higher levels of Conscientiousness are associated with a higher likelihood of choosing to work as a craft worker. Craft workers are also less patient. The decision to become a labourer is not only influenced by higher levels of Conscientiousness, but also by lower levels of Extraversion. Nieken and Störmer (2010) also find similar results for manual workers in their German sample. Self-employed respondents score higher on Conscientiousness.

Furthermore, these results hold when we run additional robustness checks. First, we re-run the analysis as a multinomial logit model, which yields almost identical results albeit with slightly higher significance levels. Results are presented in Table A.7 in the Appendix. Second, we run the analysis using Big Five measures corrected for acquiescence bias. The results are depicted in Table A.8 in the Appendix and are again almost identical to the main specification with somewhat smaller coefficients.

	Commercial Farmers	Professionals	Government Workers	Sales and Service Workers	Craft Workers	Labourers	Self- employed
Openness	-0.0080 (0.0081)	-0.0007 (0.0018)	0.0026 (0.0029)	-0.0016 (0.0029)	0.0005 (0.0021)	-0.0077^{st} (0.0040)	0.0041 (0.0055)
Conscientiousness	-0.0305^{**} (0.0119)	0.0055^{*} (0.0030)	0.0021 (0.0043)	-0.0066^{*} (0.0040)	0.0087^{**} (0.0036)	0.0133^{**} (0.0061)	0.0162^{**} (0.0082)
Extraversion	0.0040 (0.0093)	0.0015 (0.0021)	0.0027 (0.0032)	0.0037 (0.0033)	-0.0035 (0.0024)	-0.0070 (0.0046)	-0.0034 (0.0062)
Agreeableness	0.0106 (0.0114)	-0.0019 (0.0025)	0.0047 (0.0041)	0.0022 (0.0040)	0.0014 (0.0029)	-0.0049 (0.0056)	0.0006 (0.0076)
Neuroticism	-0.0031 (0.0087)	0.0051^{**} (0.0021)	-0.0044 (0.0029)	-0.0027 (0.0029)	0.0017 (0.0021)	-0.0017 (0.0043)	0.0043 (0.0057)
Locus of Control	-0.0042 (0.0035)	-0.0003 (0.0008)	0.0008 (0.0012)	0.0012 (0.0012)	-0.0004 (0.0009)	-0.0019 (0.0018)	0.0026 (0.0023)
Risk	$0.0008 \\ (0.0037)$	$egin{array}{c} -0.0012 \ (0.0009) \end{array}$	$0.0000 \\ (0.0013)$	$egin{array}{c} -0.0003 \ (0.0013) \end{array}$	$-0.0007 \\ (0.0009)$	$0.0009 \\ (0.0019)$	$0.0016 \\ (0.0025)$
Patience	$0.0053 \\ (0.0036)$	$0.0001 \\ (0.0008)$	$egin{array}{c} -0.0008 \ (0.0012) \end{array}$	$egin{array}{c} -0.0017 \ (0.0012) \end{array}$	$egin{array}{c} -0.0015^{*} \ (0.0009) \end{array}$	$0.0011 \\ (0.0018)$	$0.0002 \\ (0.0024)$
Trust	$egin{array}{c} -0.0014 \ (0.0141) \end{array}$	$egin{array}{c} -0.0005 \ (0.0029) \end{array}$	$egin{array}{c} -0.0079 \ (0.0048) \end{array}$	$egin{array}{c} -0.0010 \ (0.0050) \end{array}$	$0.0038 \\ (0.0034)$	$0.0023 \\ (0.0072)$	$egin{array}{c} -0.0101 \ (0.0096) \end{array}$
Observations Wald Chi2	$2.386 \\587.03$	$2.386 \\587.03$	$2.386 \\587.03$	$2.386 \\587.03$	$2.386 \\587.03$	$2.386 \\587.03$	$2.386 \\587.03$

Table 3: Non-cognitive Skills and Occupational Attainment - Marginal Effects

Note: Own calculations with 2017 TVSEP data. *, ** and *** denote significance at the 10, 5 and 1 percent levels. Standard errors in parentheses. Additional controls: Age, gender marital status, years of schooling, religious, ethnicity, household size, share of farmer in the district, distance to the next district town.

Our individual-level control variables indicate further important differences that relate to occupational attainment. The results reveal that women are less likely to work as a commercial farmer or as a labourer, but are more likely to be self-employed. This potentially hints that when households diversify their income earning activities, they view farming as a predominantly male activity. Whereas women run small businesses from their home, which also gives them the opportunity to take care of the children at the same time. These results seem plausible given the rural setting of the sample where gender norms are quite prevalent. In terms of age, the results show that the probability of choosing to work as a sales or service worker, a craft worker, labourer or in self-employment decreases in relation to subsistence farming with every additional year of age. This indicates that younger people opt for occupations other than subsistence farming. Finally, individuals with a higher level of education would rather engage in professional or government jobs or work in sales and services. Lower levels of education are associated with working as a commercial farmer or a labourer. Thus, higher skilled individuals prefer more complex tasks which offer higher income opportunities.

Overall, our results suggest that non-cognitive skills are important for individual occupational attainment in rural Southeast Asia. Conscientiousness, in particular, can be seen as the most important trait. Individuals who score higher on Conscientiousness, have a higher probability of choosing to work as a craft worker, labourer or be self-employed, instead of becoming a subsistence-farmer. Hence, higher levels of Conscientiousness are important for almost all jobs outside farming. Conscientiousness, has also been found to be an important determinant for individual occupation decisions within samples from industrialized countries (Barrick and Mount, 1991; Hurtz and Donovan, 2000; Wells et al., 2016). Therefore, Conscientiousness can be regarded as a stable predictor for individual occupation decisions across all labour markets.

4.2 Importance of Non-cognitive Skills for Occupational Earnings

In order to analyse the importance of non-cognitive skills for occupational earnings we run an OLS regression. Figure 1 shows the results for average marginal effects of the different non-cognitive skills for each occupation type.¹² While substantial variation can be observed across the various occupation types, Neuroticism negatively influences the earnings under all occupations. This is in line with existing literature that posits that labour market rewards emotional stability or lower Neuroticism among workers (Barrick and Mount, 1991; Nyhus and Pons, 2005; Mueller and Plug, 2006). However, we do not find any significance for Conscientiousness, which is in contrast to Barrick and Mount (1991) and Stuetzer et al. (2018). This indicates that though Conscientiousness is a valid predictor of occupation choice in the rural labour market, it does not affect earnings

 $^{^{12}\,\}mathrm{A}$ full regression output is presented in Table A.9 in the Appendix.

within the occupation types. While evidence with samples from industrialized labour markets Heineck and Anger (2010); John and Thomsen (2014) show that Locus of Control, Patience, and Risk are important predictors for individual earnings, we do not find this to be true for rural labour markets. However, we find that high levels of Trust are negatively related to earnings for all occupation types, except Craft Workers. We believe trusting behavior in these regions can make an individual prone to being scammed or cheated. Therefore, being skeptical of customers and partners would lead to better control over business or work and result in higher wages.



Figure 1: Non-cognitive skills and Individual Earnings

(a) Own calculations with 2017 TVSEP data. The Figure shows the average marginal effects of the different non-cognitive skills per occupation type with a 95% Confidence Interval. Additional controls: Age, gender marital status, years of schooling, religious, ethnicity, household size, share of farmer in the district, distance to the next district town. Explanation: If coefficient and confidence interval do not intersect with the zero-red-line, the effect is significant at the 5% level. If the confidence interval ends just on the zero-red-line it indicates that the effect is significant at the 10% level.

With regard to self-employed individuals, we find that in addition to lower levels of Trust and Neuroticism, more open and less agreeable individuals earn more. These findings are in resonance with Caliendo et al. (2012); Obschonka and Stuetzer (2017); Stuetzer et al. (2018), which implies that the success of entrepreneurs is not contingent on the market setting. Hence, to be a successful entrepreneur, individuals have to possess

the same set of traits in the developing and the developed world.

With respect to other control variables, we find that while education does play a vital role when it comes to sorting into the different occupations, it has no effect for the individual earnings within occupations. The results for years of schooling therefore show no significant effects across all occupation types. One reason for this is that education is distributed more homogeneous within the different occupations types. We further attribute this to the rural setting of our sample. Heckman et al. (2006) also state that personality traits are more important compared to cognitive skills when people are engaged in jobs with lower complexities.

Our results also hold when running alternative specifications. We hereby run two robustness checks. When running the OLS using acquiescence bias corrected Big Five factors, our results stay virtually the same. Figure A.3 presents the average marginal effects with the corrected measures. The results from the Heckman model again confirm our overall results, that lower levels of Neuroticism and Trust significantly increase individual earnings. Please refer to Table A.10 in the Appendix.

Overall, our findings highlight the importance of including non-cognitive skills in the estimation of individual earnings. We find that for rural labour markets, low levels of Neuroticism and Trust are important predictors for higher earnings. Unlike the evidence from developed countries, we observe a lesser role for Extraversion and Agreeableness. While the role of education is important for occupational decision making, it is not significant for the earnings withing our occupation types.

5 Conclusion

The role of non-cognitive skills in individual decision making and life outcomes has been widely acknowledged and empirically verified. However, the evidence in case of developing countries is scarce. labour markets in these countries are characterised by unique features, implying that existing findings from developed countries might not hold in these settings. This paper aims to fill this gap by utilising data from a comprehensive household survey from Thailand and Vietnam collected under the Thailand Vietnam Socio Economic Panel.

Our first research question examines the role of non-cognitive skills in occupational attainment using a multinomial probit estimation. We find that the Big Five, and Conscientiousness in particular, are the most important predictors of occupational attainment in our rural sample. Higher levels of Conscientiousness are important for jobs outside of farming. However, other non-cognitive skills, such as Locus of Control, Risk, Trust, and Patience play play no role in predicting occupational attainment. Our findings for Conscientiousness are similar to those from developed countries. However, insignificant results pertaining other traits present a divergence.

The second research question aims to obtain a better understanding of how noncognitive skills determine earnings. We find that Neuroticism is the most important personality trait in the rural setting. In particular, lower levels of Neuroticism are associated with higher earnings. In contrast to evidence from developed countries, Conscientiousness, Extraversion and Locus of control have a lesser role. Lower levels of Trust, however, significantly increase earnings across almost all occupation types. Furthermore, education does not have any significance. We attribute this to the relatively homogeneous composition of cognitive skills across occupation types in rural labour markets. With relation to specific occupations, only successful rural self-employed individuals show the same skills as those displayed by their developed country counterparts.

Our results underscore the need for a better understanding of non-cognitive skills in the context of developing countries. The issues of proper measurement of these skills as highlighted by (Laajaj et al., 2019) should also be addressed. Success of most development policies is contingent on an individual's participation, which again depends on the individual's personality. Therefore, in addition to improving employment services, offering financial assistance and removing labour market barriers, investment in soft skill generation is required. Most of these skills develop in early years of an individual and therefore inclusion of soft skill development in early childhood intervention programs is a plausible strategy. Additionally, policy makers should identify and resolve the factors that may hinder soft skill development.

References

- Almlund, Mathilde, Angela Lee Duckworth, James J. Heckman, and Tim D. Kautz, "Chapter 1 - Personality Psychology and Economics." in Eric A. Hanushek, Stephen Machin, and Ludger Woessmann, eds., *Handbook of the Economics of Education*, Vol. 4, Elsevier, 2011, pp. 1–181.
- Arrow, Kenneth J., 1972, "Gifts and Exchanges." Philosophy & Public Affairs, 1 (4), 343-362.
- Attanasio, Orazio, Sarah Cattan, Emla Fitzsimons, Costas Meghir, and Marta Rubio-Codina, "Estimating the Production Function for Human Capital: Results from a Randomized Control Trial in Colombial." NBER Working Paper No. 20965, National Bureau of Economic Research, Cambridge, MA, USA 2015.
- Backhaus, Klaus, Bernd Erichson, Wulff Plinke, and Rolf Weiber, Multivariate Analysemethoden: Eine anwendungsorientierte Einführung, 13th ed., Berlin, Heidelberg, New York: Springer-Verlag, 2011.
- Banerjee, Abhijit V. and Esther Duflo, 2007, "The Economic Lives of the Poor." Journal of Economic Perspectives, 21 (1), 141–167.
- Barrick, Murray R. and Michael K. Mount, 1991, "The Big Five Personality Dimensions and Job Performance: A Meta Analysis." *Personnel Psychology*, 44 (1), 1–26.
- Becker, Anke, Thomas Deckers, Thomas Dohmen, Armin Falk, and Fabian Kosse, 2012, "The Relationship between Economic Preferences and Psychological Personality Measures." *Annual Review of Economics*, 4 (1), 453–478.
- Ben-Porath, Yoram, 1967, "The Production of Human Capital and the Life Cycle of Earnings." Journal of Political Economy, 75 (4), 352–365.
- Ben-Porath, Yoram, "The Production of Human Capital over Time." in W. Lee Hansen, ed., Education, Income and Human Capital, New York, U.S.: National Bureau of Economic Research, 1970, pp. 129–147.
- Blau, Peter M., John W. Gustad, Richard Jessor, Herbert S. Parnes, and Richard C. Wilcoc, 1956, "Occupational Choice: A Conceptual Framework." *Industrial and Labor Relations Review*, 9 (4), 531–543.
- Bonin, Holger, Thomas Dohmen, Armin Falk, David Huffman, and Uwe Sunde, 2007, "Cross-sectional Earnings Risk and Occupational Sorting: The Role of Risk Attitudes." *Labour Economics*, 14, 926–937.
- Borghans, Lex, Angela Lee Duckworth, James J. Heckman, and Bas ter Weel, 2008, "The Economics and Psychology of Personality Traits." *Journal of Human Resources*, 43 (4), 973–1059.
- Bühler, Dorothee, Rasadhika Sharma, and Wiebke Stein, "Personality Traits in Southeast Asia Evidence from rural Thailand and Vietnam." TVSEP Working Papers WP-014, Leibniz University Hannover 2019.

- Caliendo, Marco, Deborah A. Cobb-Clark, and Arne Uhlendorff, 2015, "Locus of Control and Job Search Strategies." *Review of Economics and Statistics*, 97 (1), 88–103.
- Caliendo, Marco, Frank Fossen, and Alexander Kritikos, 2010, "The Impact of Risk Attitudes on Entrepreneurial Survival." Journal of Economic Behavior & Organization, 76 (1), 45–63.
- Caliendo, Marco, Frank Fossen, and Alexander Kritikos, 2012, "Trust, Positive Reciprocity, and Negative Reciprocity: Do these Traits Impact Entrepreneurial Dynamics?" *Journal of Economic Psychology*, 33 (2), 394–409.
- Caliendo, Marco, Frank Fossen, and Alexander S. Kritikos, 2014, "Personality Characteristics and the Decisions to Become and Stay Self-employed." Small Business Economics, 42 (4), 787–814.
- Campbell, Duncan, The Global Crisis: Causes, Responses and Challenges, Geneva: International Labour Office, 2011.
- Campbell, Duncan and Ishraq Rayeed Ahmed, 2012, "The Labour Market in Developing Countries." *Perspectives on Labour Economics for Development (Geneva, ILO).*
- Cawley, John, James Heckman, and Edward Vytlacil, 2001, "Three Observations on Wages and Measured Cognitive Ability." *Labour Economics*, 8 (4), 419 – 442.
- Chuang, Yating and Laura Schechter, 2015, "Stability of Experimental and Survey Measures of Risk, Time, and Social Preferences: A Review and Some New Results." *Journal of Development Economics*, 117, 151–170.
- Cobb-Clark, Deborah A. and Michelle Tan, 2011, "Non-cognitive Skills, Occupational attainment, and Relative Wages." *Labour Economics*, 18, 1–13.
- Costa, Paul T. Jr. and Robert R. McCrae, "Revised NEO Personality Inventory (NEO-PI-R) and NEO Five Factor Inventory (NEO-FFI) Professional Manual." Technical Report, Odessa, FL, USA 1992.
- Costa, Paul T. Jr. and Robert R. McCrae, 1997, "Personality Trait Structure as a Human Universal." American Psychologist, 52, 587–596.
- Cronbach, Lee J., 1951, "Coefficient Alpha and the Internal Structure of Tests." *Psychometrika*, 16 (3), 297–334.
- Cunha, Flavio, James J. Heckman, Lance J. Lochner, and Dimitriy V. Masterov, "Interpreting the Evidence on Life Cycle Skill Formation." in Eric A. Hanusheck and Finis Welch, eds., *Handbook* of the Economics of Education (Vol. 1), Amsterdam and Oxford: Elsevier, 2006, pp. 697–805.
- de Vries, Manfred F.R., 1985, "The Dark Side of Entrepreneurship." Harvard Business Review.
- **Dohmen, Thomas, Armin Falk, David Huffman, and Uwe Sunde**, 2009, "Homo Reciprocans: Survey Evidence on Behavioural Outcomes." *The Economic Journal*, 119 (536), 592–612.
- Dustmann, Christian, Francesco Fasani, Xin Meng, and Luigi Minale, "Risk Attitudes and Household Migration Decisions." Centro Studi Luca d'Agliano Development Studies Working Paper No. 423 2017.

- Erdheim, Jesse, Mo Wang, and Michael J. Zickar, 2006, "Linking the Big Five Personality Constructs to Organizational Commitment." *Personality and Individual Differences*, 41 (5), 959–970.
- Falk, Armin, Anke Becker, Thomas Dohmen, Benjamin Enke, David Huffman, and Uwe Sunde, "The Preference Survey Module: A Validated Instrument for Measuring Risk, Time, and Social Preferencesl." IZA Discussion Paper No. 9674, Institute of Labor Economics, Bonn, Germany 2016.
- Falk, Armin, Anke Becker, Thomas Dohmen, Benjamin Enke, David Huffman, and Uwe Sunde, 2018, "Global Evidence on Economic Preferences." *The Quarterly Journal of Economics*, 133 (4), 1645–1692.
- Finnie, Ross and Ronald Meng, 2002, "Minorities, Cognitive Skills and Incomes of Canadians." Canadian Public Policy / Analyse de Politiques, 28 (2), 257–273.
- Ford, J. Kevin, Robert C. MacCallum, and Marianne Tait, 1986, "The Application of Exploratory Factor Analysis in Applied Psychology: A Critical Review and Analysis." *Personnel Psychology*, 39 (2), 291–314.
- Gertler, Paul, James J. Heckman, Rodrigo Pinto, Arianna Zanolini, Christel Vermeersch, Susan Walker, Susan M. Chang, and Sally Grantham-McGregor, 2014, "Labor Market Returns to an Early Childhood Stimulation Intervention in Jamaica." Science, 344, 998–1001.
- Gollin, Douglas, David Lagakos, and Michael E. Waugh, 2014, "The Agricultural Productivity Gap." The Quarterly Journal of Economics, 129 (2), 939–993.
- Greene, William H., Econometric Analysis, 4th ed., Prentice Hall, 2000.
- Guerra, Nancy, Kathryn Modecki, and Wendy Cunningham, "Developing Socio-Emotional Skills for the Labor Market - The Practise Model." Policy Research Working Paper No. 7123, World Bank, Washington D.C., USA 2016.
- Hair, Joseph F., William C. Black, Barry J. Babin, and Rolph E. Anderson, Multivariate Data Analysis, 7 ed., Harlow, Essex, UK: Pearson Education Limited, 2009.
- Hanushek, Eric A. and Ludger Woessmann, 2008, "The Role of Cognitive Skills in Economic Development." Journal of Economic Literature, 46 (3), 607–68.
- Hardeweg, Bernd, Lukas Menkhoff, and Hermann Waibel, 2013, "Experimentally Validated Survey Evidence on Individual Risk Attitudes in Rural Thailand." *Economic Development and Cultural Change*, 61 (4), 859–888.
- Hardeweg, Bernd, Stephan Klasen, and Hermann Waibel, "Establishing a Database for Vulnerability Assessment." in Stephan Klasen and Hermann Waibel, eds., Vulnerability to Poverty: Theory, Measurements and Determinants with Case Studies from Thailand and Vietnam, Basingstoke, UK: Palgrave Macmillan, 2013, pp. 50–79.
- Heckman, James J., 1976, "A Life-Cycle Model of Earnings, Learning, and Consumption." Journal of Political Economy, 84 (4, Part 2), S9–S44.

- Heckman, James J. and Tim Kautz, 2012, "Hard Evidence on Soft Skills." *Labour Economics*, 19 (4), 451–464.
- Heckman, James J., Jora Stixrud, and Sergio Urzua, 2006, "The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior." *Journal of Labor Economics*, 24 (3), 411–482.
- Heckman, James J., Seong Hyeok Moon, Rodrigo Pinto, Peter A Savelyev, and Adam Yavitz, 2010, "The Rate of Return to the High/Scope Perry Preschool Program." Journal of Public Economics, 94 (1-2), 114–128.
- Heineck, Guido and Silke Anger, 2010, "The Returns to Cognitive Abilities and Personality Traits in Germany." *Labour Economics*, 17 (3), 535–546.
- Heinrich, Joseph, Steven J. Heine, and Ara Norenzayan, 2010, "The Weirdest People in the World?" Behavioral and Brain Sciences, 33, 61–135.
- Hofstede, Geert and Robert R. McCrae, 2004, "Personality and Culture Revisited: Linking Traits and Dimensions of Culture." Cross-Cultural Research, 38 (1), 52–88.
- Hurtz, Gregory M. and John J. Donovan, 2000, "Personality and Job Performance: The Big Five Revisited." Journal of Applied Psychology, 85 (6), 869–879.
- Jaleta, Moti, Berhanu Gebremedhim, and Dirk Hoekstra, "Smallholder Commercialization: Processes, Determinants and Impact." Discussion Paper No. 18. Improving Productivity and Market Success of Ethiopian Farmers Project, International Livestock Research Institute 2009.
- Jencks, Christopher, Susan Bartlett Mary Corcoran James Crouse David Eaglesfield Gregory Jackson Kent McCelland Peter Mueser Michael Olneck Joseph Schwartz Sherry Ward and Jill Williams, Who Gets Ahead? The Determinants of Economic Success in America, New York, U.S.: Basic Books, 1979.
- John, Katrin and Stephan L. Thomsen, 2014, "Heterogeneous Returns to Personality: The Role of Occupational Choice." *Empirical Economics*, 47, 553–592.
- Judge, Timothy A., Daniel Heller, and Michael K. Mount, 2002, "Five-factor Model of Personality and Job Satisfaction: A Meta-analysis." *Journal of Applied Psychology*, 87, 530–41.
- Judge, Timothy A., Joyce E. Bono, Remus Ilies, and Megan W. Gerhardt, 2002, "Personality and Leadership: A Qualitative and Quantitative Review." Journal of Applied Psychology, 87, 765–80.
- Klühs, Theres, Melanie Koch, and Wiebke Stein, "Don't Expect Too Much High Income Expectations and Over-Indebtedness." Discussion Paper 200, CRC TRR 190 2019.
- Laajaj, R. and K. Macours, "Measuring Skills in Developing Countries." Policy Research Working Paper No. 8000, World Bank, Washington D.C., USA 2017.
- Laajaj, Rachid, Karen Macours, Daniel Alejandro Pinzon Hernandez, Omar Arias, Samuel D. Gosling, Jeff Potter, Marta Rubio-Codina, and Renos Vakis, 2019, "Challenges to Capture the Big Five Personality Traits in Non-WEIRD Populations." Science Advances, 5 (7), eaaw5226.

- McCrae, Robert R. and Oliver P. John, 1992, "An Introduction to the Five-Factor Model and its Applications." *Journal of Personality*, 60 (2), 175–215.
- McCrae, Robert R., Jeffrey H. Herbst, and Paul T. Costa Jr, "Effects of Acquiescence on Personality Factors Structures." in R. Riemann, F. M. Spinath, and F. Ostendorf, eds., *Personality* and Temperament: Genetics, Evolution, and Structure, Basingstoke, UK: Pabst Science Publishers, 2001, pp. 217–231.
- McFadden, Daniel, "Conditional Logit Analysis of Qualitative Choice Behavior." in Paul Zarembka, ed., *Frontiers in Econometrics*, New York: Academic Press, 1974, pp. 105–142.
- McIntosh, Steven and Anna Vignoles, 2001, "Measuring and Assessing the Impact of Basic Skills on Labour Market Outcomes." Oxford Economic Papers, 53 (3), 453–481.
- Mincer, Jacob, 1970, "The Distribution of Labor Incomes: A Survey with Special Reference to the Human Capital Approach." *Journal of Economic Literature*, 8 (1), 1–26.
- Mincer, Jacob, "Schooling, Experience, and Earnings." Technical Report, National Bureau of Economic Research, New York 1974.
- Mueller, Gerrit and Erik Plug, 2006, "Estimating the Effect of Personality on Male and Female Earnings." Industrial and Labor Relations Review, 60 (1), 3–22.
- Nieken, Petra and Susi Störmer, "Personality as Predictor of Occupational Choice: Empirical Evidence from Germany." Diskussionspapiere des Schwerpunktes Unternehmensführung am Fachbereich BWL Vol. 2, No. 8 2010.
- Nyhus, Ellen K. and Empar Pons, 2005, "The Effects of Personality on Earnings." Journal of Economic Psychology, 26, 363–384.
- **Obschonka, Martin and Michael Stuetzer**, 2017, "Integrating Psychological Approaches to Entrepreneurship: The Entrepreneurial Personality System (EPS)." *Small Business Economics*, 49, 203–231.
- **OECD**, "Working age population." https://data.oecd.org/pop/working-age-population.htm 2019. [Online; accessed 12-June-2019].
- **Ones, Deniz S., Chockalingam Viswesvaran, and Frank L. Schmidt**, 2003, "Personality and Absenteeism: A Meta-analysis of Integrity Tests." *European Journal of Personality*, 17 (1), 19–38.
- **Osborne Groves, Melissa**, 2003, "How Important is your Personality? Labor Market Returns to Personality for Women in the US and UK." *Journal of Economic Psychology*, 26, 827–841.
- Parvathi, Priyanka and Trung Thanh Nguyen, 2018, "Is Environmental Income Reporting Evasive in Household Surveys? Evidence From Rural Poor in Laos." *Ecological Economics*, 143, 218–226.
- Piatek, Remi and Pia Pinger, "Maintaining (Locus of) Control? Assessing the Impact of Locus of Control on Education Decisions and Wages." SOEP Papers No. 338, German Institute for Economic Research (DIW), Berlin, Germany 2010.

- Piatek, Rmi and Pia Pinger, 2016, "Maintaining (Locus of) Control? Data Combination for the Identification and Inference of Factor Structure Models." *Journal of Applied Econometrics*, 31 (4), 734–755.
- Pingali, Prabhu L. and Mark W. Rosegrant, 1995, "Agricultural Commercialization and Diversification: Processes and Policies." Food Policy, 20 (3), 171–185.
- Rammstedt, Beatrice, 2007, "The 10-Item Big Five Inventory: Norm Values and Investigation of Sociodemographic Effects Based on a German Population Representative Sample." *European Journal* of Psychological Assessment, 23 (3), 193–201.
- Rammstedt, Beatrice and Oliver P. John, 2007, "Measuring Personality in One Minute or Less: A 10-item Short Version of the Big Five Inventory in English and German." *Journal of Research in Personality*, 41 (1), 203–212.
- Rolland, Jean-Pierre, "The Cross-Cultural Generalizability of the Five-Factor Model of Personality." in Robert R. McCrae and Jüri Allik, eds., *The Five-Factor Model of Personality Across Cultures*, Boston, MA: Springer US, 2002, pp. 7–28.
- Rotter, Julian B., 1966, "Generalized Expectancies for Internal versus External Control of Reinforcement." *Psychological Monographs: General and Applied*, 80 (1), 1–28.
- Ruthenberg, Hans, Farming Systems in the Tropics, Oxford: Clarendon Press, 1971.
- Schäfer, Konrad C., "The Influence of Personality Traits on Private Retirement Savings in Germany." SOEP Papers No. 867, German Institute for Economic Research (DIW), Berlin, Germany 2016.
- Schmidt, Peter and Robert P. Strauss, 1975, "The Prediction of Occupation Using Multiple Logit Models." International Economic Review, 16 (2), 471–486.
- Schmitt, David P., Ano Realo, Martin Voracek, and Jüri Allik, 2008, "Why Cant a Man Be More Like a Woman? Sex Differences in Big Five Personality Traits Across 55 Cultures." Journal of Personality and Social Psychology, 94 (1), 168–182.
- Schmitt, David P., Jüri Allik, Robert R. McCrae, and Verónica Benet-Martnez, 2007, "The Geographic Distribution of Big Five Personality Traits: Patterns and Profiles of Human Self-Description Across 56 Nations." Journal of Cross-Cultural Psychology, 38 (2), 173–212.
- Schnitzlein, Daniel and Jens Stephani, 2016, "Locus of Control and Low-wage Mobility." *Journal of Economic Psychology*, 53, 11–34.
- Seibert, Scott E. and Maria L. Kraimer, 2001, "The Five-Factor Model of Personality and Career Success." Journal of Vocational Behavior, 58, 1–21.
- Sharma, Rasadhika, Tung Nguyen, Ulrike Grote, and Trung Thanh Nguyen, "Changing Livelihoods in Rural Cambodia: Evidence from Panel Household Data in Stung Treng. Center of Development Research." Working Paper 149, ZEF - Centre for Development Research, Bonn, Germany 2016.

- Sharma, Smriti and Finn Tarp, 2018, "Does Managerial Personality Matter? Evidence from Firms in Vietnam." Journal of Economic Behavior & Organization, 150, 432–445.
- Sohns, Franziska and Javier Revilla Diez, 2016, "Self-Employment and its Influence on the Vulnerability to Poverty of Households in Rural Vietnam a Panel Data Analysis." *Geographical Review*, 107 (2), 336–359.
- Stuetzer, Michael, David B. Audretsch, Martin Obschonka, Samuel D. Gosling, Peter J. Rentfrow, and Jeff Potter, 2018, "Entrepreneurship Culture, Knowledge Spillovers and the Growth of Regions." *Regional Studies*, 52 (5), 608–618.
- Thiel, Hendrik and Stephan L. Thomsen, 2013, "Noncognitive Skills in Economics: Models, Measurement, and Empirical Evidence." *Research in Economics*, 67 (2), 189–214.
- Van Trotsenburg, Axel, "More and Better Jobs for Developing Nations." https://www.worldbank. org/en/news/opinion/2018/05/11/more-and-better-jobs-for-developing-nations 2018. [Online; accessed 6-September-2019].
- Vieider, Ferdinand M., Mathieu Lefebvre, Ranoua Bouchouicha, Thorsten Chmura, Rustamdjan Hakimov, Michal Krawczyk, and Peter Martinsson, 2015, "Common Components of Risk and Uncertainty Attitudes across Contexts and Domains: Evidence from 30 Countries." Journal of the European Economic Association, 13 (3), 421–452.
- Von Braun, Joachim and Eileen Kennedy, Agricultural Commercialization, Economic Development, and Nutrition, Baltimore: Published for the International Food Policy Research Institute (IFPRI) by Johns Hopkins University Press., 1994.
- Wells, Robert, Roger Ham, and P. N. (Raja) Junankar, 2016, "An Examination of Personality in Occupational Outcomes: Antagonistic Managers, Careless Workers and Extroverted Salespeople." *Applied Economics*, 48 (7), 636–651.
- Wichert, Laura and Winfried Pohlmeier, "Female Labor Force Participation and the Big Five." Discussion Paper No. 10-003, ZEW - Centre for European Economic Research, Berlin, Germany 2010.
- Yomaboot, Panida and Andrew J. Cooper, 2016, "Factor Structure and Psychometric Properties of the International Personality Item Pool-NEO (IPIP-NEO) Thai Version." Journal of Somdet Chaopraya Institute of Psychiatry, 10 (5), 36–49.

Appendix

A Additional Tables and Figures

Table A.1: Example of adjectives defining the Big Five factors

Factor	Facets/Adjectives
Extraversion	Active, Assertive, Energetic, Enthusiastic, Outgoing, Talkative
A gree a bleness	Appreciative, Forgiving, Generous, Kind, Sympathetic, Trusting
Conscientiousness	Efficient, Organized, Planful, Reliable, Responsible, Thorough
Neuroticism	Anxious, Self-Pitying, Tense, Touchy, Unstable, Worrying
Openness	Artistic, Curious, Imaginative, Insightful, Original, Wide interests

Source: McCrae and John (1992)



Figure A.1: Overview of Survey Region

(a) The six TVSEP provinces are highlighted in red. The green dots represent internal migrants from the survey rural regions. Source: Hardeweg et al. (2013b), based on ESRI World Map

Table A.2: Overview of Survey Questions

Do you see yourself as someone who...

is sometimes a bit rude to others? works thoroughly? is talkative? worries a lot? is original, comes up with new ideas? has a forgiving nature? tends to be lazy? is outgoing, sociable? gets nervous easily? values artistic, aesthetic experiences? is considerate and kind to almost everyone? does tasks efficiently? is reserved? is relaxed, handles stress well? has an active imagination?

Note: Questions from the The TVSEP survey questionnaire.

	Openness	Conscientiousness	Extraversion	Agreeableness	Neuroticism	Trust	Risk	Patience	Locus of Control
Openness	1								
Conscientiousness	0.277^{***}	1							
Extraversion	0.230^{***}	0.159^{***}	1						
Agreeableness	0.152^{***}	0.371^{***}	0.151^{***}	1					
Neuroticism	-0.146^{***}	-0.0792^{***}	-0.0738***	-0.0580^{***}	1				
Trust	-0.0361*	0.0514^{**}	0.00613	0.0748^{***}	0.123^{***}	1			
Risk	0.165^{***}	0.137^{***}	0.0700^{***}	0.0563^{***}	-0.123^{***}	0.00677	1		
Patience	0.0797^{***}	0.118^{***}	0.0805^{***}	0.0648^{***}	-0.0288	0.0365^{*}	0.311^{***}	1	
Locus of Control	0.0473^{**}	-0.0162	0.0145	-0.0166	-0.0744***	-0.0558***	0.0537^{***}	-0.00670	1
Note: Own calculatio	ns with 2017 T	VSEP data. *, ** and *	*** denote significe	ance at the 10, 5 an	id 1 percent levels	s. The values a	re generally		

Table A.3: Correlation Matrix - Non-Cognitive Skills

below 0.3 indicating very low correlation amongst the non-cognitive skills.

29

χ^2	$\mathrm{Prob} < \chi^2$
9.17	1.00
22.48	1.00
0.66	1.00
10.4	1.00
-4.23	
2.54	1.00
6.69	1.00
-6.17	
	$\begin{array}{r} \chi^2 \\ 9.17 \\ 22.48 \\ 0.66 \\ 10.4 \\ -4.23 \\ 2.54 \\ 6.69 \\ -6.17 \end{array}$

Table A.4: Hausman-test for Independence of Irrelevant Alternatives (Logit)

Note: Own calculations with 2017 TVSEP data. A significant test is evidence against H_0 : if $\chi^2 < 0$, the estimated model does not meet asymptotic assumptions.

Table A.5: Small Hsiao-test for Independence of Irrelevant Alternatives (Logit)

	$\ln L(\text{full})$	$\ln L(\text{omit})$	χ^2	df	$\mathbf{P}{<}\chi^2$
Subsistence Farmers	-973.226	-863.617	219.219	102	0.000
Commercial Farmers	-930.17	-830.071	200.198	102	0.000
Professionals	-1654.821	-1565.348	178.945	102	0.000
Government Workers	-1586.751	-1486.443	200.614	102	0.000
Services and Sales Workers	-1557.074	-1454.175	205.798	102	0.000
Craft Worker	-1569.78	-1500.042	139.474	102	0.008
Laborers	-1421.049	-1321.314	199.469	102	0.000
Self-employed	-1320.656	-1220.767	199.779	102	0.000

Note: Own calculations with 2017 TVSEP data. A significant test is evidence against H_0 .

	Commercial Farmers	Professionals	Government Workers	Sales and Service Workers	Craft Workers	Labourers	Self- employed
Openness	-0.0080 (0.0081)	-0.0007	0.0026	-0.0016	0.0005	-0.0077^{*}	0.0041 (0.0055)
Conscientiousness	(0.0001) -0.0305^{**} (0.0119)	(0.0010) 0.0055^{*} (0.0030)	(0.0023) 0.0021 (0.0043)	(0.0023) -0.0066^{*} (0.0040)	(0.0021) 0.0087^{**} (0.0036)	(0.0010) 0.0133^{**} (0.0061)	0.0162^{**} (0.0082)
Extraversion	0.0040 (0.0093)	0.0015 (0.0021)	0.0027 (0.0032)	0.0037 (0.0033)	-0.0035 (0.0024)	-0.0070 (0.0046)	-0.0034 (0.0062)
Agreeableness	0.0106 (0.0114)	-0.0019 (0.0025)	0.0047 (0.0041)	0.0022 (0.0040)	0.0014 (0.0029)	-0.0049 (0.0056)	0.0006 (0.0076)
Neuroticism	-0.0031 (0.0087)	0.0051^{**} (0.0021)	-0.0044 (0.0029)	-0.0027 (0.0029)	0.0017 (0.0021)	-0.0017 (0.0043)	0.0043 (0.0057)
Locus of Control	-0.0042 (0.0035)	-0.0003 (0.0008)	0.0008 (0.0012)	0.0012 (0.0012)	-0.0004 (0.0009)	-0.0019 (0.0018)	0.0026 (0.0023)
Risk	0.0008 (0.0037)	-0.0012 (0.0009)	0.0000 (0.0013)	-0.0003 (0.0013)	-0.0007 (0.0009)	0.0009 (0.0019)	0.0016 (0.0025)
Patience	$0.0053 \\ (0.0036)$	0.0001 (0.0008)	$-0.0008 \ (0.0012)$	$egin{array}{c} -0.0017 \ (0.0012) \end{array}$	$egin{array}{c} -0.0015^{*} \ (0.0009) \end{array}$	0.0011 (0.0018)	$0.0002 \\ (0.0024)$
Trust	$egin{array}{c} -0.0014 \ (0.0141) \end{array}$	$-0.0005 \ (0.0029)$	$-0.0079 \\ (0.0048)$	$egin{array}{c} -0.0010 \ (0.0050) \end{array}$	$0.0038 \\ (0.0034)$	$0.0023 \\ (0.0072)$	$egin{array}{c} -0.0101 \ (0.0096) \end{array}$
Age	$0.0016 \\ (0.0012)$	0.0001 (0.0002)	0.0009^{**} (0.0004)	-0.0013^{***} (0.0004)	-0.0015^{***} (0.0004)	-0.0031^{***} (0.0006)	$egin{array}{c} -0.0023^{***} \ (0.0008) \end{array}$
Marital Status	$egin{array}{c} -0.0380^{*} \ (0.0216) \end{array}$	$0.0004 \\ (0.0042)$	$0.0012 \\ (0.0073)$	$0.0045 \\ (0.0065)$	$egin{array}{c} -0.0035 \ (0.0056) \end{array}$	0.0215^{**} (0.0096)	0.0224^{*} (0.0136)
Years of Schooling	-0.0080^{***} (0.0031)	$\begin{array}{c} 0.0096^{***} \\ (0.0009) \end{array}$	$\begin{array}{c} 0.0082^{***} \\ (0.0010) \end{array}$	$\begin{array}{c} 0.0029^{***} \\ (0.0009) \end{array}$	$-0.0008 \\ (0.0007)$	-0.0050^{***} (0.0016)	0.0015 (0.0020)
Religious	0.0286 (0.0235)	$egin{array}{c} -0.0010 \ (0.0053) \end{array}$	0.0200^{**} (0.0087)	$\begin{array}{c} 0.0304^{***} \\ (0.0102) \end{array}$	$0.0058 \\ (0.0059)$	0.0267^{**} (0.0122)	-0.0413^{***} (0.0155)
Ethnicity	-0.0662^{**} (0.0325)	0.0092 (0.0072)	-0.0134 (0.0109)	0.0059 (0.0153)	-0.0048 (0.0088)	-0.0298^{*} (0.0161)	0.137^{***} (0.0309)
Gender	-0.0613^{***} (0.0208)	-0.0057 (0.0048)	(0.0012) (0.0070)	(0.0023) (0.0073)	-0.0038 (0.0052)	-0.0458^{***} (0.0103)	0.0367^{**} (0.0143)
Household Size	(0.0102) (0.0063)	-0.0004 (0.0015)	(0.0008) (0.0021)	-0.0056^{**} (0.0023)	-0.0026 (0.0017) 0.1240***	-0.0030 (0.0031)	-0.0026 (0.0043)
Distance part torm	(0.1340)	(0.0023) (0.0278)	(0.0290 (0.0446) 0.0000	(0.0485)	(0.0355)	$-0.3050^{-0.00}$ (0.0669) 0.0010*	(0.0858)
Distance next town	(0.0035^{++})	(0.0002)	(0.0004)	(0.0004)	(0.0003)	(0.0010°)	(0.0002)
Observations Wald Chi2	$2.386 \\587.03$	$2.386 \\587.03$	$2.386 \\587.03$	$2.386 \\587.03$	$2.386 \\587.03$	$2.386 \\587.03$	$2.386 \\587.03$

Table A.6: Non-Cognitive Skills and Occupational Attainment (Marginal Effects) - Full Output

Note: Own calculations with 2017 TVSEP data. *, ** and *** denote significance at the 10, 5 and 1 percent levels. Standard errors in parentheses.

	Commercial Farmers	Professionals	Government Workers	Sales and Service Workers	Craft Workers	Labourers	Self- employed
Openness	-0.0086	-0.0006	0.0033	-0.0018	0.0003	-0.0072*	0.0037
	(0.0081)	(0.0017)	(0.0029)	(0.0029)	(0.0021)	(0.0040)	(0.0056)
Conscientiousness	-0.031^{***}	0.0061^{**}	0.0007	-0.0072*	0.0088^{**}	0.0137^{**}	0.0160^{*}
	(0.0118)	(0.0029)	(0.0044)	(0.0039)	(0.0038)	(0.0062)	(0.0083)
Extraversion	0.0052	0.0007	0.0026	0.0028	-0.0029	-0.0076*	-0.0027
	(0.0093)	(0.0021)	(0.0032)	(0.0034)	(0.0024)	(0.0046)	(0.0063)
Agreeableness	0.0091	-0.0014	0.0052	0.0034	0.0014	-0.0040	0.0009
	(0.0114)	(0.0025)	(0.0042)	(0.0041)	(0.0029)	(0.0056)	(0.0077)
Neuroticism	-0.0034	0.0053**	-0.0044	-0.0028	0.0022	-0.0020	0.0040
	(0.0087)	(0.0021)	(0.0029)	(0.0030)	(0.0021)	(0.0043)	(0.0058)
Locus of Control	-0.0040	-0.0007	0.0008	0.0012	-0.0004	-0.0020	0.0025
	(0.0035)	(0.0008)	(0.0012)	(0.0012)	(0.0009)	(0.0018)	(0.0023)
Risk	0.0010	-0.0013	0.0003	-0.0005	-0.0007	0.0011	0.0014
	(0.0037)	(0.0009)	(0.0013)	(0.0013)	(0.0009)	(0.0019)	(0.0025)
Patience	0.0051	-0.0001	-0.0005	-0.0015	-0.0017^{*}	0.0012	0.0006
	(0.0036)	(0.0008)	(0.0012)	(0.0012)	(0.0009)	(0.0018)	(0.0024)
Trust	-0.0023	-0.0014	-0.0062	-0.0007	0.0035	0.0018	-0.0104
	(0.0142)	(0.0029)	(0.0048)	(0.0052)	(0.0036)	(0.0072)	(0.0098)
		· · · · ·	· · · ·		× ,	× ,	× ,
Observations	2.386	2.386	2.386	2.386	2.386	2.386	2.386
R2	0.131	0.131	0.131	0.131	0.131	0.131	0.131
Chi2	942.3	942.3	942.3	942.3	942.3	942.3	942.3

Table A.7: Non-Cognitive Skills and Occupational Attainment (Marginal Effects) - Multinomial Logit

Note: Own calculations with 2017 TVSEP data. *, ** and *** denote significance at the 10, 5 and 1 percent levels. Standard errors in parentheses. Additional controls: Age, gender marital status, years of schooling, religious, ethnicity, household size, share of farmer in the district, distance to the next district town.

	Commercial Farmers	Professionals	Government Workers	Sales and Service Workers	Craft Workers	Labourers	Self- employed
Opponness AB	-0.0016	_0.0011	0.0000	-0.0025	0.0001	_0.0081*	0.0008
Openness AD	(0.0010)	(0.0011)	(0.0000)	(0.0023)	(0.0001)	(0.0031)	(0.0038)
Constitutions AD	(0.0089)	(0.0020)	(0.0031)	(0.0031)	(0.0022)	(0.0044)	(0.0001)
Conscientiousness AB	-0.0280^{+1}	(0.0050)	(0.0013)	-0.0000	(0.0085)	0.0132^{+1}	$(0.0171)^{-1}$
	(0.0119)	(0.0029)	(0.0042)	(0.0039)	(0.0036)	(0.0061)	(0.0082)
Extraversion AB	0.0058	0.0013	0.0019	0.0037	-0.0037	-0.0066	-0.0033
	(0.0093)	(0.0021)	(0.0032)	(0.0033)	(0.0024)	(0.0046)	(0.0062)
Agreeableness AB	0.0135	-0.0021	0.0035	0.0021	0.0012	-0.0044	0.0017
	(0.0114)	(0.0025)	(0.0041)	(0.0039)	(0.0029)	(0.0056)	(0.0076)
Neuroticism AB	0.0009	0.0047^{**}	-0.0058^{**}	-0.0030	0.0014	-0.0016	0.0065
	(0.0087)	(0.0021)	(0.0029)	(0.0029)	(0.0021)	(0.0043)	(0.0057)
Locus of Control	-0.0043	-0.0003	0.0009	0.0012	-0.0004	-0.0020	0.0026
	(0.0035)	(0.0008)	(0.0012)	(0.0012)	(0.0009)	(0.0018)	(0.0023)
Risk	0.0003	-0.0013	0.0003	-0.0003	-0.0006	0.0007	0.0018
	(0.0037)	(0.0009)	(0.0013)	(0.0013)	(0.0009)	(0.0018)	(0.0025)
Patience	0.0050	0.0002	-0.0007	-0.0017	-0.0015^{*}	0.0010	0.0003
	(0.0035)	(0.0008)	(0.0012)	(0.0012)	(0.0009)	(0.0017)	(0.0024)
Trust	-0.0021	-0.0004	-0.0077	-0.0010	0.0039	0.0022	-0.0103
	(0.0141)	(0.0029)	(0.0048)	(0.0050)	(0.0034)	(0.0072)	(0.0096)
Observations	2.386	2.386	2.386	2.386	2.386	2.386	2.386
Wald Chi2	757.23	757.23	757.23	757.23	757.23	757.23	757.23

Table A.8: Non-Cognitive Skills and Occupational Attainment (Marginal Effects) - Robustness Check with Acquiescence Bias

Note: Own calculations with 2017 TVSEP data. *, ** and *** denote significance at the 10, 5 and 1 percent levels. Standard errors in parentheses. Additional controls: Age, gender marital status, years of schooling, religious, ethnicity, household size, share of farmer in the district, distance to the next district town.

	ln(Hourly Wage)
	- /
Openness	0.313
	(0.227)
Government Workers	0.932
Somice and Sales Workers	(4.332)
Service and Sales Workers	$(4 \ 379)$
Craft Workers	-1.343
	(5.923)
Labourers	-1.795
	(4.255)
Self-employed	-1.883
Occurrentian Transa & Openness	(4.124)
Occupation Types x Openness	$\begin{pmatrix} 0 \\ \end{pmatrix}$
Government Workers x Openness	-0.236
	(0.323)
Service and Sales Workers x Openness	-0.090^{-1}
	(0.284)
Craft Workers x Openness	-0.009
	(0.457)
Labourers x Openness	0.152
Self-employed y Openness	(0.204) 0.230
Sen-employed x Openness	(0.259)
Conscientiousness	-0.362
	(0.344)
Occupation Types x Conscientiousness	0
	(0)
Government Workers x Conscientiousness	0.369
Comise and Color Werlage of Constitution	(0.414)
Service and Sales workers x Conscientiousness	(0.135) (0.493)
Craft Workers x Conscientiousness	0.868
	(0.848)
Labourers x Conscientiousness	0.220
	(0.393)
Self-employed x Conscientiousness	0.368
P-transien	(0.398)
Extraversion	-0.553 (0.336)
Occupation Types x Extraversion	0
	(0)
Government Workers x Extraversion	0.341
	(0.416)
Service and Sales Workers x Extraversion	0.351
	(0.437)
Urait workers x Extraversion	1.312° (0.680)
Labourers x Extraversion	0.307
	(0.379)
Self-employed x Extraversion	0.510
	(0.372)

Table A.9: Earnings Regression - Full Output

Table A.9 continued from previous page	
	ln(Hourly Waga)
	wage)
Agreen	0.640*
Agreeablelless	(0.379)
Occupation Types x Agreeableness	0
	(0)
Government Workers x Agreeableness	-1.230^{***}
	(0.468)
Service and Sales Workers x Agreeableness	(0.530)
Craft Workers x Agreeableness	-1.955^{**}
0	(0.772)
Labourers x Agreeableness	-0.712
	(0.434)
Self-employed x Agreeableness	-1.078^{+++}
Neuroticism	(0.414) -1 025***
	(0.270)
Occupation Types x Neuroticism	0
	(0)
Government Workers x Neuroticism	0.421
Service and Sales Workers y Neuroticism	(0.310) 0.259
Service and Sales Workers & Rediotleisin	(0.339)
Craft Workers x Neuroticism	0.042
	(0.420)
Labourers x Neuroticism	0.369
Self-employed x Neuroticism	(0.302) 0.262
	(0.294)
Locus of Control	-0.114
	(0.121)
Occupation Types x Locus of Control	0
Government Workers x Locus of Control	0 114
	(0.137)
Service and Sales Workers x Locus of Control	0.204
	(0.142)
Craft Workers x Locus of Control	-0.001
Labourers x Locus of Control	0.112
	(0.139)
Self-employed Locus of Control	0.147
	(0.134)
RISK	0.0836
Occupation Types x Risk	0
	(0)
Government Workers x Risk	-0.004
Convice and Coles Workers & Disk	(0.144)
Service and Sales WORKERS X RISK	-0.050 (0.155)
Craft Workers x Risk	-0.234
	(0.215)
Labourers x Risk	-0.035
Self employed y Pick	(0.114) 0.065
pen-employed x trisk	(0.113)

Table A.9 continued from previous page ln(Hourly)			
	Wage)		
Patience	-0.021		
	(0.105)		
Occupation Types x Patience	0		
	(0)		
Government Workers x Patience	0.147		
	(0.141)		
Service and Sales Workers x Patience	-0.018		
	(0.141)		
Craft Workers x Patience	0.018		
	(0.181)		
Labourers x Patience	-0.045		
Calf and large day Dation as	(0.120)		
Self-employed x Patience	-0.040		
Truct	(0.120) _0 773**		
11 dSt	(0.356)		
Occupation Types x Trust	0		
Occupation Types x Hust	(0)		
Government Workers x Trust	0.285		
	(0.427)		
Service and Sales Workers x Trust	-0.242		
	(0.511)		
Craft Workers x Trust	0.667		
	(0.560)		
Labourers x Trust	0.203		
	(0.463)		
Self-employed x Trust	0.114		
	(0.427)		
Age	-0.003		
Marital States	(0.012)		
Marital Status	-0.037		
Voors of Schooling	(0.157)		
Tears of Schooling	-0.001 -40.032)		
Religious Majority	3.661***		
Tonglous majornoj	(0.240)		
Ethnic Majority	0.500		
	(0.346)		
Gender	-0.029		
	(0.198)		
Household Size	-0.120^{**}		
	(0.060)		
Share farmers	-2.234^{*}		
	(1.351)		
Distance to next town	0.010		
Constant	(0.001)		
Constant	1.914		
	(4.042)		
Observations	653		
R2	0.636		

Note: Own calculations with 2017 TVSEP data. *, ** and *** denote significance at the 10, 5 and 1 percent levels. Robust standard errors in parentheses.



Figure A.3: Non-Cognitive Skills and Individual Earnings - Robustness Check with Acquiescence Bias

(a) Own calculations with 2017 TVSEP data. The Figure shows the average marginal effects of the different non-cognitive skills per occupation type with a 95% Confidence Interval. Additional controls: Age, gender marital status, years of schooling, religious, ethnicity, household size, share of farmer in the district, distance to the next district town. Explanation: If coefficient and confidence interval do not intersect with the zero-red-line, the effect is significant at the 5% level. If the confidence interval lies on the zero-red-line it indicates that the effect is significant at the 10% level.

	Outcome Equation (Log Hourly Wage)	Selection Equation (Non Farmer)
	(10080)	
Openness	0.427***	-0.00877
	(0.0710)	(0.0331)
Conscientiousness	-0.0816	0.109**
	(0.111)	(0.0501)
Extraversion	-0.178^{**}	-0.0157
	(0.0816)	(0.0385)
Agreeableness	-0.276^{***}	-0.0390
Nounoticism	(0.101) 0.762***	(0.0470)
Neuroticism	-0.703	-0.0494 (0.0350)
Locus of Control	0.0256	(0.0350) 0.00832
	(0.0303)	(0.0143)
Risk	0.0221	0.0139
	(0.0330)	(0.0158)
Patience	-0.0342	-0.0210
	(0.0309)	(0.0144)
Trust	-0.591^{***}	-0.0856
	(0.123)	(0.0581)
Age	-0.00767	-0.0188^{***}
Marital Chatra	(0.0115)	(0.00510)
Marital Status	-0.0275 (0.165)	-0.109
Vears of Schooling	0.0112	0.0602***
reals of bencoming	(0.0283)	(0.0119)
Religious	3.739***	0.125
0	(0.211)	(0.0955)
Ethnicity	0.502	-0.447^{***}
	(0.346)	(0.139)
Gender	-0.0213	-0.0940
	(0.185)	(0.0860)
Household Size	-0.119^{**}	-0.112^{***}
	(0.0561)	(0.0257)
Share of farmers at district level	-2.387	-0.799 (0.557)
Distance next town	(1.082) 0.00974	-0.00218
Distance next town	(0.0101)	(0.00443)
Share of Farmers in the Household	(010101)	-6.858^{***}
		(0.268)
Occupation - Professionals	1.446^{***}	
	(0.538)	
Occupation - Government Workers	1.487***	
	(0.471)	
Occupation - Sales and Service Workers	0.987^{++}	
Occupation Labourors	(0.443) 0.005**	
Occupation - Labourers	(0.401)	
Occupation - Self-Employed	0.374	
Securitien Sen Employed	(0.387)	
athrho		0.119*
		(0.0674)
Insigma		0.759^{***}
		(0.0277)
Constant	0.0409	3.108***
	(1.243)	(0.580)
Observations	2.380	2.380

Note: Own calculations with 2017 TVSEP data. *, ** and *** denote significance at the 10, 5 and 1 percent levels. Standard errors in parentheses. Exclusion restriction share of farmers in household (probit : p>chi2 = 0.000; OLS: Prob>F = 0.1727). 38

B Validation of Survey Measures

Measures on the Big Five Inventory were introduced to the TVSEP in 2017. In order to accurately interpret the findings from our main analysis, we have to be certain that survey measures are valid. This section therefore assesses the internal validity of these survey measures. We use an unrestricted sample throughout this section.¹

We examine the internal validity of the Big Five model for our sample population in three ways: (i) We test the scales for internal consistency; (ii) We validate the presence of Big Five factors in our survey data; (iii) We test the stability of personality traits over time.

For the first objective, we estimate the Chronbach's itemized alpha coefficient (Cronbach, 1951). This instrument is widely used in the psychological literature and tests the internal consistency of the scales across the survey questions and the five personality traits (Schäfer, 2016; Yomaboot and Cooper, 2016). We also compute the within and between correlations following Laajaj et al. (2019).

We conduct principal component analysis (PCA) based on the 15 questions administered to respondents in the household questionnaire (see Table A.2) to validate the structure of the personality factors in our sample (Schmitt et al., 2007). The PCA allows us to reduce the dimension of the input variables by creating factors which are homogeneous within themselves and heterogeneous between each other (Backhaus et al., 2011). In order to compare our measures with other studies, we also construct simple averages for the respective Big Five traits to produce comparable measures of the personality traits for our sample population (see Tables A.1 and A.2 for relation between personality traits and survey questions). We use the Kaiser criterion (K1) (Ford et al., 1986) which retains all factors with eigenvalues greater or equal to one, to determine the number of factors to be retained, resulting in five factors which explain a total of 56% of the variance. Following Hair et al. (2009), only the factors with loadings greater than 0.30, i.e. meeting the minimum practical significance level, are interpreted.

Lastly, to examine the stability of the personality traits in our sample, we compare the answers from one individual at two different points in time for one of the TVSEP survey provinces. For this, we use data from an Add-on project in addition to our original data set. The Add-on project was conducted in Ubon Rathathani, Thailand, in November 2017 amongst the same households.² The Add-on questionnaire includes the exact same questions on personality traits as the TVSEP household survey from summer 2017.³ We identified 505 cases where the respondent in the summer and in November is the same person and compare the answers. A two-sided ttest is executed to compare the results.

¹ Please refer to Bühler et al. (2019) for a more elabourate discussion on personality traits in the TVSEP.

² The Add-on project is about *Behavioral insights into over-indebtedness within a vulnerable population*. For more details on the Add-on project, see Klühs et al. (2019).

³ However, the answer modalities differed slightly. Although, the items are measured on the same scale (7 point Likert scale), each number on the scale was labelled explicitly (each answer option is associated with a specific phrase, e.g. 1 means Disagree fully, 3 means Disagree a little, 6 means Agree strongly). Despite these differences, we rely on the comparison of the TVSEP data with the Add-on data to reveal, if the measures are reliable or not.

B.1 Results

Internal Consistency To test for internal consistency of the survey measures we compute the Cronbach's itemized alpha coefficient for the overall TVSEP sample as well as for the Ubon Sub-sample. The Cronbach's itemized alpha coefficient ranges between 0.42 and 0.60 across the Big Five factors. The overall reliability lays at 0.64 for the whole sample indicating a good fit (Schäfer, 2016). For the Ubon Sub-sample the score lays at 0.67. Detailed results are reported in Table B.1. Our results are similar to those of Rammstedt and John (2007).

Table B.1: Cronbach's Alpha

Personality Trait	Cronbach's alpha	No. of items
Openness	0.60	3
Conscientiousness	0.55	3
Extraversion	0.42	3
Agreeableness	0.58	3
Neuroticism	0.56	3
All Traits	0.67	15

 $\it Note:~$ Own calculations with 2017 TVSEP data.

The replication of psychometric indicators used by Laajaj et al. (2019) suggests that the within correlation ranges between 19% to 21% for our data, while the between correlation is well below 7% (see Table B.2).

	No. of items	Observations	Within correlation	Between correlation	Cronbach's alpha*
All	15	3090	0.21	0.048	0.44
Thailand	15	1447	0.19	0.040	0.41
Vietnam	15	1643	0.21	0.064	0.43

 Table B.2: Psychometric Indicators

Note: Own calculations with 2017 TVSEP data. * average for five character traits

Validation of Big Five structure The Principal Component Analysis reveals five factors (see Table B.3 and Figure B.2a). To avoid confusion with the five factors from the Big Five model, we name our factors: (i) Creativeness, (ii) Diligence, (iii) Skepticism, (iv) Approachability, and (v) Amiableness. Individuals who are creative consider themselves as artistic, have new ideas and an active imagination. They work thoroughly and efficiently, are sociable, and kind to others. People who are diligent are very determined to work (i.e. not lazy at all) and are always considerate and kind to others (i.e. never rude). The factor skepticism combines the items worrying and nervousness. Approachability combines new ideas, talkative, outgoing (i.e. not reserved) and stressed easily (i.e. not relaxed). Finally, Amiableness is a combination of talkative and sociable but also forgiving and kind.



Figure B.1: Scree Plot of Eigenvalues after PCA

(a) Own illustration with 2017 TVSEP data. The plot shows that five factors have eigenvalues greater or equal to one. This validates the presence of five factor structure in our data set.

BFI-Items	Factor 1 Creativeness	Factor 2 Diligence	Factor 3 Skepticism	Factor 4 Approachability	Factor 5 Amiableness
Artistic	0,30	-0,27	-0,10	0,01	0,08
New Ideas	$0,\!31$	-0,12	$0,\!12$	$0,\!31$	-0,35
Active Imagnation	$0,\!32$	-0,26	$0,\!10$	$0,\!05$	-0,14
Work thoroughly	$0,\!30$	$0,\!22$	$0,\!10$	$0,\!04$	-0,39
Efficient	$0,\!35$	0,11	-0,08	-0,06	-0,30
Lazy (reversed)	$0,\!10$	$0,\!53$	-0,08	$0,\!05$	-0,31
Talkative	$0,\!24$	-0,12	-0,03	$0,\!45$	0,22
Sociable	$0,\!32$	-0,02	$0,\!00$	$0,\!30$	0,30
Reserved (reversed)	-0,15	$0,\!24$	-0,12	$0,\!65$	$0,\!15$
Forgiving	$0,\!28$	$0,\!25$	$0,\!04$	-0,19	$0,\!48$
Kind	$0,\!35$	$0,\!23$	$0,\!00$	-0,18	$0,\!33$
Rude (reversed)	$0,\!00$	$0,\!53$	-0,14	-0,04	0,06
Worries	$0,\!00$	$0,\!15$	$0,\!67$	0,01	-0,01
Nervous	$0,\!00$	0,01	$0,\!66$	-0,02	$0,\!12$
Relaxed	-0,31	$0,\!12$	$0,\!17$	$0,\!32$	$0,\!00$

Table B.3: Factor Loadings according to PCA

Note: Own calculations with 2017 TVSEP data. We only interpret variables that have factor loadings greater than or equal to 0.30.

Table B.4 shows the correlation between the Big Five factors and the factors derived from the conducted PCA. The results suggest that our factors are relatively close to the Big Five factors. Our factor Creativeness is significantly correlated to the factor Openness from the Big Five model. Similarly, our factor Skepticism can be clearly mapped to the factor Neuroticism, and, our factor Approachability to the Big Five factor Extraversion. For the remaining two factors, Diligence and Amiableness we see correlations with more than one factor or with none of the factors from the Big Five model. Overall, we conclude that it is suitable to use the Big Five factors for our survey population as the results suggest a strong correlation between our factors and the Big Five factors. The same validation technique has been followed by (Rammstedt and John, 2007) to establish the equivalence of the BFI-S to the BFI-44.

 Table B.4: Correlation between Big Five and Factors from PCA

	Openness	Conscientiousness	Extraversion	Agreeableness	Neuroticism
Creativeness	0.76	0.63	0.38	0.50	-0.23
Diligence	-0.37	0.51	0.12	0.64	-0.12
Skepticism	-0.02	0.13	-0.06	0.09	0.92
Approachability	0.22	0.08	0.75	-0.24	0.11
Amiableness	-0.21	-0.42	0.46	0.32	0.07

Note: Own calculations with 2017 TVSEP data.

Stability of Personality Traits To check the stability of personality traits over time, we compare the responses from the same individuals at two points in time. Table B.5 depicts the average score for each of the Big Five factors for those individuals included in the TVSEP and the Add-on project. The results reveal that on average the factors differ only slightly between the answers given in the TVSEP data and the Add-on project. The factors Extraversion, Agreeableness and Neuroticism are not statistically different from each other. Although, the factors Openness and Conscientiousness are statistically different from each other, the mean values are still very close together and do not contradict each other. Some of this variation might also be the result of the different answer framing in the Add-on questionnaire. Due to this alteration the answers are not 100 percent comparable. Moreover, questions were posed by enumerators and not self-reported. This might have added some additional variation to the answers. The findings show that the answers are consistent over time, which lets us to believe that overall the 15 survey questions were posed in the correct way and that respondents understood them.

Overall, the results from the Cronbach's alpha and the PCA indicate that the personality factors in our sample population are similar to the Big Five factors. Furthermore, the comparison between the TVSEP data and the Add-on projects show that individuals answer consistent across the two surveys. Thus, we conclude that the personality trait questions can be utilized to form the Big Five factors for our study population. For comparability we use the average score of the original Big Five factors for our study.

	Mean TVSEP	Mean Add-on	Mean Difference
Openness	4.601	4.922	-0.321***
Conscientiousness	5.549	5.743	-0.195***
Extraversion	4.484	4.505	-0.021
Agreeableness	5.593	5.589	0.004
Neuroticism	3.399	3.264	0.135

Table B.5: Comparison of Sample Means

Note: Own calculation with 2017 TVSEP data and Add-on data. *, ** and *** denote significance at the 10, 5 and 1 percent levels for two-sided ttests.