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**The Role of Personality, Cognition and Shocks in Determining Age of Entry into Labor  
Market, Sector of Employment, and within Sector Earnings**

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# **The Role of Personality, Cognition and Shocks in Determining Age of Entry into Labor Market, Sector of Employment, and within Sector Earnings**

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## **Abstract**

Growing evidence in the economics literature links “noncognitive” skills to economic, behavioral and demographic outcomes in the developed world. However, there is little such evidence linking these traits to economic outcomes in developing country contexts. This paper estimates the joint effect of five specific personality traits and cognition on the age of entry into the labor market, labor market sectoral selection, and within sector earnings for a sample of young adults in Madagascar. The personality traits we examine are known as the Big Five Personality Traits: Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. Additionally, we look at how these traits interact with household-level shocks in determining their labor market entry decisions. We find that personality does indeed have an effect on these outcomes of interest and affects how these individuals respond to shocks in their labor decisions.

## **1. Introduction**

There is ample evidence from economics and psychology that cognitive ability is an important predictor of a number of economic, demographic, and social outcomes of interest. Cognition is a fundamental skill for processing information, learning, and decision-making. Recent, albeit more limited research points to traits that are sometimes referred to as ‘noncognitive’ skills as also being important for success in life.<sup>1</sup> In the last decade a growing literature in economics demonstrates the importance of noncognitive skills in determining a number of important economic, behavioral, and demographic outcomes including school attainment, crime participation, earnings, and participation in risky behaviors (Blau and Currie 2006; Cunha et al. 2006; Curley et al. 2011; Dawson et al. 2000; Heckman 2007; Knudsen et al. 2006; Marshall 2009; Meany 2001). Recent views hold that noncognitive skills may be equally

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<sup>1</sup> Noncognitive ability encompasses the socio-emotional status of an individual and includes characteristics such as motivation, perseverance, self-control, time preference, self-esteem, and the ability to work with others.

or even more important in determining economic success than cognition (Brunello and Scholotter 2011).

In their landmark study, Heckman, Stixrud, and Urza (2006) found that for a variety of behavioral dimensions and labor market outcomes, a change in noncognitive skills from the lowest to the highest level had an effect that was comparable or even greater than a corresponding change in cognitive skill. They found that noncognitive skills raise wages through not only a direct effect on productivity, but also indirectly by affecting schooling and work experience. Moreover, it has also been found that the effect of noncognitive skills on wages is strongest for individuals at the lower end of the earnings distribution. One study found that at the tenth percentile, the effect of noncognitive skills on wages is between 2.5 and 4 times that of cognitive skills (Brunello and Scholotter 2011).

In the psychology and sociology literature, substantial evidence from developed countries points to the importance of various personality traits known as the Big Five Personality Traits to numerous outcomes of interest. The Big Five Personality Traits are Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. Findings show that these traits are important predictors of outcomes such as job performance, wages, academic achievement, occupational choice, and health (Barrick and Mount 1991; Chamorro-Premusic and Furnham 2003; Hampson et al. 2006; Hogan, Hogan, and Roberts 1996; Hogan and Holland 2003; Robbins et al. 2006; Roberts et al. 2007; Ones et al. 2007; Schmidt and Hunter 1998).

There is growing evidence on the importance of certain dimensions of cognitive ability for economic success in developing countries. However, to date, there is no evidence linking personality and other noncognitive dimensions to outcomes of interest in a poor country context. There are a number of reasons why understanding the role of personality traits and noncognitive, in addition to cognitive, ability in economic success might have salience in a developing country context. In developing countries where schooling is not universal and school quality is generally lower, the importance of these traits and skills for success in life may be even greater than it is in developed countries. And more specifically, through direct effects as well as indirect effects through schooling choices and work experience, cognition and personality may be able to explain much in the way of occupational choice, whether an individual works in the formal or informal sector, earnings, and a number of demographic and health outcomes.

It is also the case that cognitive ability and personality may have important interaction effects with other determinants of economic and social outcomes. For example, in developing countries, shocks to a household's health and economic well-being present a real threat to a household's ability to build the human capital of its members through schooling. There is ample evidence that households in developing countries often cope with negative shocks by taking children out of school to work in the labor market or household. This decision can have long-term consequences for a child's human capital accumulation and ultimate grade attainment. However, an unexplored dimension of this problem is not only how an individual's personality directly affects his educational and labor market outcomes, but also how his personality determines how an individual responds to a household shock and how it then mediates the effect shocks might have on his educational and economic outcomes.

In this analysis we explore how personality, cognition, and shocks jointly determine the age of entry into the labor market, selection into a labor market sector of employment, and the finally within sector earnings for a group of young adults in Madagascar. Since individuals in our sample are still relatively young, most between 21 and 23 years of age, many of them have not yet entered the job market. We therefore model age of entry into the labor market as a continuous time hazard with right censored observations. In modeling employment sector selection we use a multinomial approach to estimate selection into four employment categories: unemployed, informal sector employment, formal sector employment, and student. Then correcting for sectoral selection in the manner of Dubin and McFaddin (1984) we estimate the effect of these traits on skills on within sector earnings. As far as we know, our study is unique in that we are both able to focus directly on the role of human capital in the form of school attainment and achievement tests as well as on the impact of noncognitive skills, specifically the five personality traits. Additionally, our focus on these measures of human capital and how they interact with household level shocks in determining outcomes adds to the limited literature on the role of shocks on labor market choices.

In the following section we discuss the relevant research on labor market entry, sectoral selection, earnings, and more broadly the role of personality and noncognitive skills, particularly as found in the economics literature. Then in Section 3 we discuss the Big Five Personality Traits and their relationship to economic outcomes. Section 4 describes our data and methods

for measuring personality followed by a presentation of our empirical approach in Section 5. In Section 6 we discuss our results which is followed by our conclusions in Section 7.

## **2. Skills, Education and Labor Market Outcomes in Developing Countries**

While school enrollment rates increased dramatically in the developing world over the last several decades, economic constraints and imperfect or incomplete credit markets still greatly hinder the human capital accumulation of many children in these poor countries. In the face of negative economic or health shocks, many households are forced to take children out of school to either work in the household or be employed in the labor market. This, in turn, can likely limit the labor options that child faces as an adult. Numerous studies in the development economics literature demonstrate that negative shocks reduce school enrollment and attendance, increase child labor and reduce labor market opportunities (Glick, Sahn and Walker 2015; Beegle et al., 2006; Jacoby and Skoufias, 1997; Jensen, 2000). What is less understood is how individual child skills and traits interact with environmental circumstances in determining the education and labor outcomes for a child.

For example, shocks may have differential effects on a child's education and labor market outcomes depending on their personality type. High Conscientiousness may positively effect a child's education if the household is experiencing robust income growth. However, in times of economic hardship, the conscientious child might be more likely to leave school in order to support the household. Similarly, one could easily envision that a child with greater cognitive ability would likely generate higher returns to education than a child with lower cognitive ability and would thus delay entry into the labor market in order to complete more education. However, if the returns to education are sufficiently low and a household's discount rate sufficiently high, then a household facing a negative economic shock might find greater value for those cognitive skills in the labor market than in the child completing further education. Therefore the effect of personality and cognitive ability are expected to interact with shocks to affect the age at which a child enters the labor market as well as the type of work, or segment of the labor market.

While the role of a child's education, traits, and skill set are important determinants of selection into different labor market segments, the empirical evidence in this regard is extremely

limited, especially in developing countries. In addressing this important issue, we differentiate between the formal and informal sectors in developing countries since these segments have been shown to differ by job quality and the nature of employment and it is likely that there is a difference in the rewards to skill sets and traits, in terms of the ease of job entry and remuneration. (De Beyer and Knight, 1989; ; Glick and Sahn, 1997; Khandker, 1992; Nasir, 2005; Vijverberg, 1986, 1993). As noted above, the numerous studies that investigate determinants of labor market sectoral selection and within sector earnings focus on the role of schooling in this process (De Beyer and Knight, 1989; Gindling, 1991; Khandker, 1992; Vijverberg, 1986, 1993). Vijverberg (1993) finds that education and experience increases earnings by increasing the likelihood of being a formal wage earner. He surmises that these findings suggest that human capital, either in the form of education or experience, has greater rewards (or has a greater marginal effect on productivity) in the formal labor market than in self-employment. Nasir (2005) uses a multinomial logit model to investigate employment sector selection for males and females in Pakistan. He finds that higher education is associated with being in a high paying job in the managerial, professional, teaching, and medical sectors. He also finds that education has less of an effect on sectoral selection as one moves down the occupational ladder. For women, the impact of education is also observed to be of greater importance than for men. Glick and Sahn (1997) investigate the urban labor market structure in the Guinean capital of Conakry. Also using a multinomial logistic approach, they look at four labor market sectors: self-employment, private-sector wage employment, public sector wage employment and non-participation or unemployment. Specifically, they explore whether labor market sectors differ in terms of entry determinants and earnings. They also look at sector-specific returns to schooling as well as gender differences in access to and earnings within each labor market sector. The authors find that for both men and women, more education reduces the likelihood of being self-employed while it strongly increases the likelihood of being in the public wage sector. They further find that accounting for labor market sectoral selection, school attainment differentially affects male and female within sector earnings. While these few examples from developing countries provide some understanding of the role of individual characteristics in the process of selecting into different labor market sectors and earnings within

sectors, none that we are aware of examine the role of cognitive ability and personality or other noncognitive skills in affecting these outcomes, the subject of this paper.<sup>2</sup>

Thus while our paper is unique in focusing on broader measures of human capital, specifically cognitive and non-cognitive abilities, in determining labor market outcomes, we also note that there have been some similar efforts, specifically studies that explore the role of height as an indicator of human capital (Case and Paxson, 2006; Lafave and Thomas, 2013; Vogl 2014). Case and Paxson (2006) find that the height premium in earnings all but vanishes after controlling for cognitive ability for a sample of individuals in the United States and United Kingdom. They also find that taller workers tend to sort into occupations that require high levels of cognitive relative to physical skills, providing further evidence that the height premium is largely due to improved cognitive ability. For a sample of individuals in Mexico, Vogl (2014) also finds that the height premium is mediated by cognitive ability but that cognitive tests score only account for a limited part of the height premium. He finds that taller workers tend to sort into occupations with higher intelligence and lower strength requirements and that education mediates nearly all of the relationship between height and occupational choice. LaFave and Thomas (2013), on the other hand find that although the height premium is mediated by dimensions of health, family background, education, and cognitive ability, it nonetheless persists after controlling for these factors in a sample of individuals in Indonesia. While all of these studies acknowledge the indirect effect of height and/or cognitive ability on earnings through occupational sorting, none of these studies correct for occupational selection and estimate the effects of these skills on within occupation or sector earnings.

In this paper, we thus break new ground in explicitly investigating both the direct and indirect effects of cognitive skills and personality in determining the age an individual first enters the labor market, selection into labor market sectors of employment and finally on earnings within each sector in Madagascar.

## *2.1 Economic Importance of Noncognitive Skills*

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<sup>2</sup> Using the terminology of Behrman and Birdsall (1983), we are not just interested in schooling as a measure of human capital, but more specifically of “effective schooling” which is a function of actual years of schooling as well as school characteristics (‘quality’) and household characteristics such as parental education and assets, and unobserved individual ability.



The importance of noncognitive skills first became apparent in the economics literature in a series of groundbreaking papers on the economic and behavioral outcomes of high school dropouts who completed a General Education Development (GED) Test. Cameron and Heckman (1993) observed that although GED recipients have what are supposed to be equivalent cognitive qualifications as regular high school graduates, they earn much lower wages. Heckman et al. (2010) further demonstrate that after controlling for cognitive ability, GED recipient high school dropouts actually earn less, have lower hourly wages, and obtain lower levels of schooling than high school dropouts who did not complete the GED. The performance gap between these two groups was then attributed to some unmeasured element of noncognitive ability.

In their pioneering study, Heckman et al. (2006) explicitly estimate specific noncognitive skills and provide direct evidence for their importance in numerous behavioral and labor market outcomes. The noncognitive skills they investigate are self-esteem and locus of control. An individual's locus of control indicates the degree to which an individual feels he possesses control over his own life. They find that for a variety of the outcomes they measure, a change in noncognitive skills from the lowest to the highest level of the ability distribution produces a comparable or even greater effect than a similar change in cognitive skills. For example, they found that if an individual moves from the 25<sup>th</sup> to the 75<sup>th</sup> percentile in the noncognitive skills distribution then their wages would increase approximately 10% for males and 40% for females. A similar movement in the cognitive skill distribution would increase wages about 20% for males and 40% for females. They found that noncognitive skills raise wages through not only a direct effect on productivity, but also through an indirect effect through schooling and work experience. Once the authors controlled for the effects of schooling, they found that earnings respond more strongly to noncognitive skills than they do to cognitive.

Using ability measures resulting from Swedish military enlistment, Lindqvist and Vestman (2011) investigate the relationship between cognitive and noncognitive skills and labor market outcomes. Their noncognitive indicator is extrapolated from personality tests given at the time of enlistment and were designed to assess the conscript's ability to handle the psychological demands of serving in the military. The authors find that both cognitive and noncognitive skills are important predictors of labor market earnings. Moreover, they find that the effect of

noncognitive skills on wages is strongest for individuals at the lower end of the earnings distribution. At the tenth percentile, the effect of noncognitive skills on wages is between 2.5 and 4 times that of cognitive skills. This result is partly explained by the fact that the men in the study with low noncognitive ability were more likely to be unemployed than were men with low cognitive ability. Men with low noncognitive ability were also more likely to experience longer spells of unemployment.

Carneiro et al. (2007) find that for a sample of individuals in Great Britain, a general measure of noncognitive skills was important in explaining a number of educational and employment outcomes including whether or not an individual drops out of school by age 16, whether a degree is obtained by age 42, employment status at 42, work experience, and wages. In this sample general noncognitive skill also explains risky behaviors such as teen smoking, teen pregnancy, crime participation, health, truancy and exclusion from school. The authors then split noncognitive skill into twelve different domains. They found that 'inconsequential behavior' at age 11 is associated with the likelihood of dropping out of school by age 16, teen smoking and later truancy and crime participation. They also found that depression at age 11 is associated with school attainment, teen smoking, school exclusion and adult depression.

While these studies all focus on the role of non-cognitive skills in affecting various labor market outcomes, we are aware of no such research from developing countries. This paucity of such work is especially acute since there is good reason to believe that personality will have important impacts on work, especially where levels of schooling are low and the importance of cognitive skills may be less than in a more highly skilled workforce.

### **3. The Big Five Personality Trait Taxonomy**

A widely accepted taxonomy of personality traits is found in the Five-Factor Model of Personality, also referred to as the Big Five Personality Traits. Most variables used to assess personality in the field of personality psychology can be mapped into one or more dimensions of the Big Five Personality Traits: Openness to Experience, Conscientiousness, Extroversion, Agreeableness, and Neuroticism (John et al., 2008; McCrae and Costa, 2008; Brunello and Schlotter, 2011). *Openness to Experience* is the degree to which a person is curious, needs intellectual stimulation, change and variety. It describes the complexity, depth, and originality of

an individual. *Conscientiousness* captures the attitude of being hardworking, organized and dependable as opposed to lazy, disorganized and unreliable. People high in Conscientiousness tend to be able to delay gratification, follow the rules, adhere to norms and think before acting. It describes the characteristics behind task- and goal-oriented behavior. *Extroversion* captures the preference for human contact, empathy, gregariousness, assertiveness, and a wish to inspire people. Extroverted individuals have an energetic approach to social and material life. *Agreeableness* is the degree to which someone is cooperative, altruistic, modest, warm and agreeable, in contrast to being cold, disagreeable, and antagonistic. *Neuroticism* is the extent to which an individual is insecure, anxious, depressed and emotional rather than calm and self-confident (McCrae and Costa, 2008). These five personality traits are summarized in Table 1.

Historically, researchers in personality psychology were beset by a wide ranging array of personality scales with little guidance how to choose between or use them. The Five Factor Model of Personality first rose out of lexicographic studies describing personality (John et al., 2008). Since then the use of this model has increased substantially and the field of psychology has reached an initial consensus around the five factor framework (John et al. 2008). This has given way to replication and consistent definitions, even though there remain variations in methodology and data sources. The model has also been consistent, and argued to be relevant, across different periods of the adult lifespan (McCrae and Costa, 2008).

Evidence from sociology and psychology links the Big Five Personality Traits to educational outcomes, job performance, occupational choice, earnings, and health. Conscientiousness has been shown to be an important predictor of good health habits, health outcomes, and longevity, and is inversely related to participation in numerous risky behaviors (Hampson et al., 2006; John et al., 2008). Agreeableness negatively predicts heart disease. High Neuroticism is associated with less successful coping with and poorer reactions to illness. Extroversion, on the other hand, is associated with more social support and close relationships, which are important for coping with illness (John et al., 2008).

Studies demonstrate Conscientiousness is an important predictor of grades, years of education, job performance in a wide range of jobs, and leadership ratings (Borghans et al., 2008; Brunello and Schlotter, 2011; John et al., 2008). Furthermore, evidence shows that self-discipline (an aspect of Conscientiousness) accounts for more than twice as much of variation in grades than does IQ (Brunello and Schlotter, 2011). Research shows Openness to Experience to

be the best personality predictor of the number of years of education. Agreeableness positively and Neuroticism negatively predict job performance where people work in groups. Openness predicts success in artistic jobs and Neuroticism is an important predictor of job satisfaction (Brunello and Schlotter, 2011; John et al., 2008).

A number of studies investigate the role of the Big Five Personality Trait taxonomy in explaining earnings in developed countries. Generally Openness to Experience and Conscientiousness is associated with higher earnings and selection into white collar or higher paying jobs (Cobb-Clark and Tan, 2010; Gensowski, 2014; Ham et al., 2009; Heineck and Anger, 2010; Mueller and Plug, 2006). However, Gensowski (2010) further investigates the role of these traits in earnings by decomposing their direct and indirect effect. She finds that while Openness to Experience has a positive indirect effect on male earnings through educational attainment, it's direct effect is negative. Neuroticism and Agreeableness tend to negatively affect earnings and selection into white collar occupations (Cobb-Clark and Tan, 2010; Gensowski, 2014; Ham et al., 2009; Heineck and Anger, 2010; Mueller and Plug, 2006)

#### **4. Madagascar Life Course transitions of Young Adults Survey**

The data used in this paper come from the *Madagascar Life Course Transitions of Young Adults Survey*. In 2011-2012, the survey re-interviewed a cohort of 1749 young adults between the ages of 21 and 24 years, who were originally surveyed in 2004. The surveys were specifically designed to capture the transition from adolescence to young adulthood and contain detailed information on household characteristics, family background and health. Detailed community surveys were also conducted in 2004 and 2012 and the 2004 surveys also include a detailed module on local schools.

1733 of these individuals were administered a personality questionnaire and approximately 1500 also took cognitive tests. Cognitive tests were administered that were designed to measure abilities in math and French, and involved both written and oral

components.<sup>3</sup> We aggregate the scores of the two math and two French tests together and then standardized this aggregate using the data's sample moments.<sup>4</sup>

The surveys also measured household-level shocks using individual recall. The survey recorded whether or not the cohort member's parents were living and if not the time of their death. All individuals in the household were asked if they suffered an illness or injury that prevented them from working or performing normal activities in the approximately eight year period between the two surveys. Questions were also asked about unexpected losses or gains in crops and livestock, as well as non-farm revenues, both in 2004 and again in 2012. We use this information to construct eight household-level shocks: whether or not the cohort members mother or father died, whether or not the mother or father experienced an illness or injury that prevented him or her from working, and whether or not the household experienced a positive or negative income shock during three stages of childhood. These stages were the period before the cohort member turned 10 years old, between the ages of 10 and 14, and finally after age 14.<sup>5</sup>

### *Measuring Personality*

The 2012 questionnaire includes a module to characterize individual personality traits. This module has 116 questions designed to capture how individuals behave and respond to different situations. For each question in the personality module, individuals were asked to rate their response to a statement as 1-Strongly Disagree, 2-Somewhat Disagree, 3-Neither Agree or Disagree, 4-Tend to Agree, and 5-Strongly Agree. These questions are then used as inputs to measure the Big Five Personality Traits for each individual. A few examples of questions used to measure each personality trait can be found in Table 2. Tables A.1-A.5 in the appendix lists summary statistics for all the questions used to measure each personality trait.

We model the Big Five Personality Traits as unobserved variables and used confirmatory factor analysis to uncover their latent distributions. By using confirmatory factor analysis we

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<sup>3</sup> In addition a 'life skills' test was given, which was designed to measure practical knowledge and covered topics such as health practices, nutrition, and civics.

<sup>4</sup> We also performed the following estimations using each cognitive test score individually, using separate math and French score aggregates and using separate oral and written score aggregates. None of these specifications had a meaningful difference with our reported results.

<sup>5</sup> We also conducted our analyses in which income shocks were disaggregated into different types of income shocks but that provided no substantive difference in our results. We also specified the shock variables as a count variable indicating the number of positive or negative income shocks. Again, this specification did not differ substantially from the results reported in this paper.

can estimate the latent joint distribution of our five personality traits using the variance-covariance structure of survey questions designed to measure each trait. Personality traits are then estimated using the following measurement system:

$$(1) \quad \begin{aligned} Z_j^O &= \mu_j^O + \lambda_j^O \theta^O + \varepsilon_j^O & \text{for } j \in \{1, \dots, m_j^O\} \\ Z_j^C &= \mu_j^C + \lambda_j^C \theta^C + \varepsilon_j^C & \text{for } j \in \{1, \dots, m_j^C\} \\ Z_j^E &= \mu_j^E + \lambda_j^E \theta^E + \varepsilon_j^E & \text{for } j \in \{1, \dots, m_j^E\} \\ Z_j^A &= \mu_j^A + \lambda_j^A \theta^A + \varepsilon_j^A & \text{for } j \in \{1, \dots, m_j^A\} \\ Z_j^N &= \mu_j^N + \lambda_j^N \theta^N + \varepsilon_j^N & \text{for } j \in \{1, \dots, m_j^N\} \end{aligned}$$

Where O indexes Openness to Experience, C indexes Conscientiousness, E indexes Extraversion, A indexes Agreeableness, and N indexes Neuroticism.  $Z_j^p$  is the observed  $j^{th}$  measurement for latent trait  $\theta^p$ .  $m^p$  is the number of observed measurements for latent trait  $p$ ,  $p \in \{O, C, E, A, N\}$ . To ensure that the model is not underidentified, we normalize  $\lambda_1^p = 1$  for all  $p \in \{O, C, E, A, N\}$ . This simply sets scale and is common practice in factor analysis. We also normalize  $E[\theta^p] = 0$ . Doing so centers the distribution of latent factors over zero and is also common practice. Since the factors do not have any cardinal value, this normalization does not have any implications for how we interpret our results. The  $\varepsilon$ 's are assumed to be mean zero, are uncorrelated with the factors and are independent across agents and factors. Using confirmatory factor analysis we estimate the factor loadings,  $\lambda_j^p$ , and predict a personality trait factor score for each individual in the sample. We then use the standardized factor scores to estimate their effect school completion, age of labor market entry, and selection into employment sectors. Estimated factor loadings,  $\lambda_j^p$ , and the intercepts,  $\mu_j^p$ , from the measurement model can be found in Appendix Tables A.6-A.10.<sup>6</sup> Table 3 gives the correlation matrix of each of the five personality traits and the standardized aggregate cognitive test score. Each of these variables are statistically significantly correlated at the one percent level. In particular, there is a high degree

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<sup>6</sup> Cronbach's  $\alpha$  is a coefficient that measures the internal consistency or reliability of the measurements being used to estimate the five personality factors. Estimates for Cronbach's  $\alpha$  for each personality trait is 0.71, 0.92, 0.80, 0.66, and 0.82 for Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism, respectively. Thus for the most part, our measurement instruments are reasonably consistent.

of correlation between Openness to Experience, Conscientiousness, and Extroversion. Of the five personality traits, the aggregate cognitive test score is most correlated with Openness to Experience.

. In this paper we estimate three models: one predicting the age of entry into the labor market one predicting labor market sectoral selection and one predicting within sector earnings. After accounting for missing variables at the individual and community levels, we are left with 1202, 1109, and 982 observations in each estimation sample, respectively. Table 4 compares individual characteristics across these samples and with the full sample of 1539 individuals who took the cognitive tests and personality module. Overall, there appears to be little to no difference in observed characteristics across the full sample, the job entry sample, and the sectoral selection sample. Indeed, there are no statistically significant differences between any pairwise combination of variables between any two of these three samples. There are statistically significant differences on numerous characteristics between the earnings sample and the other three samples. The earnings sample is significantly lower in Openness to Experience, cognitive test scores, the 2004 asset index, parental education, grade, ever employed and percent living in an urban area. However, by construction, this sample is only made up of employed individuals and excludes students and these variables are all likely determinants of either working or being enrolled in school. Therefore to the best of our knowledge any individual exclusion from our working samples is largely random or by construction and unlikely to affect our core results.

Roughly 48% of our sample is male, approximately 26% live in an urban area, and the average age is 22 years old.<sup>7</sup> The mean level of education for individuals in the sample is around 8 years and their mothers and fathers have attained an average of around 5 and 5.5 years of education, respectively.

Approximately, 80% of our sample was employed at least once by the time of the 2012 survey. Of those previously employed, approximately 52.5% started their first job before the age of 16. Tables 5 and 6 describe the distribution of characteristics of the first jobs reported. Over half of the first jobs were working for a family-owned enterprise, and this was the case for 70% of the first jobs of individuals who began working before age 16. Only three percent of the first

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<sup>7</sup> The reported descriptive statistics are from the sample used to estimate labor market sectoral selection. These statistics do not substantively change if we report them using either the school attainment sample or the age of labor market entry sample.

jobs for these individuals were in the formal sector. However, 32% of the first jobs for individuals who began working after age 16 were in the formal sector. The majority of first jobs were in the agricultural or livestock sector (85% of first jobs for individuals who started working before 16 and 43% for those who started working after 16). Another 48% of the first jobs of individuals who started working after age 16 were in either in the service, high skill, or low skill sectors.

In this paper we model selection into four categories: unemployed, employment in the formal sector, employment in the informal sector, and student. Tables 7-9 describe the sectoral distribution in our sample. Most of our sample (58% or 642 individuals) is employed in the informal sector. These workers are predominately self-employed (mostly the agricultural or livestock) or are doing unpaid work in a family enterprise or as a caregiver or apprentice. 19% of our sample is working in the formal public or private sector and are largely working in skilled or semi-skilled jobs or are in upper or middle management positions.

Table 10 describes individual characteristics by employment sector. Comparing observed characteristics of individuals employed in the informal sector to the mean levels in the other three categories, we see that these individuals have lower cognitive test scores, lower grade attainment, entered the labor market at a younger age, were less likely to live in an urban area and their parents had lower levels of education than the average of all these characteristics in the sample. They also exhibited lower levels of Conscientiousness, Extraversion, Openness, and Agreeableness and higher levels of Neuroticism. Individuals found in the other three sectors, on the other hand, had higher cognitive test scores, were more likely to live in an urban area, had more education and had better educated parents. Individuals employed in the formal sector and unemployed individuals were older than the sample average when they held their first job (conditional on being employed at least once) while students were younger. However, it is important to note that only 11% of students in the sample were ever employed before.

## **5. Estimation Strategy**

In this paper we estimate three related models. We model the age an individual first enters the labor market, selection into different labor market sectors, and finally earnings within these sectors. In modeling these outcomes we must account for their interrelatedness. For example,



the length of time in the labor market indicated by the age of entry can be a signal of work experience and potentially a set of skills which are differentially valued by different labor market sectors. These differences would then be reflected in both sectoral selection and within sector earnings. We therefore account for age of labor market entry in both the selection earnings model. We further use probabilities for sector of employment predicted from the selection model to correct for selection in the manner of Dubin and McFadden (1984).

Much of the literature investigating these labor outcomes focus on the role of education in this process. In this paper we are particularly interested in the role personality and cognitive skills play in these processes in addition to schooling. However school attainment is endogenous to each of these outcomes. For example, in our sample some individuals are still enrolled in school and thus student is a category we must account for in the sectoral selection model. Clearly, people who have attained higher grades at the time of the survey are more likely to still be a student by construction. Individuals may also work to achieve a certain level of education *in order* to obtain work in a particular occupation. Additionally, the decisions to terminate education and to enter the labor market may occur independently or they might be determined jointly. For example, in times of economic stress, a household may be forced to pull a child out of school so that she/he may begin to work and provide for the financial support the household. Conversely, an individual may delay her entry into the labor market in order to complete higher levels of education. She might delay entry into the labor market in order to obtain informal training or experience. She might also choose to leave school in order to marry but not enter the labor market. Finally, the decision to leave school might have more to do with preferences for education than labor market conditions. Because cognitive skills, particularly the math and French skills we measure, are, in part, learned in school these skills are tightly intertwined in school attainment and are thus also endogenous to our outcomes of interest. To account for this endogeneity we use the rich information on local schools in 2004 available in these surveys to instrument for grade attainment and cognitive test scores in our three models.

### *5.1 Endogeneity of Personality Traits*

In each of the three models we estimate we treat the Big Five Personality Traits as exogenous. Currently, the empirical evidence as to how personality is formed in an individual is

sparse. A growing body of evidence points to the interaction between environment and inherited genetics in producing individual characteristics (Committee, 2000). However, there is no evidence that we are aware of that demonstrates the effects of childhood experiences and circumstances on the formation of adult personality. And likewise, there is little evidence of the relationship between personality traits of children and those upon reaching adulthood. There is evidence, however, that the Big Five Personality Traits remain generally stable over adulthood (Costa and McCrae, 1988). Consequently, the literature estimating the effect of personality on economic outcomes largely treats personality as exogenous.

While we follow the literature and treat the five personality traits as exogenous, we are cognizant that there may be unobserved variables that affect both our outcome variables interest and the personality traits we measure in adulthood. For example, one might think that an event like the death of a parent might impact the formation of a child's personality. Like other researchers, there is little we can do to address this possibility other than checking the robustness of our result to the inclusion and exclusion of numerous control variables in each of our models. Tables A.12-A.17 in the appendix reported estimated coefficients for each of our empirical models with and without controls. Each column of these tables incrementally adds an extensive set of individual-, school-, and community-level controls from different periods in the life-course. Incrementally adding each group of controls has little to no effect on the point estimates of our coefficients of interest. Therefore if there is some unobserved factor impacting both personality and our dependent variables, it would have to be uncorrelated with our individual-, household-, and community-level controls. This greatly alleviates concerns that unobserved characteristics correlated with our control variables bias our estimated coefficients of interest.

## 5.2 *Schooling and cognition*

Given our interest in dealing with the endogeneity of schooling and cognition in our labor market models, especially since one of the employment states is still being in school, we begin by presenting the results of the model of the grade attainment,  $G_{ijr}$ , and cognitive test scores,  $\theta_{ijr}^C$  of individual  $i$  in community  $j$  and region  $r$ , as a function of the individual's personality, household-level shocks, and numerous individual- and community-level controls and local school-level

characteristics which effectively serve as instruments for these two variables in our labor models.<sup>8</sup>

$$(1) \quad G_{ijr} = \alpha^s + \beta_1^s \theta_{ijr}^P + \beta_2^s S_{ijr} + \beta_3^s X_{ijr}^s + \beta_4^s SCH_{jr} + \beta_5^s C_{jr}^{2004} + r_r^s + u_{ijr}^s$$

$$(2) \quad \theta_{ijr}^C = \alpha^C + \beta_1^C \theta_{ijr}^P + \beta_2^C S_{ijr} + \beta_3^C X_{ijr}^s + \beta_4^C SCH_{jr} + \beta_5^C C_{jr}^{2004} + r_r^C + u_{ijr}^C$$

where  $\theta_{ijr}^P = [\theta_{ijr}^O, \theta_{ijr}^C, \theta_{ijr}^E, \theta_{ijr}^A, \theta_{ijr}^N]$  is a vector of the individual standardized factor scores for each of the Big Five Personality Traits.  $S_{ijr}$  is a vector of the four parental shock variables and six household income shock variables.  $X_i^s$  is a matrix of individual-level controls and includes gender, 2004 and 2012 household-level non-labor income in the form of transfers,<sup>9</sup> the highest grade attained by both the individual's mother and father, 2004 household size and number of children in the household under the age of 17 in 2004. Following Sahn and Stifel (2003), we include a 2004 household asset index constructed using factor analysis so as not to worry about the potential for reverse causality if we used a contemporaneous measure of wealth.

$C_j^{2004}$  is a vector of 2004 community-level controls for community  $j$ . Given the large number of potential community controls, we create three indices related to community quality and infrastructure using factor analysis. We include a community health index using indicators of whether or not there is a hospital or health center in the community, whether family planning services and contraception is available in the community and whether or not maternal health information is accessible in the community. We also include a community infrastructure index generated from variables indicating the availability of electricity, pumped water, and daily and weekly markets in the community. We include a remoteness index using information on distance to health services, banks, post offices, schools, taxis, courts, markets, inputs, extension services, veterinarians, access to national and provincial roads, utilities, media, and

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<sup>8</sup> We also estimated this model using ordered probit on both five and seven schooling categories. The five schooling categories were no school, at least some primary, at least some middle, at least some secondary, and at least some university. The seven categories were no school, some primary, completed primary, some middle, completed middle, some secondary, completed secondary, some or completed university. Neither of the order probit estimations produces any meaningfully different results than the ordinary least squares model. We therefore went with the simpler specification.

<sup>9</sup> Non-labor income includes the value of in-kind and monetary transfers into the household both from individuals outside the household and from the government.

transportation. Finally we also include variables indicating whether or not one of the top three means of savings in the community is with a formal account and whether one of the top three sources of a large loan in the community is a bank.  $r_r$  is a regional fixed effect.

$SCH_j$  is a vector of school-level controls for community  $j$ , in 2004. The 2004 survey round includes rich information on the primary school closest to the center of town in the community in which the child resided in 2004. School-level variables we include are the distance between the center of town and this primary school, whether or not this primary school participated in a government sponsored nutrition program, and a school facilities quality index. The facilities quality index is formed using factor analysis on indicators on the availability of electricity, medicine, toilets, separate toilets for boys and girls, recreation grounds, and clean water in the school. Finally, we also include whether or not there is a private school in the community.

Note that the primary school conditions measured for our instruments are not necessarily measuring the conditions of the primary school attended by the sample individual. We instead use as instruments the characteristics and conditions of the primary school closest to the center of town so as to avoid the issue of school choice. Our exclusion restriction is based on the premise that primary school conditions in the area where the sample individual grew up is unlikely to directly affect the labor decisions of interest, but instead exert its influence only through the impact on education and cognitive ability. Furthermore, while communities in the sample generally have a primary school, many do not have a secondary school. Therefore there is also weak correlation between primary school quality and secondary school quality, strengthening the case that our instruments meet the necessary exclusion restrictions. Indeed, only 57% of our sample communities have a secondary school.

### *5.3 Age of Entry into the Labor Market*

We estimate entry into a first job using a Cox Proportional Hazard model (Cox 1972). Specifically, the hazard of an individual,  $i$ , in community,  $j$ , and region,  $r$ , for entering the labor market at age  $a$  is:

$$\begin{aligned}
(3) \quad h_{ijr}(a) = & h_o(a) * \exp(\gamma_1 \theta_{ijr} + \gamma_2 S_{ijr}^I + \gamma_3 Male_{ijr} + \gamma_4 \theta_{ijr} \times S_{ijr}^I + \gamma_5 \theta_{ijr} \times Male_{ijr} + \\
& \gamma_6 S_{ijr}^I \times Male_{ijr} + \gamma_7 \theta_{ijr} \times S_{ijr}^I \times Male_{ijr} + \gamma_8 S_{ijr}^P + \gamma_9 X_{ijr}^I + \gamma_{10} G_{ijr} + \gamma_{11} \hat{u}_{ijr}^S \\
& + \gamma_{12} \hat{u}_{ijr}^C + \gamma_{13} C_{jr}^{2004} + r_r + u_{ijr}^I)
\end{aligned}$$

Where  $h_o(a)$  represents the baseline hazard function for leaving the state of not working at age  $a$ .  $\theta_{ijr} = [\theta_{ijr}^P, \theta_{ijr}^C]$  is now a vector of both the standardized factor scores of each of the five personality traits ( $\theta_{ijr}^P$ ) and the instrumented individual standardized aggregate cognitive test score, ( $\theta_{ijr}^C$ ), for individual  $i$ .  $S_{ijr}^I$  is a vector containing the six income-related shock indicator variables: whether a positive or negative income shock occurred before the cohort members were 10 years old, whether it occurred between ages 10 and 14, and whether these shocks occurred after they were 14. A child's personality and cognition effects might differ across gender. Also, his personality type and cognitive ability and gender might also influence his labor-entry response to shocks. Therefore, we allow for differential labor responses across gender, personality type and cognition, and shock realizations. We include pairwise interactions between the personality factor scores, cognitive tests scores, gender and the six household income shock variables and a triple interaction between personality and cognition, gender, and the income shock variables.

$S_{ijr}^P$  is a vector of the four parental shock variables. Interacting parental shocks with gender, personality, or cognitive ability did not yield substantively different results than excluding these interactions. Therefore we exclude these interactions in order to preserve degrees of freedom.  $X_{ijr}^I$  and  $C_{jr}^{2004}$  are the same individual- and community-level controls described in (1).  $G_{ijr}$  is highest grade attained by the 2012 survey.

If a child's decision to enter the labor market is partially determined by the decision to leave school, then school attainment and cognitive test scores are endogenous to the decision to enter the labor market. We instrument for grade and the aggregate cognitive test score using the school-level variables described in the previous section. A traditional instrumental variable approach in which grade and cognitive test score are replaced by their first-stage predicted value will not yield a consistent estimate of  $\gamma_4$  and  $\gamma_{10}$  due to the nonlinearity of the hazard function. Therefore, we employ a control function approach (also referred to as two-stage residual

inclusion method), which remains consistent in the nonlinear hazard (Terza et al., 2008).  $\hat{u}_{ijr}^S$  is the predicted residual from (1) and  $\hat{u}_{ijr}^C$  is the predicted first-stage residual from instrumenting for cognitive skills.

#### 5.4 Selection into Labor Market Sector

Our model of selection into different labor market sectors has four categories: unemployed, informal sector employment, formal sector employment, and student. Following Dubin and Mcfadden (1984) we use a multinomial logistic model to estimate the probabilities that an individual will be found in each employment sector.

$$(4) \quad \begin{aligned} V_{ijrk} = & \mu_k + \delta_{1k} \theta_{ijr} + \delta_{2k} G_{ijr} + \delta_{3k} E_{ijr} \times A_{ijr} + \delta_{4k} Married_{ijr} + \delta_{5k} Male_{ijr} + \\ & \delta_{6k} Male_{ijr} \times (\theta_{ijr} + G_{ijr} + E_{ijr} \times A_{ijr} + Married_{ijr}) + \delta_{7k} X_{ijr}^m + \delta_{8k} C_{jr}^{2012} + \\ & + \delta_{9k} \hat{u}_{ijr}^S + \delta_{10k} \hat{u}_{ijr}^C + r_r + u_i^m \end{aligned}$$

$V_{ijrk}$  is the utility received by individual  $i$ , in community  $j$  and region  $r$ , by being employed in market sector alternative  $k$ .  $\theta_{ijr}$  is again a vector of the standardized factor scores for the five personality traits and cognitive test scores.  $G_{ijr}$  is highest grade attained.  $E_{ijr}$  is an dummy variable indicating whether or not the individual has ever been employed and  $A_{ijr}$  is the age at which the individual first entered the labor market. Thus,  $\delta_{3k}$  captures the effect of the age an individual is when he is first employed only for individuals who have been previously employed.  $Married_{ijr}$  is a dummy variable indicating whether or not the individual is currently married. Because the effects of an individual's personality, cognitive ability, education, age of labor market entry, and marital status might differ by gender, we also include interactions between each of these variables and gender.  $X_i^m$  is a vector of individual-level controls and includes age, parental education, household size, the 2004 household asset index, and 2012 non-labor

transfers.  $C_{ijr}^{2012}$  is a vector of 2012 community controls and includes the same community indices described above using 2012 conditions.. Again,  $r_r$  is a regional fixed effect.

We instrument for grade and cognitive test scores using the same specification described for (3). Again, a traditional IV approach may not yield consistent estimates given the nonlinear nature of the multinomial logistic model. We, therefore, again employ the control function approach, which remains consistent in this framework.

Under the multinomial framework, an individual is assumed to select into employment sector  $k \in \{1,2,3,4\}$  for which he receives the highest utility. Thus the probability that individual  $i$  selects into sector  $k$  is

$$(5) \quad P_{ik} = \Pr(V_{ik} > V_{il}) \text{ for all } k \neq l.$$

Since the formulation of (5) is a function of differences in utilities derived from choosing each sector, some normalization is required. We therefore use working in the formal sector as the base category in our estimation. The estimated coefficients can therefore be interpreted as the effects of a variable on the utility of being in employment alternative  $k$  relative to the utility derived from the base category of working in the formal sector.

### 5.5 Within Sector Earnings

While much of the limited literature evaluating the effect of personality and skills on earnings in some way controls for occupation type, it does not explicitly correct for selection into different occupations or sectors and then estimate the effects of these characteristics on within sector earnings. However, different labor market sectors likely value skills sets differently and therefore it is important to account and correct for selection into these sectors when evaluating the effect of skills and traits on earnings. Clearly, educational attainment is a signal of an individual's skills set. Different occupations will place different marginal values on the skill set acquired through formal education. Additionally, the length of time in the labor market indicated by age of entry can be a signal of work experience and potentially another set of skills valued differently than those garnered in school. Furthermore, learning one skill set may have an opportunity cost of acquiring another set of skills. Therefore it is quite possible that an

individual may invest in his or her human capital (say in education) specifically to acquire a skills valued in an intended future occupation.

To correct for the selection process we follow Dubbin and McFadden (1984) and model within sector earnings as follows.

$$(6) \quad \ln(W_{ijr}^k) = \mu^k + \omega_1^k T_{ijr} + \omega_2^k Male + \omega_3^k Male \times T_{ijr} + \omega_4^k X_{ijr} + \omega_5^k C_{jr}^{2012} + r_r + \lambda_{ijr}^k + u_{ijy}^w$$

where  $\ln(W_{ijr}^k)$  is the log earnings of individual  $i$  in community  $j$  and region  $r$  who is employed in labor market sector  $k$ .  $T_{ijr} = [\theta_{ijr}^P, \hat{\theta}_{ijr}^C, \hat{G}_{ijr}, A_{ijr}, ]$  is a vector of traits that includes the five personality traits, instrumented cognitive test score, instrumented grade attainment, and the age at first job. These variables are all interacted with a dummy variable for male to allow for differential returns to skills and traits by gender.  $X_{ijr}$  includes the same individual controls described for (3). To proxy for experience, it also includes the years the individual is employed at the his/her current occupation and it's square.  $C_{jr}^{2012}$  are the same community controls included in (4).

Following Dubin and McFaddin (1984) we use the probability of being employed in employment sector  $k$  predicted from (4) to calculate the selection correction term  $\lambda_{ijr}^k$ , such that

$$(7) \quad \lambda_{ijr}^k = \sum_{j \neq k} \varphi_j \left[ \frac{\hat{P}_j \ln(\hat{P}_j)}{1 - \hat{P}_j} + \ln(\hat{P}_k) \right]$$

## 6. Results

First-stage estimates for grade attainment and test score outcomes can be found in Appendix Table A11. As we evaluate the role of personality in labor market decisions it is worth noting that Openness to Experience and Neuroticism are significant determinants of both grade attainment and cognitive ability. Openness to Experience positively determines grade attainment and cognitive ability while Neuroticism is a negative determinant. This finding is consistent with the literature from developed countries. Therefore the effects of grade attainment and



cognitive ability on the labor market outcomes of interest will also partly reflect the indirect effect of these personality traits.

## 6.2 Age of Entry into the Labor Market

Appendix Table A.12 reports the estimated coefficients for the hazard model with and without controls. Incrementally adding individual- and community-level controls has little to no effect on the personality coefficients and other estimates of interest. Therefore if there is unobserved heterogeneity biasing our coefficients, it would have to be uncorrelated with all of our control variables.

Table 11 reports the estimated coefficients in the Cox Proportional Hazard model predicting the age a child first enters the labor market. The first column of Table 11 reports the estimated coefficients without instrumenting for grade and cognitive test scores and the second column reports them with instrumenting for these characteristics. The estimated coefficients can be interpreted as the marginal effect of the explanatory variable on the log of the relative hazard of entering the labor market at a younger age. The main difference to note between the two columns is that without instrumenting, the effect of grade and cognitive test scores on the relative log hazard is negative, meaning increasing grade attainment or cognitive test scores increases the hazard of entering the labor market at a younger age. This result is fairly intuitive because, by construction, increasing a child's education (and related performance of cognitive tests) delays his entry into the labor market and thus decreases the hazard of entry. However, once we instrument for grade attainment and cognitive test score, these effects become positive. In other words increasing grade attainment or cognitive test scores *increases* the hazard of entering at a younger age. Adolescents with higher cognitive ability and more education are likely to be able to find employment sooner and higher paying jobs.. They are therefore likely to receive greater returns to entering the labor market and thus have higher opportunity costs of delaying entry.

Table 12 reports the marginal effects of household shocks by gender and Figure 1 plots the survival functions of males and females across income shock realizations. The death of a mother increases the relative log hazard of labor market entry while the death of a father decreases it.<sup>10</sup> A positive household income shock when the sample child is between the ages of

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<sup>10</sup> Note that the effect of the parental shock variables do not differ by gender since they were not interacted with gender. Results did not substantially vary if they were interacted with gender.

10 and 14 decreases his or her hazard of entering the labor market at a younger age. At this stage of adolescence, the sample individuals are approaching the average age of entering the labor market. Thus it appears that a positive income shock during this time gives these adolescents the freedom to delay entry. On the other hand, a negative income shock after age 14 increases the hazard of entering the labor market. In the face of unexpected economic pressure, older adolescents are likely expected to help support the household financially.

Table 13 reports the effects of personality traits and cognition on the relative log hazard of labor market entry across shock realizations. Figures 2-5 plot the survival functions of male and females with high and low levels of cognitive ability, Openness to Experience, Neuroticism and Conscientiousness across shock realizations. As noted, the effect of cognitive test scores on the hazard of labor market entry is positive. What is immediately striking is that this effect is substantial and statistically significant for both sexes and across all shock realizations. Across all shock realizations and for both males and females, individuals with high cognitive ability have drastically lower survival rates than individuals with low cognitive ability, all else equal. In other words, these individuals are at much higher risk of entering the labor market at a younger age. Again, these high cognitive ability individuals likely are able to get more desirable employment, receive higher returns to their labor and spend less time searching for employment, all resulting in a higher likelihood of entering the labor market at a younger age. The effect of cognitive ability on the hazard of entering the labor market at a younger age is considerably larger than that of any of the personality traits examined. It is also larger than the effects of the shocks themselves.

After cognitive ability, Openness to Experience has the largest effect on the hazard of labor market entry. Openness generally reduces the hazard of entering the labor market for both sexes and its effect is substantial and statistically significant across most shock realizations. The effect of Openness appears to be particularly strong in the face of income shocks experienced during adolescence. So while a negative income shock after the age of 10 increases the hazard of males and females entering the labor market, those higher in Openness are largely protected from the entry effects of this shock. Neuroticism, on the other hand, increases the hazard of entry at a younger age and this effect is generally consistent across shock realizations.

Finally, in Figure X we can see the effect of Conscientiousness on the hazard of labor market entry varies by shock realization and gender. In the face of positive income shocks or

income shocks early in childhood, higher Conscientious reduces the hazard of entering the labor market at a younger age. However, in the event of a negative income shock after age 14, high Conscientiousness increases the hazard of both males and females entering the labor market at a younger age. High Conscientiousness also increases the hazard of males' entry if there is a negative income shock between ages 10 and 14. Highly conscientious individuals tend to be hardworking, responsible, organized and dutiful. So in the face of a negative income shock during adolescence, high Conscientiousness individuals are entering the labor market earlier likely to help support the family financially.

### *6.3 Labor Market Sectoral Selection*

Appendix Tables A.13-A.15 report the estimated coefficients of the multinomial logistic regression for selection into the three non-base category employment sectors with and without controls. Again, incrementally adding controls does not affect our estimated coefficients of interest. It is therefore unlikely that unobserved characteristics correlated with our controls are biasing our results.

Table 14 reports the estimated coefficients for the multinomial logit estimation of selection into labor market sectors. Working in the formal sector is used as a base outcome. Therefore the estimated coefficients can be interpreted as the effect of a variable on the utility of being in an alternative sector relative to being employed in the base category of the formal sector. Table 15 reports the estimated average marginal effects of each of the five personality traits, instrumented cognitive test score, marital status, instrumented school attainment and age of labor market entry on the probability of being employed in each of the four sectors of interest: the formal sector, the informal sector, student and unemployed.

Intuitively, increasing grade attainment increases the likelihood that both males and females are still students at the time of the survey. Higher school attainment also decreases the likelihood of females being employed in the informal sector. Increasing female grade attainment by one grade reduces her likelihood of being employed in the informal sector by three percent.

In Table 18 we see that a number of the five personality traits are significant predictors of selection into employment sectors for males, however, none of the personality traits significantly directly predict sectoral selection for females. However, personality does have indirect effects

through their effects on age of entry into the labor market and grade attainment. Of the explanatory variables of interest, females' labor sector selection is instead significantly determined by their cognitive ability, age of labor market entry and marital status. An increase in cognitive ability by one standard deviation significantly decreases the likelihood of a female being employed in the informal sector by 13 percent. Conversely, cognitive ability increases her likelihood of being employed in the formal sector by 12 percent. Increasing the age a female enters the labor market by one year decreases her likelihood of informal sector employment by 13% and increases her likelihood of formal sector employment by 19%. Intuitively, marriage increases the likelihood of females being unemployed by 11 percent. Marriage also increases their likelihood of informal employment by 7 percent and decreases the probability of formal sector employment and being a student by 7 and 11 percent, respectively. Therefore married females are generally not employed in the labor market and if they are they are largely employed in informal employment such as family enterprises or self-employment.

As with females, cognitive ability and age of labor market entry significantly and positively predicts the likelihood of male selection into the formal sector and negatively predicts the likelihood of selection into the informal sector. Increasing cognitive ability by one standard deviation increases the likelihood of male selection into the formal sector by 19% and reduces the likelihood of male selection into the informal sector by 19%. Increasing the age at which a male first enters the labor market by one year decreases the probability of informal sector employment by 3 percent and increases the probability of formal sector employment by 3.5 percent.

Personality does have statistically significant direct effects on selection into labor market sectors for males. Neuroticism significantly increases the probability that males are unemployed. Increasing Neuroticism by one standard deviation increases the likelihood of being unemployed by 3.2 percent and reduces the probability that they are still students by 2.7 percent. Openness to Experience in males significantly increases their likelihood of being employed in the formal sector by 5.7 percent, while Extraversion reduces it by 6 percent. Extraversion also increases the likelihood of informal sector employment by 5.8 percent.

### *6.3 Within Sector Earnings*

Appendix Tables A16 and A17 report estimated coefficients from (6) with and without controls. Estimated coefficients remain fairly consistent as we incrementally add a large number of individual- and community-level controls. Again, this indicated that there are not unobserved characteristics correlated with our controls contaminating our results.

Table 16 reports estimated coefficients from earnings models. The first two columns report estimates for the returns to skills in which we do not correct for sectoral selection and pool the formal and informal sectors but include an variable controlling for sector of employment. The main result to note in the pooled model is that there is a large earnings premium for working in the formal sector. Working in the formal sector instead of the informal sector is associated with an over 300% increase in income. Since selection into the formal sector is endogenous, this result cannot be interpreted causally. However, it is worth keeping in mind as we analyze the within sector earnings.

Columns 3-6 in Table 16 report estimated coefficients for informal sector earnings and columns 7-10 report those for formal sector earnings. Table 17 reports the marginal effects of personality, cognitive test scores and grade on within sector earnings. Given the limited sample size in these models we will highlight some results that do not meet standard levels of significance, and thus some caution is required in interpreting some of the findings. The first panel of Table 17 reports returns to skills and traits in the informal sector and the second panel reports those for the formal sector.

What is immediately striking is that cognitive ability measured by the aggregate cognitive test score has a substantial and statistically significant *negative* effect on both male and female earnings in the informal sector. This result is robust to the inclusion and exclusion of control variables and with and without correcting for selection into the informal sector. One would expect that cognitive ability might be insignificant in explaining informal sector earnings, but a statistically significant negative effect is surprising. However, it is important to note that while the literature tends to treat cognitive ability as one dimensional (often proxied by IQ), it is in fact a multidimensional trait. The cognitive ability here is measured by performance on math and French achievement tests. It is possible that developing this particular set of cognitive skills comes at the opportunity cost of developing another set of skills that are more useful in the informal sector (much of which is characterized in this setting by agricultural jobs). Another possible explanation is that given the evidence from Africa that formal sector work is limited and

there is often long queuing for such jobs, it is plausible that individuals with higher test scores may be temporarily taking these informal sector jobs and are doing this work while awaiting for formal sector employment. However, there is no way to test that explanation. Regardless it is important to remember that although the direct effect of this set of cognitive skills on informal sector earnings is negative, it has a substantial positive indirect effect through sectoral selection. As noted previously, increasing cognitive test scores by one standard deviation decreases the probability of informal sector employment by 13 and 19 percent for females and males, respectively, and increases the probability of formal sector employment by 15 and 19 percent for females and males, respectively. Since there is an upwards of 300% earnings premium to formal sector work, the net effect of these skills on earnings is positive.

Interestingly, even though male personality traits (Extraversion and Openness) and cognitive test scores significantly determine male selection into the formal sector, these traits have no effect on male earnings within this sector. So while these traits and skills indirectly affect earnings through sectoral selection, they do not appear to have a significant direct effect. On the other hand, female personality traits did not significantly impact selection into the formal or informal sector, however, they do appear to play an important role for within sector earnings.

Conscientiousness positively affects male earnings in the informal sector and female earnings in the formal sector. Neuroticism on the other hand has the opposite effect in that it negatively impacts male informal sector earnings and female formal sector earnings. This result is fairly intuitive and consistent with the literature out of developed countries. High Conscientiousness individuals tend to be dependable and hardworking and are thus likely to be more productive while the increased anxiety and depression of highly Neurotic individuals reduces productivity.

Evidence is mixed as to the direction of the effect of Extraversion and Openness to Experience should have on earnings. Here we find that Extraversion is inversely related to male and female earnings in the informal sector although the statistical significance is weak. Although increased Openness to Experience is associated with increased grade attainment and increased likelihood of formal sector employment, its effect on female earnings within the formal sector is negative. Similar to Gensowski (2014), we find that Openness has a positive indirect effect on formal sector earnings but a negative direct effect.

## **Conclusion**

In recent years there is an increasing interest in the effect of “noncognitive” dimensions of human capital on economic outcomes. Numerous studies from industrialized countries find that noncognitive skills can be as an important of a predictor of economic outcomes as cognition. In developing countries, it is reasonable to think that certain noncognitive skills may prove to be even more important to economic success since school quality and school enrollment rates are generally lower in these countries than in industrialized ones. Moreover, noncognitive traits may also affect how individuals and households respond to economic and health shocks which are persistent threats to households’ economic well-being in this context.

For a sample of young adults in Madagascar, we estimate the effect of cognition and the Big Five Personality Traits on the age of labor market entry, employment sectoral selection, and within sector earnings. We find that personality and cognitive ability are significant predictors of these labor outcomes of interest. As research continues to evaluate the role of human capital in economic success and development, it is becoming increasingly clear that we need to also consider noncognitive dimensions of human capital such as personality and elements of psycho-social well-being in addition to cognitive ability, schooling and health.

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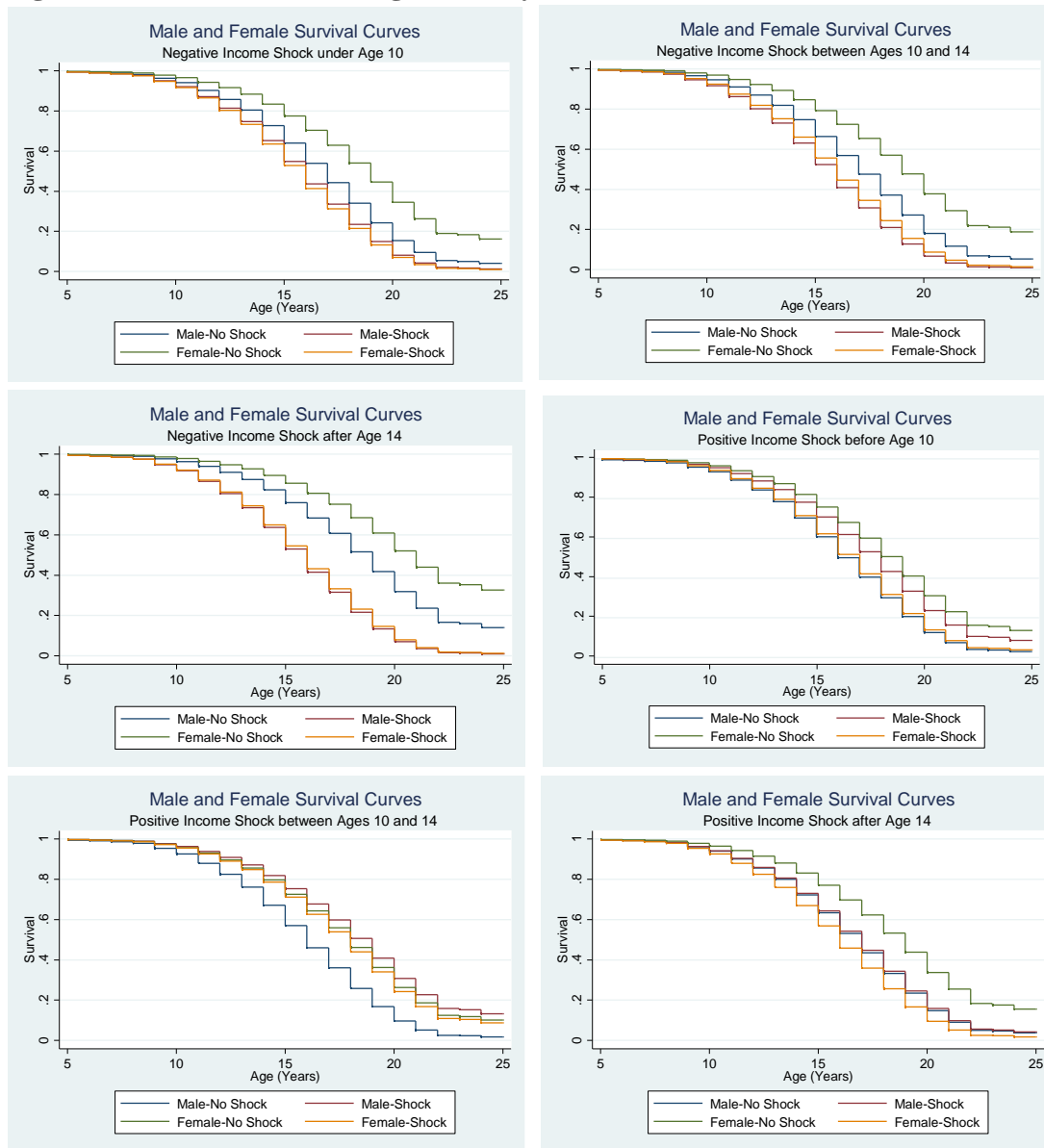


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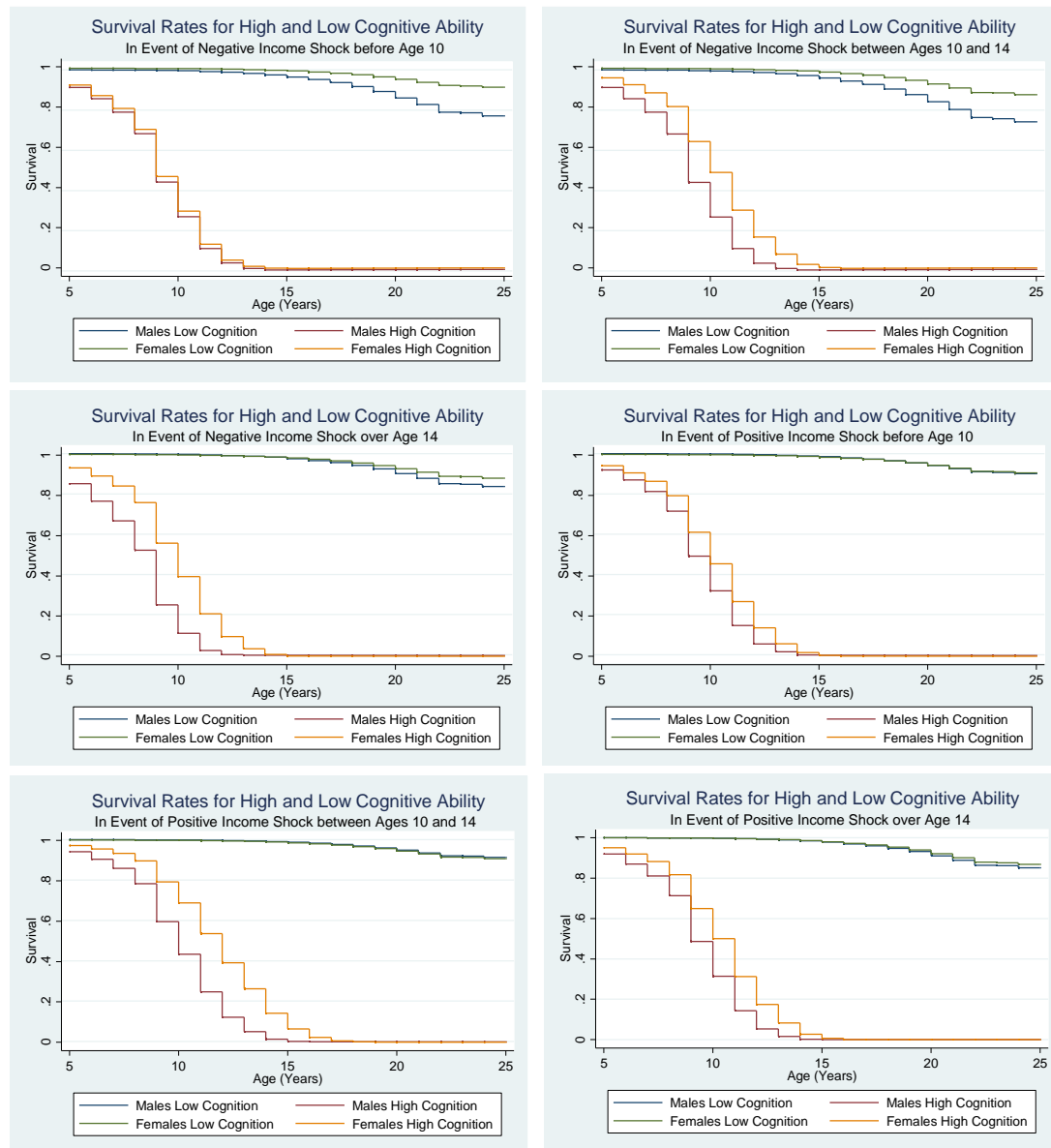
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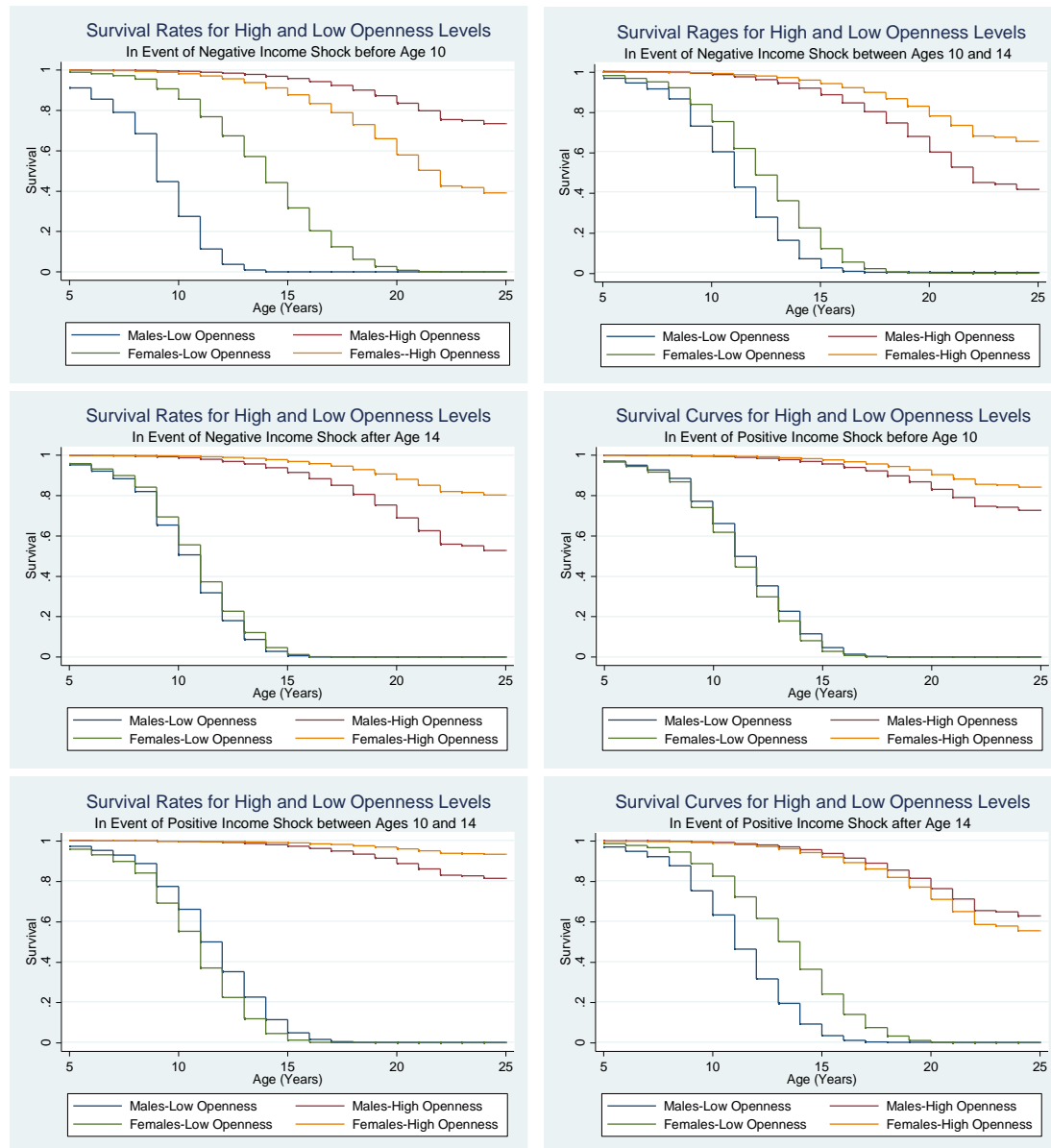
**Figure 1: Male and Female Age of Entry Survival Curves across Shock Realizations**



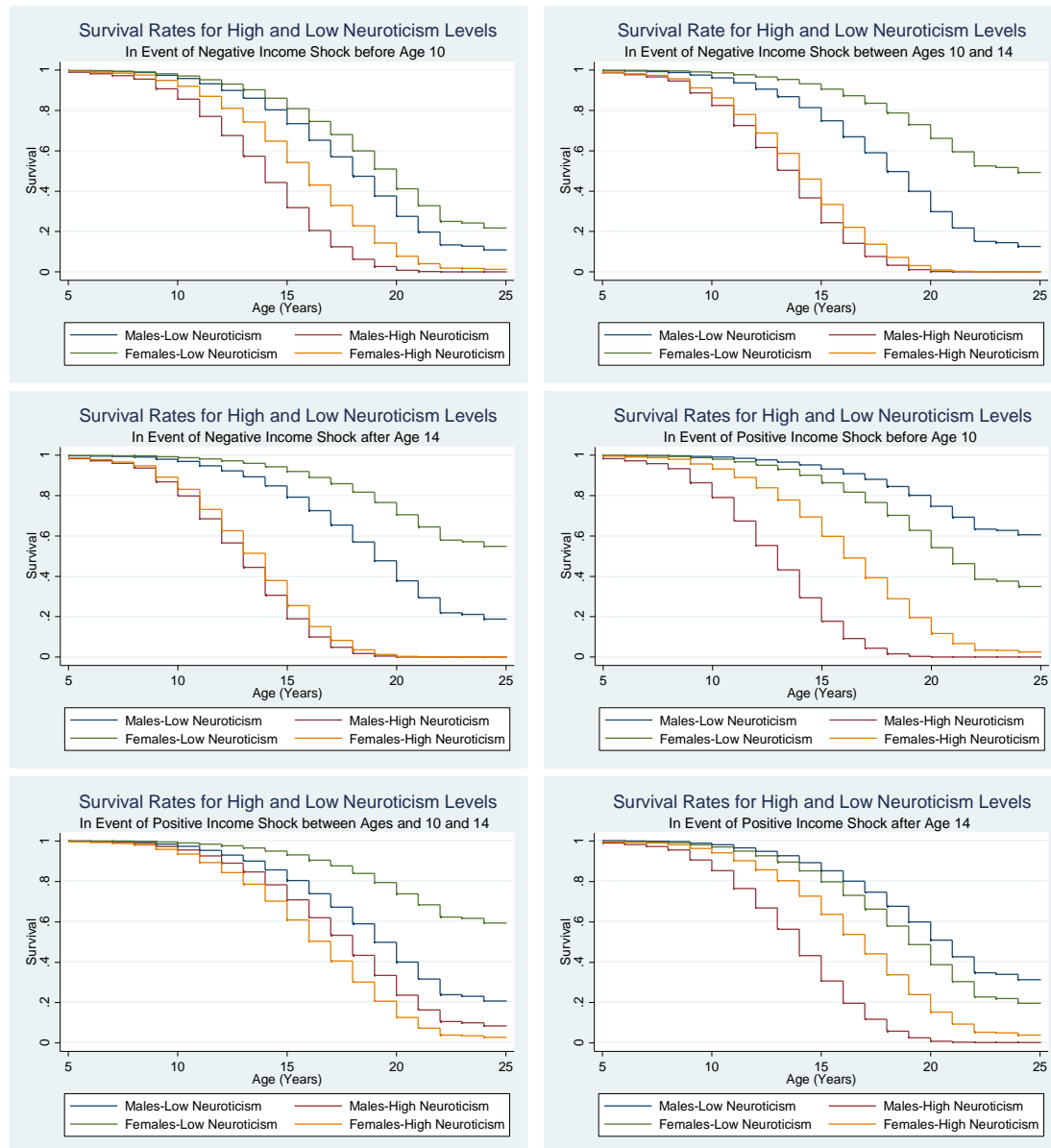
**Figure 2: Age of Entry Survival Curves for High and Low Cognitive Ability Individuals across Shock Realizations**



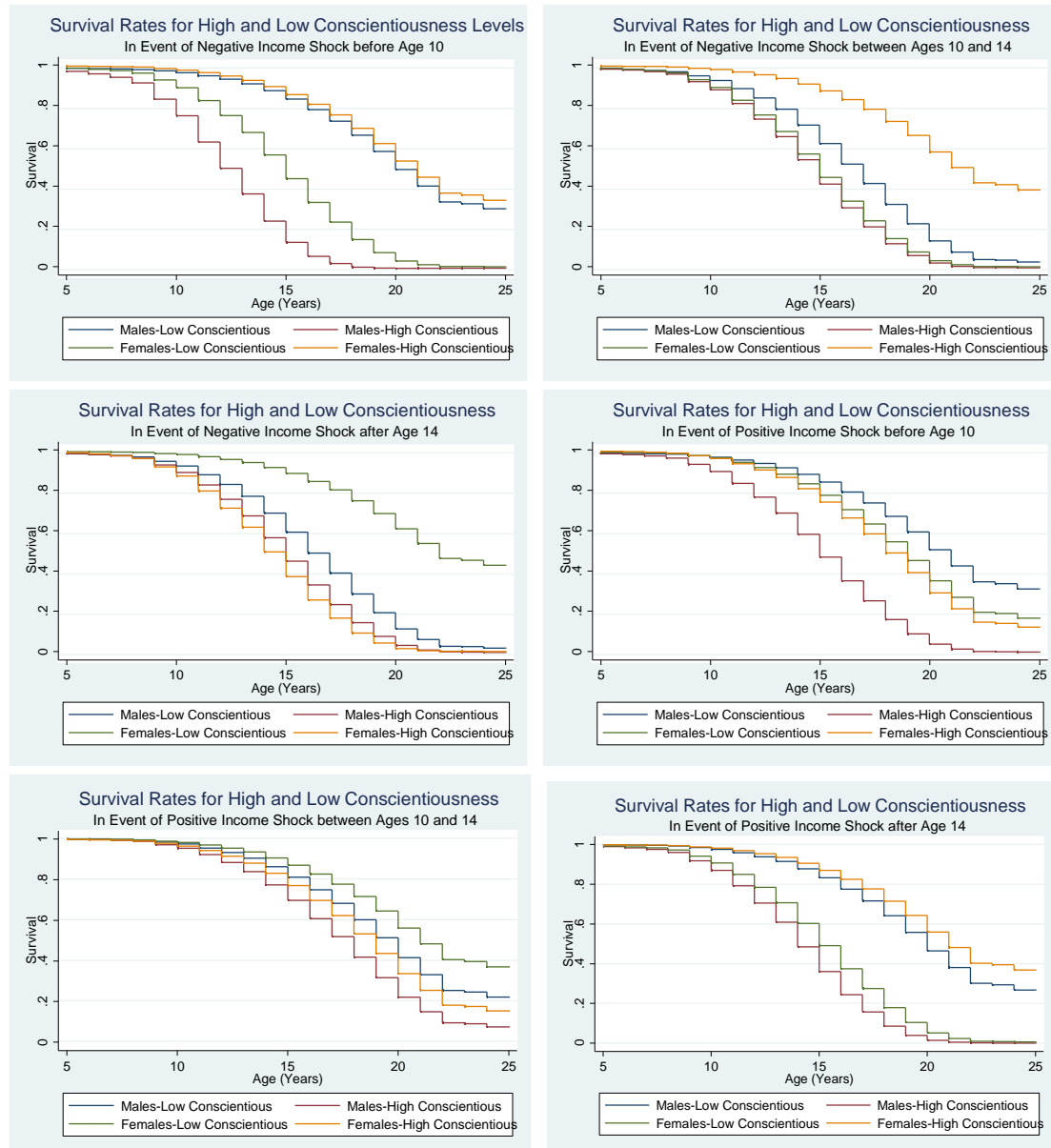
**Figure 3: Age of Entry Survival Curves for High and Low Openness across Shock Realizations**



**Figure 4: Age of Entry Survival Curves for High and Low Neuroticism across Shock Realizations**



**Figure 5: Age of Entry Survival Curves for High and Low Conscientiousness across Shock Realizations**





**Table 1: Big Five Personality Traits**

<b>Personality Trait</b>	<b>Basic Tendencies</b>	<b>Characteristic Adaptations</b>
Openness to Experience	a need for variety, novelty, and change	intellectual curiosity; interest in travel; many different hobbies; diverse vocational interests
Conscientiousness	strong sense of purpose and high aspiration levels	leadership skills; long-term planner; hardworking; organized; dependable
Extraversion	preference for companionship and social stimulation	social skills; numerous friendships; gregarious; assertive; talkative
Agreeableness	a willingness to defer to others during interpersonal conflict	forgiving attitude; belief in cooperation; warm
Neuroticism	sadness, hopelessness, guilt	Low self-esteem; pessimistic attitude; insecure; anxious; depressed

**Table 2: Examples of Questions Measuring the Big Five Personality Traits**

<b>Openness to Experience</b>
I find the world very interesting
In any situation I can find something interesting
I'm very interested in other countries and their cultures
<b>Conscientiousness</b>
I never leave a task without completing it
I do my job without waiting
I like to order things around me
I always keep my promises
<b>Extroversion</b>
I like to animate groups
I take the initiative in conversations
I always have something to say
I work better when I'm alone
<b>Agreeableness</b>
I respect the decisions of the group
I think honesty is the basis of trust
I am rarely angry
<b>Neuroticism</b>
I panic easily
I am often sad
I get discouraged easily
I am often worried

**Table 3 Correlation Matrix of Personality Traits and Cognitive Test Score**

	Openness to Experience Zscore	Conscientiousness Zscore	Extroversion Zscore	Agreeableness Zscore	Neuroticism Zscore	Aggregate Math/French Zscore
Openness to Experience Zscore	1					
Conscientiousness Zscore	0.66***	1				
Extroversion Zscore	0.63***	0.75***	1			
Agreeableness Zscore	0.52***	0.72***	0.75***	1		
Neuroticism Zscore	-0.17***	-0.34***	-0.44***	-0.28***	1	
Aggregate Math/French Zscore	0.23***	0.14***	0.18***	0.09***	-0.13***	1

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 4: Comparison of Observed Characteristics across Samples**

	<u>Full</u> <u>Sample</u> N=1539	<u>Job</u> <u>Entry</u> <u>Sample</u> N=1202	<u>Sector</u> <u>Selection</u> <u>Sample</u> N=1109	<u>Earnings</u> <u>Sample</u> N=982
Conscientiousness Zscore	0.01 (0.98)	0.04 (0.97)	0.04 (0.98)	-0.02 (0.97)
Extraversion Zscore	0.01 (0.98)	0.03 (0.97)	0.02 (0.96)	-0.02 (0.97)
Openness to Experience Zscore	0.03 (0.98)	0.05 (0.98)	0.04 (0.98)	-0.06 (0.98)
Agreeableness Zscore	0.00 (0.99)	0.01 (0.97)	0.01 (0.98)	-0.01 (0.96)
Neuroticism Zscore	0.02 (0.99)	0.03 (1.01)	0.02 (0.99)	0.01 (0.98)
Aggregate Cognitive Test Zscore	0.00 (1.00)	0.00 (0.99)	0.00 (1.00)	-0.21 (0.95)
2004 Asset Index	0.11 (1.00)	0.10 (1.01)	0.10 (1.01)	-0.10 (0.81)
Male	0.48 (0.50)	0.48 (0.50)	0.48 (0.50)	0.51 (0.50)
Mother's Education	4.86 (3.59)	4.90 (3.57)	4.85 (3.57)	4.13 (3.26)
Father's Education	5.57 (3.95)	5.53 (3.94)	5.47 (3.96)	4.66 (3.62)
Age	21.93 (1.35)	21.96 (1.24)	21.95 (1.23)	21.97 (1.24)
Highest Grade Attained in 2012	8.19 (3.67)	8.26 (3.65)	8.22 (3.67)	7.01 (3.45)
Ever Employed Previously	0.81 (0.39)	0.81 (0.39)	0.81 (0.39)	1.00 (0.00)
Age of Entry into Labor Market	15.98 (3.70)	16.00 (3.69)	15.92 (3.70)	15.89 (3.65)
Urban	0.27 (0.44)	0.26 0.44(	0.26 (0.44)	0.20 (0.40)
Death of Mother	0.09 (0.29)	0.09 (0.28)	0.09 (0.28)	0.40 (0.30)
Death of Father	0.17 (0.38)	0.17 (0.38)	0.17 (0.38)	0.18 (0.38)
Mother Illness/Injury	0.17 (0.37)	0.16 (0.37)	0.16 (0.37)	0.17 (0.37)
Father Illness/Injury	0.17 (0.37)	0.16 (0.36)	0.16 (0.37)	0.16 (0.37)
Positive Income Shock before Age 10	0.20 (0.40)	0.21 (0.41)	0.21 (0.41)	0.21 (0.41)
Positive Income Shock between Ages 10 and 14	0.25 (0.43)	0.27 (0.44)	0.26 (0.44)	0.26 (0.44)
Positive Income Shock after Age 14	0.51 (0.50)	0.51 (0.50)	0.51 (0.50)	0.54 (0.50)
Negative Income Shock before Age 10	0.21	0.21	0.20	0.20

	(0.41)	(0.41)	(0.40)	(0.40)
Negative Income Shock between Ages 10 and 14	0.37	0.39	0.38	0.38
	(0.48)	(0.49)	(0.49)	(0.49)
Negative Income Shock after Age 14	0.67	0.68	0.68	0.73
	(0.47)	(0.47)	(0.47)	(0.44)
Standard errors in parentheses				

**Table 5: Proportion of Sample in Occupation Types**

	<u>Full</u> <u>Age of</u> <u>Entry</u> <u>Sample</u> N=1202	<u>Entered</u> <u>before</u> <u>Age 16</u> N=511	<u>Entered</u> <u>after</u> <u>Age 16</u> N=691
Formal Sector Employment	17	3	32
Self-Employment	27	26	29
Work in Family Enterprise	53	70	34
Domestic Work in other Household	3	1	5

**Table 6: Proportion of Sample in Employment Sectors**

	<u>Full</u> <u>Age of</u> <u>Entry</u> <u>Sample</u> N=1202	<u>Entered</u> <u>before</u> <u>Age 16</u> N=511	<u>Entered</u> <u>after</u> <u>Age 16</u> N=691
Agriculture or Livestock	65	85	43
Manual Labor	6	3	9
Service	11	7	16
High Skill	8	2	14
Low Skill	10	3	18

**Table 7: Distribution of Labor Sectors across Gender**

	<u>Females</u>	<u>Males</u>	<u>Total</u>
	N=579	N=530	N=1109
Unemployed	73	34	107
Informal Sector	348	294	642
Formal Sector	67	143	210
Student	91	59	150

**Table 8: Distribution of Occupation Types across Labor Sectors**

	<u>Unemployed</u>	<u>Informal Sector</u>	<u>Formal Sector</u>	<u>Student</u>	<u>Total</u>
	N=103	N=642	N=210	N=150	N=1109
Public/Private Formal Sector	0	0	152	0	152
Self-Employed	11	261	0	0	272
Family Enterprise or Domestic Work in other Household	0	347	53	0	400
Student	0	4	2	150	156
Unemployed	88	0	0	0	88
Other	8	30	3	0	41

**Table 9: Distribution of Occupation Types across Labor Sectors**

	<u>Unemployed</u>	<u>Informal Sector</u>	<u>Formal Sector</u>	<u>Student</u>	<u>Total</u>
	N=107	N=642	N=210	N=150	N=1109
Agriculture/Livestock	10	498	23	0	531
Manual Labor	0	30	26	0	56
Service	3	80	27	0	110
High Skill	0	7	67	1	75
Low Skill	1	27	67	0	95
Student	0	0	0	149	149
Unemployed	88	0	0	0	88
Other	5	0	0	0	5

**Table 10: Individual Characteristics across Labor Sectors**

	<u>Unemployed</u>	<u>Informal Sector</u>	<u>Formal Sector</u>	<u>Student</u>
Conscientiousness Zscore	0.13 (1.06)	-0.11*** (0.98)	0.22*** (0.86)	0.23*** (0.89)
Extraversion Zscore	0.19** (1.06)	-0.10*** (0.96)	0.16*** (0.88)	0.19*** (0.90)
Openness to Experience Zscore	0.13 (1.12)	-0.14*** (0.95)	0.33*** (0.87)	0.37*** (0.91)
Agreeableness Zscore	0.13 (1.11)	-0.07*** (0.96)	0.11* (0.93)	0.15** (0.95)
Neuroticism Zscore	0.06 (1.07)	0.08*** (1.01)	-0.14*** (0.84)	-0.07 (1.01)
Aggregate Cognitive Test Zscore	0.34*** (0.88)	-0.37*** (0.91)	0.34*** (0.87)	0.94*** (0.70)
2004 Asset Index	0.43*** (1.19)	-0.18*** (0.68)	0.27*** (1.07)	0.86*** (1.35)
Male	0.35*** (0.48)	0.46* (0.50)	0.67*** (0.47)	0.42* (0.49)
Mother's Education	6.61*** (3.73)	3.93*** (3.02)	5.42** (3.58)	7.31*** (4.04)
Father's Education	7.20*** (4.22)	4.53*** (3.47)	6.15** (3.93)	8.23*** (4.08)
Age	22.03 (1.24)	21.91 (1.21)	22.12*** (1.24)	21.72*** (1.34)
Highest Grade Attained in 2012	9.53*** (3.10)	6.80*** (3.12)	9.12*** (3.28)	12.03*** (2.93)
Ever Employed Previously	0.29*** (0.46)	1.00*** (0.00)	1.00*** (0.00)	0.13*** (0.34)
Age of Entry into Labor Market	16.44 (3.55)	15.41*** (3.52)	17.80*** (3.52)	14.71* (4.92)
Urban	0.43*** (0.50)	0.15*** (0.36)	0.37*** (0.48)	0.48*** (0.50)
Death of Mother	0.07** (0.25)	0.09 (0.29)	0.10 (0.30)	0.05* (0.23)
Death of Father	0.16 (0.37)	0.16 (0.37)	0.20 (0.40)	0.14 (0.35)
Mother Illness/Injury	0.23 (0.42)	0.16 (0.36)	0.16 (0.37)	0.13 (0.33)
Father Illness/Injury	0.18 (0.39)	0.17 (0.38)	0.15 (0.36)	0.15 (0.35)
Positive Income Shock before Age 10	0.14** (0.34)	0.23** (0.42)	0.19 (0.39)	0.19 (0.40)
Positive Income Shock between Ages 10 and 14	0.19* (0.39)	0.26 (0.44)	0.27 (0.44)	0.24 (0.43)
Positive Income Shock after Age 14	0.45 (0.50)	0.59*** (0.49)	0.44*** (0.50)	0.37*** (0.48)
Negative Income Shock before Age 10	0.18 (0.39)	0.20 (0.40)	0.23 (0.42)	0.18 (0.39)
Negative Income Shock between Ages 10 and 14	0.28*** (0.45)	0.38 (0.49)	0.38 (0.49)	0.41 (0.49)
Negative Income Shock after Age 14	0.56*** (0.50)	0.76*** (0.42)	0.62** (0.49)	0.51*** (0.50)



**Table 11: Hazard of Age of Entry into the Labor Market**

	<b>No IV</b>	<b>IV</b>
Conscientiousness Zscore	-0.2718* (0.157)	-0.0560 (0.185)
Extraversion Zscore	-0.0859 (0.155)	-0.1569 (0.161)
Openness to Experience Zscore	-0.0077 (0.131)	-1.0091** (0.475)
Agreeableness Zscore	0.2224 (0.150)	0.1250 (0.157)
Neuroticism Zscore	-0.0786 (0.108)	0.4140* (0.249)
Aggregate Cognitive Test Zscore	-0.182* (0.111)	2.9376** (1.469)
Cognitive Test First-Stage Predicted Residual		-3.1374** (1.467)
Male	0.3261** (0.138)	0.5632*** (0.179)
2004 Household Asset Index	-0.0771 (0.052)	-1.0390** (0.435)
2012 Nonlabor Income Transfers	-0.0000 (0.000)	-0.0001** (0.000)
2004 Nonlabor Income Transfers	0.0000*** (0.000)	-0.0000 (0.000)
Mother's Highest Grade	-0.0272** (0.012)	-0.3477** (0.147)
Father's Highest Grade	-0.0129 (0.012)	-0.3341** (0.146)
2004 Household Size	-0.0239 (0.026)	-0.2611** (0.110)
Number of Kids<17 yrs in 2004	0.0181 (0.031)	0.4406** (0.194)
Highest Grade Attained	-0.0914*** (0.015)	0.8493* (0.482)
Predicted Residual from (1)		-0.9376* (0.481)
2004 Community Health Index	-0.0403 (0.055)	0.2678* (0.148)
2004 Community Infrastructure Index	-0.0958 (0.062)	-1.2182** (0.509)
2004 Remoteness Index	-0.0519 (0.035)	0.8612** (0.412)
Formal Account a Primary Savings Method	-0.3318*** (0.116)	1.3970* (0.788)
Bank is a Primary Source for Large Loans	0.2349** (0.095)	-0.2389 (0.243)
Regional Dummies	YES	YES

Positive Income Shock before Age 10	0.3846** (0.168)	-0.0288 (0.285)
Positive Income Shock between Ages 10 and 14	-0.0703 (0.137)	-0.5028** (0.247)
Positive Income Shock after Age 14	0.1077 (0.124)	0.2108 (0.135)
Negative Income Shock before Age 10	0.1155 (0.148)	0.3562* (0.213)
Negative Income Shock between Ages 10 and 14	-0.0304 (0.147)	0.3573 (0.231)
Negative Income Shock after Age 14	0.1929 (0.138)	0.7921** (0.316)
Death of Mother	0.0432 (0.122)	-0.2978 (0.221)
Death of Father	0.1128 (0.092)	-0.1285 (0.142)
Mother Illness/Injury	-0.1074 (0.099)	0.6849* (0.375)
Father Illness/Injury	-0.0619 (0.100)	-0.5660** (0.263)
Interactions between Shocks and Personality Traits and Cognition	YES	YES
Interactions between Male and Personality Traits and Cognition	YES	YES
Interactions between Male and Shocks	YES	YES
Interactions between Male, Shocks, and Personality Traits and Cognition	YES	YES
Observations	1,202	1,202

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 12: Marginal Effect of Household Shocks on Relative Log Hazard of Labor Market Entry**

	<b>Female</b>	<b>Male</b>
Positive Income Shock before Age 10	-0.029 0.285	-0.357 0.286
Positive Income Shock between Ages 10 and 14	-0.503**	-0.689***
Positive Income Shock after Age 14	0.211 0.135	-0.033 0.128
Negative Income Shock before Age 10	0.356*	0.295
Negative Income Shock between Ages 10 and 14	0.357 0.231	0.459** 0.221
Negative Income Shock after Age 14	0.792***	0.839***
Mother Illness/Injury	-0.2978 (0.221)	-0.2978 (0.221)
Father Illness/Injury	-0.1285 (0.142)	-0.1285 (0.142)
Death of Mother	0.6849* (0.375)	0.6849* (0.375)
Death of Father	-0.5660** (0.263)	-0.5660** (0.263)

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 13: Marginal Effects of Personality and Cognitive Ability on Relative Log Hazard of Labor Market Entry Across Shock Realizations**

	<u>No Shocks</u>		<u>Positive Income before 10</u>		<u>Positive Income between 10 and 14</u>		<u>Positive Income after 14</u>	
	Females	Males	Females	Males	Females	Males	Females	Males
Conscientiousness Zscore	-0.0560 (0.185)	0.436** (0.214)	0.044 (0.345)	0.385 (0.393)	0.158 (0.300)	0.135 (0.307)	-0.408 (0.301)	0.428* (0.260)
Extraversion Zscore	-0.1569 (0.161)	-0.276 (0.202)	-0.147 (0.399)	-0.155 (0.336)	0.529* (0.323)	-0.313 (0.280)	-0.220 (0.281)	-0.089 (0.255)
Openness Zscore	-1.0091** (0.475)	-1.082** (0.473)	-1.249*** (0.535)	-1.056** (0.524)	-1.534*** (0.514)	-1.169** (0.510)	-0.714 (0.499)	-0.988** (0.485)
Agreeableness Zscore	0.1250 (0.157)	-0.032 (0.174)	0.268 (0.336)	0.164 (0.337)	-0.353 (0.255)	0.300 (0.275)	0.400 (0.258)	-0.151 (0.234)
Neuroticism Zscore	0.4140* (0.249)	0.488* (0.261)	0.314 (0.315)	0.802*** (0.309)	0.480* (0.293)	0.113 (0.291)	0.171 (0.274)	0.496* (0.279)
Instrumented Aggregate Cognitive Test Score	2.9376** (1.469)	3.016** (1.466)	3.044** (1.489)	3.189** (1.477)	2.658* (1.475)	3.093** (1.474)	2.778* (1.475)	2.973** (1.472)
	<u>Negative Income before 10</u>		<u>Negative Income between 10 and 14</u>		<u>Negative Income after 14</u>			
	Females	Males	Females	Males	Females	Males		
Conscientiousness Zscore	-0.415 (0.332)	0.622** (0.319)	-0.446* (0.271)	0.153 (0.307)	0.531* (0.272)	0.111 (0.222)		
Extraversion Zscore	-0.324 (0.332)	-0.417 (0.312)	0.126 (0.289)	-0.402 (0.280)	-0.004 (0.218)	-0.050 (0.207)		
Openness Zscore	-0.543 (0.513)	-1.35*** (0.495)	-0.896* (0.520)	-0.857* (0.504)	-1.238*** (0.484)	-1.008** (0.483)		
Agreeableness Zscore	0.272 (0.314)	-0.128 (0.260)	-0.056 (0.268)	-0.176 (0.252)	-0.235 (0.210)	0.031 (0.185)		
Neuroticism Zscore	0.265 (0.286)	0.328 (0.291)	0.601** (0.275)	0.396 (0.295)	0.698*** (0.249)	0.492* (0.264)		
Instrumented Aggregate Cognitive Test Score	3.236** (1.476)	2.79* (1.468)	2.796* (1.477)	2.722* (1.472)	2.991** (1.468)	3.252** (1.468)		

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 14: Estimated Multinomial Logistic Coefficients for Selection into Labor Market Sectors**

	<u>Unemployed</u>	<u>Informal Sector</u>	<u>Formal Sector</u>	<u>Student</u>
Conscientiousness Zscore	-0.4671 (0.574)	-0.0387 (0.282)	<b>Base Outcome</b>	-0.6182 (0.526)
Extraversion Zscore	0.2987 (0.545)	-0.0553 (0.346)		0.0767 (0.746)
Openness to Experience Zscore	-0.2916 (0.424)	-0.1629 (0.288)		-0.2396 (0.528)
Agreeableness Zscore	0.2208 (0.374)	0.2822 (0.208)		0.3229 (0.530)
Neuroticism Zscore	-0.0071 (0.527)	0.1243 (0.235)		-0.0140 (0.639)
Aggregate Cognitive Test Zscore	-1.3499 (1.250)	-1.5784*** (0.549)		-2.2296 (1.708)
Cognitive Test First-Stage Predicted Residual	1.0459 (1.256)	1.0171* (0.541)		2.2316 (1.639)
Male	-0.0725 (2.833)	0.2851 (1.277)		0.4032 (4.614)
Currently Married	1.1782* (0.660)	0.7580* (0.444)		-1.6041 (1.431)
Age	0.0921 (0.241)	0.0086 (0.122)		-0.1943 (0.234)
2004 Asset Index	0.2092 (0.323)	0.2735 (0.190)		0.5084 (0.402)
Mother's Highest Grade	0.0562 (0.095)	0.0324 (0.040)		0.0981 (0.120)
Father's Highest Grade	0.0155 (0.106)	0.0770** (0.034)		-0.1024 (0.133)
2004 Household Size	0.0059 (0.111)	0.0112 (0.052)		0.1289 (0.149)
2012 Nonlabor Income Transfers	0.0004 (0.000)	0.0002 (0.000)		0.0003 (0.000)
Highest Grade Attained	0.0202 (0.238)	-0.1870 (0.148)		0.6295* (0.372)
Predicted Residual from (1)	-0.1239 (0.221)	0.1124 (0.146)		-0.4637 (0.325)
Previously Employed X Age at First Job	-0.0912 (0.110)	-0.1294*** (0.044)		-0.2171 (0.139)
				(1.200)
2012 Community Health Index	0.4059 (1.149)	0.1312 (0.468)		1.4672 (1.566)
2012 Community Infrastructure Index	0.5724 (0.453)	0.2598 (0.241)		0.4784 (0.600)
Regional Dummies	YES	YES	YES	YES
Male X Grade	0.1311 (0.210)	0.0994 (0.097)		0.0643 (0.315)
Male X Age at First Job	-0.0858 (0.127)	-0.0977 (0.067)		-0.2473 (0.254)
Male X Conscientiousness	0.5544 (0.734)	-0.0462 (0.398)		1.2589 (0.941)
Male X Extraversion	0.2539	0.5674		-0.1818

	(0.771)	(0.457)	(1.176)	
Male X Openness	-0.7215	-0.2804	-0.5609	
	(0.573)	(0.420)	(1.046)	
Male X Neuroticism	0.1598	-0.3270	-0.8355	
	(0.470)	(0.264)	(1.092)	
Male X Agreeableness	0.3202	-0.2684	0.4200	
	(0.741)	(0.343)	(0.978)	
Male X Cognitive Test Score	0.0687	-0.0551	0.8852	
	(0.744)	(0.315)	(1.072)	
Male X Currently Married	-1.4263	-0.5246	2.4514	
	(1.152)	(0.569)	(5.055)	
Constant	-2.4766	4.3560*	-2.6975	
	(3.692)	(2.475)	(5.416)	
Observations	1,109	1,109	1,109	1,109

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 15: Average Marginal Effects on the Likelihood of Selection into each Labor Market Sector**

	<u>Unemployed</u>		<u>Informal</u>		<u>Formal</u>		<u>Student</u>	
	<u>Females</u>	<u>Males</u>	<u>Females</u>	<u>Males</u>	<u>Females</u>	<u>Males</u>	<u>Females</u>	<u>Males</u>
Conscientiousness Zscore	-0.008 (0.028)	-0.012 (0.022)	0.012 (0.029)	-0.015 (0.034)	0.009 (0.026)	0.007 (0.037)	-0.013 (0.024)	0.019 (0.023)
Extraversion Zscore	0.016 (0.020)	0.022 (0.024)	-0.014 (0.034)	0.058* (0.036)	0.002 (0.032)	-0.060* (0.032)	-0.004 (0.022)	-0.020 (0.025)
Openness to Experience Zscore	-0.006 (0.021)	-0.020 (0.025)	-0.010 (0.029)	-0.039 (0.029)	0.016 (0.026)	0.057** (0.029)	-0.001 (0.019)	0.002 (0.028)
Agreeableness Zscore	-0.003 (0.019)	0.006 (0.034)	0.014 (0.033)	-0.025 (0.038)	-0.010 (0.031)	0.013 (0.029)	-0.002 (0.022)	0.006 (0.025)
Neuroticism Zscore	-0.003 (0.014)	0.032** (0.013)	0.024 (0.020)	-0.009 (0.025)	-0.026 (0.020)	0.003 (0.023)	0.005 (0.016)	-0.027* (0.015)
Instrumented Cognitive Test Zscore	0.020 (0.050)	-0.002 (0.058)	-0.126** (0.057)	-0.186*** (0.072)	0.147*** (0.054)	0.191*** (0.076)	-0.042 (0.059)	-0.003 (0.053)
Grade	-0.012 (0.011)	-0.010 (0.012)	-0.028** (0.014)	-0.016 (0.018)	0.012 (0.013)	0.007 (0.018)	0.028** (0.014)	0.019* (0.011)
Currently Married	0.112*** (0.040)	-0.033 (0.097)	0.067* (0.036)	0.029 (0.049)	-0.065** (0.029)	-0.026 (0.040)	-0.114*** (0.037)	0.030 (0.133)
Age of Job Entry	0.000 (0.004)	-0.001 (0.002)	-0.014*** (0.005)	-0.031*** (0.006)	0.017*** (0.006)	0.035*** (0.005)	-0.004 (0.003)	-0.003 (0.003)

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 16: Estimated Coefficients on within Sector Earnings**

	<u>Pooled Sectors</u>		<u>Informal Sector</u>			
	OLS	IV	<u>No Selection Correction</u>		<u>Selection Correction</u>	
			OLS	IV	OLS	IV
	1	2	3	4	5	6
Conscientiousness Zscore	0.2423 (0.308)	0.2810 (0.329)	0.1003 (0.337)	0.1121 (0.301)	0.1635 (0.356)	0.1688 (0.315)
Extraversion Zscore	-0.3803 (0.391)	-0.3402 (0.369)	-0.2844 (0.439)	-0.4317 (0.438)	-0.3204 (0.497)	-0.5954 <sup>+</sup> (0.417)
Openness to Experience Zscore	0.5830 <sup>**</sup> (0.287)	0.5486 <sup>*</sup> (0.299)	0.7764 <sup>**</sup> (0.321)	0.6895 <sup>**</sup> (0.293)	0.8482 <sup>**</sup> (0.385)	0.8251 <sup>**</sup> (0.357)
Agreeableness Zscore	0.0975 (0.301)	-0.0192 (0.272)	0.0535 (0.354)	0.0654 (0.336)	0.0145 (0.373)	0.0682 (0.404)
Neuroticism Zscore	-0.1604 (0.224)	-0.2748 (0.281)	-0.0728 (0.253)	-0.1134 (0.250)	-0.0869 (0.309)	-0.1748 (0.277)
Selection Term					0.6252 (0.461)	0.7917 <sup>+</sup> (0.509)
Standardized Cognitive Test Score	0.1328 (0.310)	-2.0076 <sup>**</sup> (0.861)	0.0590 (0.339)	-1.2905 <sup>*</sup> (0.761)	0.0713 (0.370)	-1.2939 <sup>+</sup> (0.829)
Grade	-0.1628 <sup>*</sup> (0.085)	0.0712 (0.206)	-0.1520 <sup>*</sup> (0.093)	-0.0097 (0.174)	-0.1393 (0.102)	0.1544 (0.273)
Age of Job Entry	-0.0010 (0.060)	0.0178 (0.063)	0.0038 (0.081)	0.0601 (0.074)	0.0795 (0.101)	0.1529 <sup>+</sup> (0.099)
Male	-0.4373 (1.458)	1.0027 (1.812)	1.1209 (1.759)	1.2985 (2.298)	-0.6295 (1.873)	1.5910 (2.287)
Age	0.2191 <sup>**</sup> (0.104)	0.1733 <sup>*</sup> (0.098)	0.1278 (0.126)	0.0430 (0.138)	0.0819 (0.131)	-0.0228 (0.122)
2004 Household Asset Index	0.2339 (0.185)	0.5554 <sup>**</sup> (0.227)	0.4090 <sup>*</sup> (0.253)	0.6498 <sup>**</sup> (0.268)	0.8071 <sup>***</sup> (0.306)	0.9408 <sup>***</sup> (0.302)
Mother's Highest Grade	-0.0411 (0.051)	0.0313 (0.059)	-0.0459 (0.062)	0.0214 (0.070)	-0.0061 (0.080)	0.0309 (0.081)
Father's Highest Grade	0.0882 <sup>*</sup> (0.046)	0.1314 <sup>***</sup> (0.051)	0.0240 (0.054)	0.0626 (0.067)	0.0072 (0.057)	0.0272 (0.071)
Years at Job	-0.3363 <sup>***</sup> (0.123)	-0.3066 <sup>**</sup> (0.127)	-0.3507 <sup>**</sup> (0.137)	-0.2705 <sup>*</sup> (0.147)	-0.3496 <sup>**</sup> (0.151)	-0.3430 <sup>**</sup> (0.142)
Years at Job Squared	0.0084 (0.009)	0.0067 (0.011)	0.0078 (0.010)	0.0054 (0.011)	0.0122 (0.012)	0.0135 (0.012)
Urban	1.1848 <sup>**</sup> (0.460)	0.7884 (0.573)	1.1993 <sup>**</sup> (0.554)	0.6456 (0.592)	1.4639 <sup>**</sup> (0.639)	1.0291 <sup>*</sup> (0.560)
2012 Community Health Index	0.5785 (0.489)	0.4267 (0.422)	0.1910 (0.556)	-0.0566 (0.607)	-0.0768 (0.594)	0.0681 (0.583)
2012 Community Infrastructure Index	-1.2667 <sup>***</sup> (0.247)	-0.9598 <sup>***</sup> (0.301)	-1.1905 <sup>***</sup> (0.286)	-0.8758 <sup>**</sup> (0.357)	-1.2192 <sup>***</sup> (0.305)	-0.9691 <sup>***</sup> (0.302)
Works in Formal Sector	3.4159 <sup>***</sup> (0.366)	3.3371 <sup>***</sup> (0.389)				
Regional Dummies	YES	YES	YES	YES	YES	YES
Male X Conscientiousness	0.4085 (0.469)	0.3154 (0.417)	0.8241 <sup>+</sup> (0.577)	0.6421 (0.482)	0.4991 (0.606)	0.5373 (0.524)
Male X Extraversion	0.0035 (0.557)	-0.0645 (0.582)	-0.1594 (0.649)	-0.0044 (0.466)	-0.2733 (0.687)	-0.0745 (0.654)
Male X Openness	-0.8131 <sup>**</sup>	-0.6121	-0.8900 <sup>**</sup>	-0.6987 <sup>*</sup>	-0.7943 <sup>*</sup>	-0.6442



	(0.375)	(0.462)	(0.432)	(0.362)	(0.460)	(0.469)
Male X Agreeableness	-0.2732	-0.2207	-0.2502	-0.3222	-0.1677	-0.2826
	(0.446)	(0.442)	(0.550)	(0.441)	(0.571)	(0.382)
Male X Neuroticism	0.1880	0.2335	-0.0054	-0.0972	-0.3178	-0.2240
	(0.319)	(0.326)	(0.366)	(0.364)	(0.408)	(0.621)
Male X Cognitive Test Score	-0.8080**	-0.1615	-1.0657**	-0.0020	-0.8502*	-0.3497
	(0.402)	(0.957)	(0.484)	(0.272)	(0.514)	(0.939)
Male X Grade	0.1189	-0.0093	0.0679	-0.8235	0.0751	-0.1101
	(0.110)	(0.234)	(0.136)	(1.081)	(0.136)	(0.285)
Male X Age at First Job	0.0197	0.0113	-0.0726	-0.0259	0.0623	0.0323
	(0.074)	(0.079)	(0.091)	(0.084)	(0.101)	(0.098)
Constant	0.9684	-1.0445	2.3137	0.8368	2.3146	0.4209
	(1.923)	(2.299)	(2.283)	(2.802)	(2.350)	(2.913)
Observations	982	982	741	741	729	729
R-squared	0.271	0.272	0.195	0.201	0.205	0.212

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 16 (cont.): Estimated Coefficients on within Sector Earnings**

	<b>Formal Sector</b>			
	<b>No Selection Correction</b>		<b>Selection Correction</b>	
	<b>OLS</b>	<b>IV</b>	<b>OLS</b>	<b>IV</b>
	7	8	9	10
Conscientiousness Zscore	1.4142 <sup>*</sup> (0.814)	1.6291 <sup>*</sup> (0.994)	1.8278 <sup>*</sup> (1.097)	1.8435 <sup>**</sup> (0.852)
Extraversion Zscore	-0.8832 (0.801)	-0.6426 (0.908)	-1.3294 -1.055	-1.1655 (0.908)
Openness to Experience Zscore	-0.9760 (0.726)	-1.2938 <sup>+</sup> (0.899)	-0.9245 (0.959)	-1.1423 (0.848)
Agreeableness Zscore	-0.1519 (0.534)	-0.2457 (0.688)	-0.0884 (0.650)	-0.1667 (0.779)
Neuroticism Zscore	-0.7383 (0.562)	-1.3233 <sup>*</sup> (0.752)	-1.0029 (0.715)	-1.4900 <sup>**</sup> (0.582)
Selection Term			0.0009 (0.266)	0.0018 (0.363)
Standardized Cognitive Test Score	-0.2385 (0.711)	-3.6512 (2.741)	-0.1441 (0.729)	-3.7845 (2.738)
Grade	0.0997 (0.162)	0.9356 <sup>*</sup> (0.515)	0.1579 (0.201)	0.9554 <sup>*</sup> (0.548)
Age of Job Entry	-0.0177 (0.103)	-0.0116 (0.144)	-0.0235 (0.195)	-0.0461 (0.238)
Male	-1.5498 (2.508)	7.0897 (5.721)	-0.3322 (3.238)	7.0041 (5.338)
Age	0.2062 (0.219)	0.3471 <sup>*</sup> (0.208)	0.2102 (0.245)	0.3257 <sup>*</sup> (0.182)
2004 Household Asset Index	-0.2705 (0.250)	0.0142 (0.380)	-0.1542 (0.271)	0.0233 (0.396)
Mother's Highest Grade	-0.0744 (0.087)	-0.0401 (0.118)	-0.0696 (0.098)	-0.0192 (0.142)
Father's Highest Grade	0.2088 <sup>**</sup> (0.089)	0.2146 <sup>*</sup> (0.111)	0.2209 <sup>**</sup> (0.098)	0.2298 <sup>***</sup> (0.082)
Years at Job	0.5967 <sup>+</sup> (0.379)	0.2844 (0.502)	0.5003 (0.416)	0.2862 (0.436)
Years at Job Squared	-0.1159 <sup>**</sup> (0.052)	-0.0822 (0.070)	-0.0955 <sup>+</sup> (0.060)	-0.0804 (0.064)
Urban	0.7232 (0.896)	0.7417 (0.940)	0.7970 (1.090)	0.8668 (1.084)
2012 Community Health Index	3.3515 <sup>***</sup> (1.258)	2.3528 <sup>*</sup> (1.381)	3.4056 <sup>**</sup> (1.438)	2.5128 <sup>*</sup> (1.303)
2012 Community Infrastructure Index	-1.0183 <sup>*</sup> (0.533)	-1.1423 <sup>*</sup> (0.640)	-1.1237 <sup>*</sup> (0.579)	-1.1520 <sup>**</sup> (0.489)
Works in Formal Sector				
Regional Dummies	YES	YES	YES	YES
Male X Conscientiousness	-1.4421 <sup>+</sup> (0.998)	-1.6441 (1.204)	-1.8485 <sup>+</sup> (1.241)	-1.9337 <sup>+</sup> (1.275)
Male X Extraversion	0.3046 (1.026)	0.1064 (1.110)	0.7476 (1.275)	0.7097 (1.297)
Male X Openness	0.3314 (0.837)	0.8543 (0.937)	0.2630 (1.003)	0.6887 (0.947)

Male X Agreeableness	0.7592 (0.730)	0.5958 (0.902)	0.6070 (0.878)	0.4667 (1.027)
Male X Neuroticism	1.2601* (0.707)	1.8338** (0.855)	1.6220** (0.813)	2.0078*** (0.603)
Male X Cognitive Test Score	-0.2785 (0.824)	2.3414 (2.400)	-0.3572 (0.869)	2.4106 (2.406)
Male X Grade	0.0719 (0.195)	-0.6952 (0.555)	0.0289 (0.233)	-0.7442 (0.559)
Male X Age at First Job	0.1484 (0.134)	0.0260 (0.172)	0.1248 (0.163)	0.0585 (0.179)
Constant	1.6138 (3.706)	-7.3748 (6.222)	0.7312 (6.324)	-6.8370 (9.228)
Observations	225	225	221	221
R-squared	0.219	0.232	0.226	0.243

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 17: Marginal Effects of Personality, Cognition, and Grade on Male and Female Earnings**

	Informal							
	No Selection Correction				With Selection Correction			
	OLS		IV		OLS		IV	
	Females	Males	Females	Males	Females	Males	Females	Males
Conscientiousness Zscore	0.100 (0.337)	0.924** (0.460)	0.112 (0.301)	0.754** (0.387)	0.164 (0.356)	0.663 (0.483)	0.169 (0.315)	0.706* (0.431)
Extraversion Zscore	-0.284 (0.439)	-0.444 (0.480)	-0.432 (0.438)	-0.436 (0.420)	-0.32 (0.497)	-0.594 (0.513)	-0.595+ (0.417)	-0.67+ (0.45)
Openness Zscore	0.776** (0.321)	-0.114 (0.305)	0.690** (0.293)	-0.009 (0.271)	0.848** (0.385)	0.054 (0.344)	0.825** (0.357)	0.181 (0.31)
Agreeableness Zscore	0.053 (0.354)	-0.197 (0.415)	0.065 (0.336)	-0.257 (0.341)	0.015 (0.373)	-0.153 (0.426)	0.068 (0.404)	-0.156 (0.445)
Neuroticism Zscore	-0.073 (0.253)	-0.078 (0.269)	-0.113 (0.250)	-0.211 (0.220)	-0.087 (0.309)	-0.405 (0.327)	-0.175 (0.277)	0.457+ (0.297)
Cognitive Test Score Aggregate	0.059 (0.339)	-1.007*** (0.370)	-1.29* (0.761)	-2.114** (1.084)	0.071 (0.370)	-0.779** (0.380)	-1.294+ (0.829)	1.644** (0.823)
Grade	-0.152* (0.093)	-0.084 (0.106)	-0.010 (0.174)	-0.012 (0.212)	-0.139 (0.102)	-0.064 (0.102)	0.154 (0.273)	0.044 (0.241)
Formal Sector								
	Females	Males	Females	Males	Females	Males	Females	Males
Conscientiousness Zscore	1.414* (0.814)	-0.028 (0.559)	1.629* (1.005)	-0.015 (0.608)	1.828* (1.097)	-0.021 (0.597)	1.844* (1.07)	-0.090 (0.589)
Extraversion Zscore	-0.883 (0.801)	-0.579 (0.699)	-0.643 (1.029)	-0.536 (0.777)	-1.329 (1.055)	-0.582 (0.773)	-1.165 (0.836)	-0.456 (0.813)
Openness Zscore	-0.976 (0.726)	-0.645+ (0.436)	-1.294* (0.707)	-0.44 (0.469)	-0.924 (0.959)	-0.661 (0.485)	-1.142+ (0.810)	-0.454 (0.525)
Agreeableness Zscore	-0.152 (0.534)	0.607 (0.480)	-0.246 (0.678)	0.350 (0.525)	-0.088 (0.650)	0.519 (0.557)	-0.167 (0.791)	0.300 (0.499)
Neuroticism Zscore	-0.738 (0.562)	0.522 (0.451)	-1.323** (0.658)	0.511 (0.363)	-1.003 (0.715)	0.619 (0.515)	-1.49** (0.723)	0.518 (0.435)
Cognitive Test Score Aggregate	-0.238 (0.711)	-0.517 (0.446)	-3.651+ (2.463)	-1.31 (1.886)	-0.144 (0.729)	-0.501 (0.492)	-3.785 (2.585)	-1.374 (2.053)
Grade	0.100 (0.162)	0.172+ (0.113)	0.936* (0.549)	0.240 (0.266)	0.158 (0.201)	0.187+ (0.124)	0.955* (0.568)	0.211 (0.364)
Formal and Informal Sectors Pooled								
	Females	Males	Females	Males				
Conscientiousness Zscore	0.242 (0.308)	0.651* (0.354)	0.281 (0.356)	0.596* (0.338)				
Extraversion Zscore	-0.38 (0.391)	-0.377 (0.404)	-0.34 (0.391)	-0.405 (0.387)				
Openness Zscore	0.583** (0.287)	-0.23 (0.256)	0.549* (0.309)	-0.064 (0.295)				
Agreeableness Zscore	0.097 (0.301)	-0.176 (0.322)	-0.019 (0.301)	-0.24 (0.295)				
Neuroticism Zscore	-0.16 (0.224)	0.028 (0.231)	-0.275 (0.211)	-0.041 (0.238)				
Cognitive Test Score Aggregate	0.133 (0.310)	-0.675** (0.280)	-2.008** (0.824)	-2.169*** (0.869)				

Grade	-0.163 <sup>*</sup>	-0.044	0.071	0.062
	(0.085)	(0.077)	(0.172)	(0.176)

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Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Appendix

**Table A1: Openness to Experience Measurements**

	<u>Mean</u>	<u>Std.</u> <u>Dev.</u>	<u>Min</u>	<u>Max</u>
I find the world very interesting	3.4311	1.066	1	5
I am never bored	3.8074	0.8355	1	5
I am proficient in several areas	3.019	1.0338	1	5
I am always busy with something interesting	3.6604	0.8602	1	5
I am interested in many things	3.1393	1.043	1	5
In any situation I can find something interesting	3.1142	0.9656	1	5
I think my life is very interesting	3.2809	0.9649	1	5
I am very interested in other countries and their cultures	3.2378	1.136	1	5
I am not very curious about what is happening in the world	2.6983	1.0739	1	5
I am interested in very few things	2.314	0.9426	1	5

**Table A2 : Conscientiousness Measurements**

	<u>Mean</u>	<u>Std. Dev.</u>	<u>Min</u>	<u>Max</u>
I am always ready	4.232	0.7408	1	5
I love to bring order	4.1423	0.7	1	5
I do things quickly	3.7816	0.8333	1	5
I never leave a task without completeing it	3.8899	0.8424	1	5
I like to step up to the plate	4.0562	0.7486	1	5
I am always up to my jobs/tasks	3.9795	0.7731	1	5
I always keep my promises	4.0287	0.7736	1	5
I like to tidy up	4.161	0.6693	1	5
I benefit well from my work	3.714	0.8906	1	5
I never leave work to be done	3.6405	0.8943	1	5
I do my job without waiting	3.8273	0.805	1	5
I like when everything is in its place	4.1706	0.654	1	5
I finish tasks no matter what obstacles encountered	3.5386	0.9475	1	5
I start work without delay	3.8589	0.8176	1	5
I like ordering things around me	3.8466	0.7961	1	5
I can clearly articulate ideas	3.6036	0.8498	1	5
I always keep my word	4.024	0.7492	1	5
I like order and regularity	4.1434	0.6939	1	5
I always act first	3.6447	0.8812	1	5
I work with conviction	4.1781	0.6612	1	5
I am a workaholic	3.4646	0.968	1	5
I am a planner	3.2162	1.0027	1	5
I can bounce back after challenges	3.7335	0.8795	1	5
I am faithful to my own values	3.8664	0.9077	1	5
I do things by following a plan	3.8049	0.8153	1	5
I quickly realize the tasks to do	3.6452	0.8407	1	5
I am not distracted when I work	3.7067	0.8846	1	5
I immediately begin my chores	3.8799	0.7526	1	5
I am a person who sets goals	4.082	0.7488	1	5
I pay attention to detail	3.8202	0.8217	1	5

**Table A3: Extraversion Measurements**

	<u>Mean</u>	<u>Std. Dev.</u>	<u>Min</u>	<u>Max</u>
I get involved in community/collective activities	3.9918	0.8363	1	5
I like to animate groups	3.1517	1.095	1	5
I like belonging to a group	3.7278	0.9096	1	5
I can captivate people's attention	3.1598	0.9853	1	5
I can keep my cool	3.945	0.7471	1	5
I take the initiative in conversations	3.784	0.8354	1	5
I talk easily	3.2412	1.0591	1	5
I can clearly articulate ideas	3.6036	0.8498	1	5
I interact with different people when they are gathered	3.7458	0.8428	1	5
I am uncomfortable working in a group	2.1945	0.9444	1	5
I always have something to say	2.7206	0.9702	1	5
I like to draw attention to myself	2.8036	1.0521	1	5
I am not usually talkative	3.1003	0.997	1	5
I prefer to do it alone	2.5329	1.0009	1	5
I am not talkative	3.0592	0.9997	1	5
I have trouble expressing my feelings	2.693	1.0355	1	5
I work better when I'm alone	3.0568	1.0799	1	5
I do not like to take the lead	3.3175	1.0145	1	5
I wait for others to lead the way	2.587	1.0475	1	5
I keep to myself	3.1567	1.0937	1	5
I do not talk a lot	3.0439	1.0191	1	5
I rarely associate with others	2.0334	0.8765	1	5
I try not to attract attention to myself	2.864	1.1806	1	5
I'm afraid to draw attention to myself	2.7013	1.0785	1	5
I leave others to take the initiative	2.16	0.8988	1	5
I leave others to decide	2.2724	0.9446	1	5
I feel comfortable with people	3.8729	0.8385	1	5
I am a team player	3.9531	0.7876	1	5



**Table A4: Agreeableness Measurements**

	<u>Mean</u>	<u>Std. Dev.</u>	<u>Min</u>	<u>Max</u>
I get involved in community/collective activities	3.9918	0.8363	1	5
I like belonging to a group	3.7276	0.9096	1	5
I think honesty is the basis of trust	4.1107	0.8364	1	5
I always keep my word	4.024	0.7492	1	5
I respect the decisions of the group	4.0698	0.7066	1	5

**Table A5: Neuroticism Measurements**

	<u>Mean</u>	<u>Std. Dev.</u>	<u>Min</u>	<u>Max</u>
I have often worried	2.7822	1.0794	1	5
I am not often worried	3.1987	1.0505	1	5
I am often sad	2.2237	0.9623	1	5
I feel hopeless	2.2168	0.9887	1	5
I have mood swings	3.7036	0.9111	1	5
I can bounce back after challenges	3.7335	0.8795	1	5
I have a bad feeling about what is going to happen	2.2425	1.0305	1	5
I panic easily	2.2015	0.9466	1	5
I lie to get out of things	2.085	1.0118	1	5
I see problems everywhere	2.4671	1.0085	1	5
I am rarely angry	3.2019	1.1439	1	5
I get frustrated quickly	2.2806	0.941	1	5
I have trouble expressing my feelings	2.693	1.0355	1	5
I am a difficult person to understand	2.8143	1.0515	1	5
I give up easily	2.0234	0.8925	1	5
I get discouraged easily	2.0152	0.8768	1	5
I rarely worry	3.225	0.9958	1	5
I sometimes feel dishonest	1.8089	0.8451	1	5
I am easily intimidated	2.0299	0.8768	1	5
It's often difficult for me to have fun	2.3705	1.0309	1	5
I exaggerate my troubles	2.0709	0.8706	1	5
I fear the worst will happen	2.7825	1.1412	1	5
I am unflappable	3.2151	1.045	1	5
I have a lot of fun	2.9795	0.9856	1	5
I'm consumed by my own problems	2.2973	0.947	1	5

**Table A6: Openness to Experience Estimates**

	<b>Factor Loading</b>	<b>Constant</b>
I find the world very interesting	1.0000	3.4310***
I am never bored	0.4714***	3.8080***
I am proficient in several areas	0.6707***	3.0206***
I am always busy with something interesting	0.7073***	3.6624***
I am interested in many things	0.6845***	3.1368***
In any situation I can find something interesting	0.8995***	3.1133***
I think my life is very interesting	0.7382***	3.2813***
I am very interested in other countries and their cultures	1.1427***	3.2372***
I am not very curious about what is happening in the world	-0.4902***	2.6976***
I am interested in very few things	-0.1742***	2.3147***

**Table A7: Conscientiousness Estimates**

	<b>Factor Loading</b>	<b>Constant</b>
I am always ready	1.0000	4.2289***
I love to bring order	0.9489***	4.1407***
I do things quickly	1.2030***	3.7812***
I never leave a task without completeing it	1.2790***	3.8906***
I like to step up to the plate	1.3252***	4.0532***
I am always up to my jobs/tasks	1.4385***	3.9787***
I always keep my promises	1.3067***	4.0272***
I like to tidy up	1.0557***	4.1591***
I benefit well from my work	1.3832***	3.7114***
I never leave work to be done	1.3590***	3.6387***
I do my job without waiting	1.3382***	3.8273***
I like when everything is in its place	0.9487***	4.1697***
I finish tasks no matter what obstacles encountered	1.4048***	3.5376***
I start work without delay	1.3734***	3.8587***
I like ordering things around me	1.1400***	3.8439***
I can clearly articulate ideas	1.3056***	3.5985***
I always keep my word	1.2625***	4.0219***
I like order and regularity	1.1098***	4.1431***
I always act first	1.1263***	3.6458***
I work with conviction	0.9899***	4.1750***
I am a workaholic	1.3058***	3.4624***
I am a planner	1.1236***	3.2170***
I can bounce back after challenges	1.5037***	3.7321***
I am faithful to my own values	1.2373***	3.8622***
I do things by following a plan	1.3231***	3.8025***
I quickly realize the tasks to do	1.2905***	3.6452***
I am not distracted when I work	1.0688***	3.7067***
I immediately begin my chores	1.2344***	3.8817***
I am a person who sets goals	1.2342***	4.0816***
I pay attention to detail	1.1054***	3.8196***

**Table A8: Extroversion Estimates**

	<b>Factor Loading</b>	<b>Constant</b>
I get involved in community/collective activities	1.0000	3.9923***
I like to animate groups	0.9976***	3.1530***
I like belonging to a group	1.0798***	3.7271***
I can captivate people's attention	0.8997***	3.1607***
I can keep my cool	0.8390***	3.9468***
I take the initiative in conversations	1.0952***	3.7844***
I talk easily	0.7552***	3.2392***
I can clearly articulate ideas	0.9967***	3.6060***
I interact with different people when they are gathered	1.0291***	3.7460***
I am uncomfortable working in a group	-0.7069***	2.1955***
I always have something to say	0.5207***	2.7212***
I like to draw attention to myself	0.7325***	2.8021***
I am not usually talkative	-0.4272***	3.1010***
I prefer to do it alone	-0.2628***	2.5346***
I am not talkative	-0.5708***	3.0602***
I have trouble expressing my feelings	-0.6399***	2.6929***
I work better when I'm alone	0.0865	3.0561***
I do not like to take the lead	-0.1796***	3.3207***
I wait for others to lead the way	-0.3261***	2.5883***
I keep to myself	-0.1505**	3.1559***
I do not talk a lot	-0.5989***	3.0443***
I rarely associate with others	-0.7581***	2.0307***
I try not to attract attention to myself	-0.6578***	2.8641***
I'm afraid to draw attention to myself	-0.6918***	2.6988***
I leave others to take the initiative	-0.8393***	2.1577***
I leave others to decide	-0.7280***	2.2705***
I feel comfortable with people	0.8178***	3.8748***
I am a team player	0.9104***	3.9545***

**Table A9: Agreeableness Estimates**

	<b>Factor Loading</b>	<b>Constant</b>
I get involved in community/collective activities	1.0000	3.9924***
I like belonging to a group	0.9792***	3.7273***
I think honesty is the basis of trust	0.5626***	4.1097***
I always keep my word	0.6772***	4.0240***
I respect the decisions of the group	0.6460***	4.0698***

**Table A10: Neuroticism Estimates**

	<b>Factor Loading</b>	<b>Constant</b>
I have often worried	1.0000	2.7825***
I am not often worried	-0.5230***	3.1974***
I am often sad	1.0921***	2.4965***
I feel hopeless	1.1355***	2.2169***
I have mood swings	0.2514***	3.7021***
I can bounce back after challenges	-0.4762***	3.7305***
I have a bad feeling about what is going to happen	0.7088***	2.2470***
I panic easily	1.0688***	2.2045***
I lie to get out of things	0.5988***	2.0857***
I see problems everywhere	0.9497***	2.4675***
I am rarely angry	-0.0347	3.2033***
I get frustrated quickly	0.9652***	2.2825***
I have trouble expressing my feelings	0.9433***	2.6950***
I am a difficult person to understand	0.7272***	2.8174***
I give up easily	1.0426***	2.0266***
I get discouraged easily	1.1387***	2.0165***
I rarely worry	-0.1413***	3.2287***
I sometimes feel dishonest	0.9316***	1.8085***
I am easily intimidated	0.9783***	2.0307***
It's often difficult for me to have fun	0.7225***	2.3729***
I exaggerate my troubles	0.8541***	2.0751***
I fear the worst will happen	1.1304***	2.7843***
I am unflappable	-0.3405***	3.2122***
I have a lot of fun	-0.1185**	2.9775***
I'm consumed by my own problems	1.0307***	2.2991***

**Table A11: First-Stage Prediction for Grade Attainment and Cognitive Test Scores**

	Grade	Cognitive Test Score
Conscientiousness Zscore	0.0080 (0.104)	-0.0338 (0.029)
Extraversion Zscore	-0.0445 (0.114)	0.0237 (0.030)
Openness to Experience Zscore	0.2247** (0.090)	0.0503** (0.024)
Agreeableness Zscore	0.0876 (0.103)	-0.0121 (0.027)
Neuroticism Zscore	-0.0682 (0.071)	-0.0426** (0.019)
Male	-0.2583** (0.125)	0.0387 (0.034)
Mother's Education	0.0813*** (0.021)	0.0139** (0.006)
Father's Education	0.1077*** (0.021)	0.0069 (0.006)
2004 Household Asset Index	0.1846* (0.095)	0.0604** (0.024)
2012 Nonlabor Income Transfers	0.0000 (0.000)	0.0000 (0.000)
2004 Nonlabor Income Transfers	0.0000*** (0.000)	-0.0000 (0.000)
2004 Household Size	0.0582 (0.051)	0.0151 (0.013)
Number of Kids<17 yrs in 2004	-0.1132* (0.063)	-0.0235 (0.016)
2004 Primary School Facilities Quality Index	0.0081 (0.127)	0.0121 (0.032)
2004 Distance between Town Center and Primary School	-0.0706 (0.061)	0.0160 (0.017)
2004 Primary School Participation in Nutrition Program	-0.2629** (0.131)	0.0860** (0.034)
2004 Private School in Community	0.0394 (0.167)	-0.0173 (0.042)
2004 Community Health Index	-0.1602* (0.099)	0.0103 (0.027)
2004 Community Infrastructure Index	0.0097 (0.120)	0.1256*** (0.033)
2004 Remoteness Index	-0.0587 (0.063)	-0.0842*** (0.017)
Formal Account a Primary Savings Method	0.2590 (0.212)	-0.2805*** (0.056)
Bank is a Primary Source for Large Loans	-0.3139* (0.173)	0.1244** (0.049)
Regional Dummies	YES	YES

Death of Mother	-0.2845 (0.225)	0.1338** (0.067)
Death of Father	0.1366 (0.173)	-0.0027 (0.047)
Mother Illness/Injury	-0.2898* (0.173)	-0.0108 (0.047)
Father Illness/Injury	0.0122 (0.178)	0.0505 (0.047)
Positive Income Shock before Age 10	0.0928 (0.202)	0.0244 (0.053)
Positive Income Shock between Ages 10 and 14	-0.1956 (0.165)	0.0983** (0.044)
Positive Income Shock after Age 14	0.1105 (0.150)	-0.0461 (0.039)
Negative Income Shock before Age 10	-0.0446 (0.184)	-0.0235 (0.049)
Negative Income Shock between Ages 10 and 14	0.0597 (0.179)	-0.0671 (0.047)
Negative Income Shock after Age 14	-0.2592 (0.162)	0.0168 (0.043)
Standardized Aggregate Cognitive Test Score	2.3437*** (0.084)	0.1664*** (0.007)
Constant	8.0491*** (0.355)	-1.3089*** (0.113)
Observations	1,242	1,242
R-squared	0.653	0.666

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A12: Hazard of Age of Entry into the Labor Market**

	(1)	(2)	(3)	(4)	(5)
Conscientiousness Zscore	-0.0489 (0.048)	-0.1023* (0.058)	-0.0604 (0.058)	-0.0687 (0.059)	-0.0635 (0.060)
Extraversion Zscore	-0.0325 (0.051)	-0.0004 (0.058)	-0.0085 (0.058)	-0.0017 (0.058)	0.0047 (0.059)
Openness to Experience Zscore	0.1924*** (0.038)	-0.0277 (0.047)	-0.0960** (0.048)	-0.0264 (0.052)	-0.0336 (0.058)
Agreeableness Zscore	0.0647 (0.044)	0.0283 (0.052)	0.0328 (0.052)	0.0454 (0.053)	0.0506 (0.054)
Neuroticism Zscore	-0.0287 (0.031)	-0.0860** (0.037)	-0.0258 (0.038)	-0.0314 (0.039)	-0.0289 (0.042)
Aggregate Cognitive Test Zscore		0.5875*** (0.054)	-0.0067 (0.103)	0.5223*** (0.188)	0.6306*** (0.222)
Cognitive Test First-Stage Predicted Residual		0.2303*** (0.068)	0.3386*** (0.109)	0.6785*** (0.196)	0.7736*** (0.228)
Male			0.1361** (0.065)	0.1081* (0.066)	0.0876 (0.067)
2004 Household Asset Index			0.2179*** (0.049)	0.1573*** (0.052)	-0.1197** (0.057)
2012 Nonlabor Income Transfers			-0.0001* (0.000)	-0.0000 (0.000)	-0.0000 (0.000)
2004 Nonlabor Income Transfers			0.0000*** (0.000)	0.0000*** (0.000)	0.0000*** (0.000)
Mother's Highest Grade			0.0456*** (0.013)	-0.0245* (0.014)	-0.0262* (0.016)
Father's Highest Grade			0.0395*** (0.012)	-0.0127 (0.014)	-0.0096 (0.016)
2004 Household Size			-0.0115 (0.023)	-0.0091 (0.023)	-0.0170 (0.024)
Number of Kids<17 yrs in 2004			0.0197 (0.030)	-0.0001 (0.030)	0.0046 (0.031)
Highest Grade Attained				0.2421*** (0.066)	0.2517*** (0.078)
Predicted Residual from (1)				0.1585** (0.067)	0.1651** (0.079)
2004 Community Health Index					-0.0842 (0.053)
2004 Community Infrastructure Index					-0.1161* (0.066)
2004 Remoteness Index					0.0107 (0.042)
Formal Account a Primary Savings Method					-0.0687 (0.126)
Bank is a Primary Source for Large Loans					0.1244 (0.095)



Regional Dummies  
 Positive Income Shock before Age 10  
 Positive Income Shock between Ages 10 and 14  
 Positive Income Shock after Age 14  
 Negative Income Shock before Age 10  
 Negative Income Shock between Ages 10 and 14  
 Negative Income Shock after Age 14  
 Death of Mother  
 Death of Father  
 Mother Illness/Injury  
 Father Illness/Injury  
 Interactions between Shocks and Personality Traits and Cognition  
 Interactions between Male and Personality Traits and Cognition  
 Interactions between Male and Shocks  
 Interactions between Male, Shocks, and Personality Traits and Cognition

Observations	1,660	1,220	1,220	1,202	1,202
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Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A12 (cont.): Hazard of Age of Entry into the Labor Market**

	(6)	(7)	(8)	(9)
Conscientiousness Zscore	-0.1414** (0.063)	0.0299 (0.107)	0.1565 (0.151)	-0.0560 (0.185)
Extraversion Zscore	0.0436 (0.061)	-0.0251 (0.072)	-0.1871 (0.125)	-0.1569 (0.161)
Openness to Experience Zscore	0.0336 (0.081)	-0.6910* (0.423)	-0.7611* (0.445)	-1.0091** (0.475)
Agreeableness Zscore	0.0483 (0.055)	0.0043 (0.066)	0.0572 (0.118)	0.1250 (0.157)
Neuroticism Zscore	-0.0590 (0.052)	0.3307 (0.210)	0.3323 (0.226)	0.4140* (0.249)
Aggregate Cognitive Test Zscore	-0.2684 (0.401)	2.6670* (1.395)	2.6535* (1.420)	2.9376** (1.469)
Cognitive Test First-Stage Predicted Residual	0.1061 (0.400)	-2.8295** (1.396)	-2.8323** (1.422)	-3.1374** (1.467)
Male	0.0955 (0.070)	0.2283* (0.122)	0.2434* (0.126)	0.5632*** (0.179)
2004 Household Asset Index	-0.0566 (0.081)	-0.7898* (0.411)	-0.7971* (0.418)	-1.0390** (0.435)
2012 Nonlabor Income Transfers	-0.0000 (0.000)	-0.0001 (0.000)	-0.0001 (0.000)	-0.0001** (0.000)
2004 Nonlabor Income Transfers	0.0000*** (0.000)	-0.0000 (0.000)	-0.0000 (0.000)	-0.0000 (0.000)
Mother's Highest Grade	-0.0151 (0.025)	-0.2500* (0.138)	-0.2530* (0.141)	-0.3477** (0.147)
Father's Highest Grade	-0.0004 (0.025)	-0.2261* (0.137)	-0.2318* (0.139)	-0.3341** (0.146)
2004 Household Size	-0.0034 (0.027)	-0.1877* (0.103)	-0.1835* (0.105)	-0.2611** (0.110)
Number of Kids<17 yrs in 2004	-0.0192 (0.040)	0.3013* (0.183)	0.2996 (0.186)	0.4406** (0.194)
Highest Grade Attained	-0.1142 (0.110)	0.4125 (0.449)	0.4229 (0.460)	0.8493* (0.482)
Predicted Residual from (1)	0.0330 (0.110)	-0.4919 (0.448)	-0.5062 (0.459)	-0.9376* (0.481)
2004 Community Health Index	-0.0612 (0.055)	0.1291 (0.138)	0.1667 (0.141)	0.2678* (0.148)
2004 Community Infrastructure Index	-0.0032 (0.096)	-0.8596* (0.479)	-0.8946* (0.488)	-1.2182** (0.509)
2004 Remoteness Index	-0.0463 (0.070)	0.6478* (0.388)	0.6350 (0.395)	0.8612** (0.412)
Formal Account a Primary Savings Method	-0.3466* (0.178)	1.1010 (0.746)	1.1139 (0.759)	1.3970* (0.788)
Bank is a Primary Source for Large Loans	0.2438** (0.107)	-0.1969 (0.230)	-0.2200 (0.235)	-0.2389 (0.243)
Regional Dummies	YES	YES	YES	YES
Positive Income Shock before Age 10		-0.1265 (0.242)	-0.1397 (0.250)	-0.0288 (0.285)
Positive Income Shock between Ages 10 and 14		-0.4859** (0.214)	-0.4896** (0.219)	-0.5028** (0.247)
Positive Income Shock after Age 14		0.0679 (0.092)	0.0479 (0.096)	0.2108 (0.135)

Negative Income Shock before Age 10	0.2767*	0.2387	0.3562*
	(0.170)	(0.176)	(0.213)
Negative Income Shock between Ages 10 and 14	0.3351*	0.3639*	0.3573
	(0.191)	(0.197)	(0.231)
Negative Income Shock after Age 14	0.5833**	0.6225**	0.7921**
	(0.281)	(0.287)	(0.316)
Death of Mother	-0.3824*	-0.3758*	-0.2978
	(0.207)	(0.214)	(0.221)
Death of Father	-0.1193	-0.1070	-0.1285
	(0.134)	(0.136)	(0.142)
Mother Illness/Injury	0.4213	0.4063	0.6849*
	(0.355)	(0.361)	(0.375)
Father Illness/Injury	-0.4141*	-0.4233*	-0.5660**
	(0.251)	(0.255)	(0.263)
Interactions between Shocks and Personality Traits and Cognition		YES	YES
Interactions between Male and Personality Traits and Cognition			YES
Interactions between Male and Shocks			YES
Interactions between Male, Shocks, and Personality Traits and Cognition			YES
Observations	1,202	1,202	1,202

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A13: Multinomial Logit Coefficients on Selection into Unemployment with and without Controls**

	<u>Unemployed</u>	<u>Unemployed</u>	<u>Unemployed</u>	<u>Unemployed</u>	<u>Unemployed</u>	<u>Unemployed</u>
Conscientiousness Zscore	-0.1093 (0.336)	-0.2054 (0.354)	-0.5318 (0.508)	-0.4430 (0.515)	-0.3792 (0.547)	-0.4671 (0.574)
Extraversion Zscore	0.1201 (0.346)	0.1100 (0.287)	0.3159 (0.540)	0.2238 (0.497)	0.2755 (0.622)	0.2987 (0.545)
Openness to Experience Zscore	-0.1693 (0.301)	-0.1131 (0.258)	-0.2176 (0.497)	-0.2876 (0.451)	-0.3364 (0.535)	-0.2916 (0.424)
Agreeableness Zscore	0.0867 (0.200)	-0.0197 (0.162)	0.1465 (0.332)	0.2308 (0.289)	0.2624 (0.344)	0.2208 (0.374)
Neuroticism Zscore	0.0674 (0.286)	0.0592 (0.336)	0.0278 (0.441)	0.0446 (0.460)	-0.0220 (0.600)	-0.0071 (0.527)
Aggregate Cognitive Test Zscore	-0.1257 (0.224)	-1.1327*** (0.341)	-1.6645** (0.744)	-1.3816 (0.891)	-1.3354 (1.231)	-1.3499 (1.250)
Cognitive Test First-Stage Predicted Residual	-0.2246 (0.282)	0.8339* (0.454)	1.3600* (0.816)	0.9652 (0.882)	0.9265 (1.262)	1.0459 (1.256)
Male	-1.1908*** (0.357)	-1.0592*** (0.363)	-0.5516 (0.496)	-0.8031 (0.609)	-0.7772 (0.759)	-0.0725 (2.833)
Currently Married	0.6538** (0.307)	0.7989** (0.408)	1.0623** (0.542)	1.1219* (0.603)	1.1060* (0.640)	1.1782* (0.660)
Age		-0.0784 (0.114)	0.1369 (0.178)	0.0967 (0.185)	0.0969 (0.220)	0.0921 (0.241)
2004 Asset Index		0.1879 (0.178)	0.3320 (0.229)	0.1862 (0.372)	0.1684 (0.310)	0.2092 (0.323)
Mother's Highest Grade		0.1025** (0.044)	0.0811 (0.063)	0.0569 (0.082)	0.0470 (0.088)	0.0562 (0.095)
Father's Highest Grade		0.0664* (0.039)	0.0114 (0.076)	0.0106 (0.079)	0.0129 (0.103)	0.0155 (0.106)
2004 Household Size		0.0266 (0.064)	-0.0361 (0.074)	0.0060 (0.082)	0.0006 (0.100)	0.0059 (0.111)
2012 Nonlabor Income Transfers		0.0002 (0.000)	0.0003** (0.000)	0.0003 (0.000)	0.0004* (0.000)	0.0004 (0.000)
Highest Grade Attained			0.0666 (0.203)	0.0599 (0.241)	0.0860 (0.287)	0.0202 (0.238)
Predicted Residual from (1)			-0.1130 (0.179)	-0.1036 (0.250)	-0.1205 (0.272)	-0.1239 (0.221)
Previously Employed X Age at First Job			-0.1605*** (0.053)	-0.1416** (0.072)	-0.1429* (0.074)	-0.0912 (0.110)
Urban				-0.6955 (0.769)	-0.4911 (0.773)	-0.5094 (0.733)
2012 Community Health Index				0.2438 (0.865)	0.4071 (1.187)	0.4059 (1.149)
2012 Community Infrastructure Index				0.6420 (0.416)	0.5422 (0.386)	0.5724 (0.453)
Regional Dummies					YES	YES
Male X Grade						0.1311 (0.210)

Male X Age at First Job						-0.0858 (0.127)
Male X Conscientiousness	0.2766 (0.388)	0.3667 (0.501)	0.5388 (0.704)	0.4346 (0.783)	0.4442 (0.898)	0.5544 (0.734)
Male X Extraversion	-0.0902 (0.555)	-0.0459 (0.518)	-0.1285 (0.683)	0.3204 (0.592)	0.2793 (0.978)	0.2539 (0.771)
Male X Openness	-0.1374 (0.381)	-0.1397 (0.376)	-0.2157 (0.613)	-0.6578 (0.560)	-0.6964 (0.601)	-0.7215 (0.573)
Male X Neuroticism	0.4324 (0.328)	0.4536* (0.276)	0.2039 (0.547)	0.1265 (0.510)	0.1501 (0.547)	0.1598 (0.470)
Male X Agreeableness	0.2731 (0.481)	0.2533 (0.494)	0.5844 (0.668)	0.3219 (0.689)	0.3197 (0.946)	0.3202 (0.741)
Male X Cognitive Test Score	0.4056 (0.292)	0.3843 (0.325)	0.1875 (0.475)	0.2882 (0.610)	0.2349 (0.693)	0.0687 (0.744)
Male X Currently Married	-2.1092 (3.886)	-2.2035 (3.921)	-1.7231 (6.332)	-1.3552 (7.107)	-1.3164 (7.278)	-1.4263 (1.152)
Constant	-0.0668 (0.259)	-0.1016 (1.622)	-1.8400 (3.283)	-1.5688 (3.250)	-1.9510 (4.037)	-2.4766 (3.692)
Observations	1,207	1,207	1,156	1,109	1,109	1,109
Standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

**Table A14: Multinomial Logit Coefficients on Selection into Informal Employment with and without Controls**

	Informal Sector	Informal Sector	Informal Sector	Informal Sector	Informal Sector	Informal Sector
Conscientiousness Zscore	-0.2882 (0.247)	-0.2999 (0.309)	-0.0897 (0.329)	0.0184 (0.397)	0.0298 (0.393)	-0.0387 (0.282)
Extraversion Zscore	-0.1380 (0.303)	-0.1229 (0.265)	-0.1044 (0.388)	-0.1376 (0.300)	-0.0557 (0.403)	-0.0553 (0.346)
Openness to Experience Zscore	-0.0819 (0.217)	-0.0920 (0.238)	-0.1197 (0.261)	-0.2074 (0.255)	-0.2147 (0.221)	-0.1629 (0.288)
Agreeableness Zscore	0.0575 (0.155)	0.0691 (0.162)	0.2789 (0.235)	0.3144 (0.202)	0.3130 (0.211)	0.2822 (0.208)
Neuroticism Zscore	0.2403 (0.267)	0.2511 (0.323)	0.1796 (0.322)	0.1565 (0.344)	0.1027 (0.359)	0.1243 (0.235)
Aggregate Cognitive Test Zscore	-1.4722*** (0.150)	-1.4941*** (0.290)	-1.0229*** (0.364)	-1.0695*** (0.398)	-1.6337*** (0.521)	-1.5784*** (0.549)
Cognitive Test First-Stage Predicted Residual	0.7083*** (0.186)	0.7216** (0.280)	0.4181 (0.376)	0.3997 (0.395)	0.9468** (0.472)	1.0171* (0.541)
Male	-0.5967** (0.247)	-0.5920** (0.267)	-0.5606** (0.248)	-0.5724** (0.282)	-0.5313** (0.258)	0.2851 (1.277)
Currently Married	0.7875*** (0.288)	0.8448*** (0.326)	0.8428*** (0.302)	0.7902** (0.368)	0.8407** (0.372)	0.7580* (0.444)
Age		-0.1215 (0.084)	0.0316 (0.100)	0.0175 (0.104)	0.0111 (0.105)	0.0086 (0.122)
2004 Asset Index		-0.0921 (0.145)	0.0793 (0.160)	0.2125 (0.155)	0.2554 (0.184)	0.2735 (0.190)
Mother's Highest Grade		0.0008 (0.031)	0.0369 (0.041)	0.0224 (0.034)	0.0310 (0.043)	0.0324 (0.040)
Father's Highest Grade		0.0049 (0.027)	0.0599* (0.033)	0.0629** (0.027)	0.0726* (0.038)	0.0770** (0.034)
2004 Household Size		0.0279 (0.046)	-0.0117 (0.048)	0.0027 (0.048)	0.0132 (0.049)	0.0112 (0.052)
2012 Nonlabor Income Transfers		0.0000 (0.000)	0.0001 (0.000)	0.0001 (0.000)	0.0002 (0.000)	0.0002 (0.000)
Highest Grade Attained			-0.2389** (0.096)	-0.2043* (0.118)	-0.1314 (0.123)	-0.1870 (0.148)
Predicted Residual from (1)			0.2062** (0.097)	0.1906 (0.121)	0.1176 (0.127)	0.1124 (0.146)
Previously Employed X Age at First Job			-0.1956*** (0.034)	-0.1996*** (0.039)	-0.1875*** (0.036)	-0.1294*** (0.044)
Urban				-0.8568*** (0.326)	-0.8138** (0.408)	-0.7969** (0.391)
2012 Community Health Index				0.2445 (0.426)	0.1370 (0.551)	0.1312 (0.468)
2012 Community Infrastructure Index				0.1729 (0.190)	0.2465 (0.214)	0.2598 (0.241)
Regional Dummies					YES	YES
Male X Grade						0.0994 (0.097)

Male X Age at First Job						-0.0977 (0.067)
Male X Conscientiousness	0.1852 (0.311)	0.2284 (0.363)	-0.0250 (0.422)	-0.1174 (0.474)	-0.1186 (0.455)	-0.0462 (0.398)
Male X Extraversion	0.3578 (0.352)	0.3594 (0.353)	0.5511 (0.495)	0.5317 (0.353)	0.5409 (0.533)	0.5674 (0.457)
Male X Openness	-0.3310 (0.273)	-0.3305 (0.276)	-0.3195 (0.292)	-0.2149 (0.281)	-0.2076 (0.292)	-0.2804 (0.420)
Male X Neuroticism	-0.1723 (0.222)	-0.1631 (0.199)	-0.3876 (0.254)	-0.4003 (0.255)	-0.3717 (0.235)	-0.3270 (0.264)
Male X Agreeableness	-0.2008 (0.326)	-0.2366 (0.328)	-0.3314 (0.411)	-0.2417 (0.425)	-0.2393 (0.428)	-0.2684 (0.343)
Male X Cognitive Test Score	0.2861 (0.230)	0.3276 (0.250)	0.2616 (0.240)	0.1537 (0.216)	0.1680 (0.246)	-0.0551 (0.315)
Male X Currently Married	-0.7198** (0.307)	-0.7322** (0.368)	-0.6293 (0.449)	-0.6271 (0.451)	-0.6443 (0.469)	-0.5246 (0.569)
Constant	1.4023*** (0.226)	2.9997** (1.263)	5.6077*** (1.655)	5.7457*** (1.974)	4.8197*** (1.685)	4.3560* (2.475)
Observations	1,207	1,207	1,156	1,109	1,109	1,109

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A15: Multinomial Logit Coefficients on Selection into Student with and without Controls**

	Student	Student	Student	Student	Student	Student
Conscientiousness Zscore	-0.1040 (0.262)	-0.2795 (0.385)	-0.7437 (0.643)	-0.6444 (0.646)	-0.5861 (0.615)	-0.6182 (0.526)
Extraversion Zscore	-0.3295 (0.367)	-0.4247 (0.366)	0.0329 (0.667)	0.0663 (0.819)	0.0983 (0.791)	0.0767 (0.746)
Openness to Experience Zscore	0.1106 (0.262)	0.2684 (0.296)	0.0796 (0.602)	-0.0814 (0.452)	-0.2548 (0.531)	-0.2396 (0.528)
Agreeableness Zscore	0.0975 (0.183)	-0.0584 (0.176)	0.3057 (0.405)	0.3299 (0.340)	0.3781 (0.486)	0.3229 (0.530)
Neuroticism Zscore	0.2520 (0.326)	0.3588 (0.375)	-0.1513 (0.564)	-0.0812 (0.732)	-0.0701 (0.624)	-0.0140 (0.639)
Aggregate Cognitive Test Zscore	0.4865** (0.235)	-1.2486*** (0.471)	-2.8353** (1.266)	-3.3929*** (1.008)	-2.2518 (1.801)	-2.2296 (1.708)
Cognitive Test First-Stage Predicted Residual	0.1857 (0.285)	2.0335*** (0.482)	2.9527** (1.189)	3.1727*** (1.001)	2.1315 (1.680)	2.2316 (1.639)
Male	-1.5133*** (0.397)	-1.4139*** (0.367)	-1.4067* (0.724)	-1.8559** (0.761)	-1.9200** (0.847)	0.4032 (4.614)
Currently Married	-2.5080 (2.791)	-2.2985 (2.050)	-1.4919 (4.582)	-1.5071 (4.686)	-1.6293 (1.181)	-1.6041 (1.431)
Age		-0.3625*** (0.101)	-0.1088 (0.283)	-0.1580 (0.276)	-0.1899 (0.277)	-0.1943 (0.234)
2004 Asset Index		0.5784*** (0.145)	0.5610* (0.300)	0.5737* (0.324)	0.4880 (0.439)	0.5084 (0.402)
Mother's Highest Grade		0.1174*** (0.044)	0.0956 (0.089)	0.0983 (0.125)	0.0894 (0.115)	0.0981 (0.120)
Father's Highest Grade		0.0889*** (0.033)	-0.0550 (0.086)	-0.0530 (0.083)	-0.0995 (0.103)	-0.1024 (0.133)
2004 Household Size		0.0426 (0.057)	0.0520 (0.113)	0.0966 (0.118)	0.1196 (0.103)	0.1289 (0.149)
2012 Nonlabor Income Transfers		0.0002 (0.000)	0.0003** (0.000)	0.0003** (0.000)	0.0003* (0.000)	0.0003 (0.000)
Highest Grade Attained			0.6295** (0.311)	0.7106** (0.281)	0.6633** (0.330)	0.6295* (0.372)
Predicted Residual from (1)			-0.4154 (0.269)	-0.4928** (0.235)	-0.4383 (0.314)	-0.4637 (0.325)
Previously Employed X Age at First Job			-0.3072*** (0.101)	-0.3105*** (0.116)	-0.3226** (0.135)	-0.2171 (0.139)
Urban				-1.1277 (1.094)	-0.9284 (1.213)	-1.0149 (1.200)
2012 Community Health Index				1.2712 (1.032)	1.4399 (1.658)	1.4672 (1.566)
2012 Community Infrastructure Index				0.6918 (0.626)	0.4095 (0.682)	0.4784 (0.600)
Regional Dummies					YES	YES
Male X Grade						0.0643 (0.315)



Male X Age at First Job						-0.2473 (0.254)
Male X Conscientiousness	0.3282 (0.464)	0.4377 (0.606)	1.0337 (0.918)	0.9935 (0.918)	1.1285 (1.139)	1.2589 (0.941)
Male X Extraversion	-0.1152 (0.489)	0.0790 (0.546)	-0.4416 (0.699)	-0.1397 (0.930)	-0.1833 (1.145)	-0.1818 (1.176)
Male X Openness	0.0739 (0.369)	0.0283 (0.404)	-0.1190 (0.698)	-0.4072 (0.670)	-0.4578 (0.849)	-0.5609 (1.046)
Male X Neuroticism	-0.1512 (0.301)	-0.0934 (0.318)	-0.5938 (0.614)	-0.6976 (0.438)	-0.7467 (0.678)	-0.8355 (1.092)
Male X Agreeableness	-0.0835 (0.421)	-0.2087 (0.543)	0.7415 (0.921)	0.5973 (0.950)	0.4305 (1.110)	0.4200 (0.978)
Male X Cognitive Test Score	0.2985 (0.352)	0.2737 (0.370)	0.6456 (0.665)	0.9868 (0.665)	0.9152 (0.780)	0.8852 (1.072)
Male X Currently Married	0.4019 (4.278)	0.2807 (5.477)	1.4688 (7.102)	1.9187 (7.944)	2.0481 (5.542)	2.4514 (5.055)
Constant	0.2261 (0.264)	4.0601** (1.648)	-1.8815 (4.791)	-1.8563 (3.947)	-1.5084 (4.491)	-2.6975 (5.416)
Observations	1,207	1,207	1,156	1,109	1,109	1,109

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A16: Informal Sector Earnings with and without Controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conscientiousness Zscore	0.5594** (0.273)	0.2822 (0.264)	0.2812 (0.314)	0.1798 (0.313)	0.1312 (0.315)	0.1435 (0.304)	0.3781+ (0.242)	0.1688 (0.315)
Extraversion Zscore	-0.4506 (0.369)	-0.3295 (0.344)	-0.3346 (0.307)	-0.4110 (0.347)	-0.6085* (0.321)	-0.5275+ (0.337)	-0.5600* (0.331)	-0.5954+ (0.417)
Openness to Experience Zscore	0.2375 (0.213)	0.4853** (0.227)	0.4868*** (0.186)	0.5739** (0.229)	0.7857*** (0.255)	0.7420*** (0.253)	0.5255* (0.272)	0.8251** (0.357)
Agreeableness Zscore	-0.1302 (0.266)	-0.1163 (0.270)	-0.1181 (0.264)	-0.0884 (0.275)	-0.0035 (0.313)	-0.0470 (0.277)	-0.0442 (0.222)	0.0682 (0.404)
Neuroticism Zscore	0.0956 (0.216)	-0.0845 (0.218)	-0.0906 (0.197)	-0.2194 (0.202)	-0.3397+ (0.238)	-0.2947 (0.243)	-0.2778+ (0.188)	-0.1748 (0.277)
Selection Term	0.1486 (0.190)	-0.6708*** (0.247)	-0.6513*** (0.221)	0.0140 (0.355)	0.7945* (0.449)	0.7739* (0.462)	0.8759* (0.452)	0.7917+ (0.509)
Instrumented Cognitive Test Score		-2.4799*** (0.347)	-2.5831*** (0.427)	-2.3279*** (0.502)	-3.1449*** (0.515)	2.7106*** (0.505)	-1.4880* (0.786)	-1.2939+ (0.829)
Instrumented Grade			0.0379 (0.144)	0.1323 (0.152)	0.2323 (0.191)	0.1959 (0.193)	0.1225 (0.193)	0.1544 (0.273)
Age of Job Entry				0.2613*** (0.062)	0.2406** (0.109)	0.2306** (0.098)	0.1872* (0.097)	0.1529+ (0.099)
Male					1.5914*** (0.394)	1.4879*** (0.384)	1.5273*** (0.442)	1.5910 (2.287)
Age					0.0191 (0.151)	0.0126 (0.129)	-0.0178 (0.134)	-0.0228 (0.122)
2004 Household Asset Index					1.0267*** (0.280)	1.0815*** (0.255)	1.0114*** (0.346)	0.9408*** (0.302)
Mother's Highest Grade					0.0652 (0.071)	0.0672 (0.064)	0.0314 (0.066)	0.0309 (0.081)
Father's Highest Grade					0.0549 (0.062)	0.0492 (0.059)	0.0222 (0.069)	0.0272 (0.071)
Years at Job					-0.3646** (0.160)	-0.3707** (0.146)	0.3445*** (0.128)	-0.3430** (0.142)
Years at Job Squared					0.0154 (0.012)	0.0154 (0.012)	0.0141 (0.010)	0.0135 (0.012)
Urban						0.5122 (0.492)	1.0661** (0.539)	1.0291* (0.560)
2012 Community Health Index						0.3857 (0.503)	0.0163 (0.527)	0.0681 (0.583)
2012 Community Infrastructure Index						- 0.7031*** (0.247)	- 0.9405*** (0.292)	- -0.9691*** (0.302)
Regional Dummies							YES	YES
Male X Conscientiousness								0.5373 (0.524)
Male X Extraversion								-0.0745 (0.654)
Male X Openness								-0.6442 (0.469)

Male X Agreeableness								-0.2826 (0.382)
Male X Neuroticism								-0.2240 (0.621)
Male X Cognitive Test Score								-0.3497 (0.939)
Male X Grade								-0.1101 (0.285)
Male X Age at First Job								0.0323 (0.098)
Constant	3.6862 <sup>***</sup> (0.321)	2.0255 <sup>***</sup> (0.404)	1.7608 <sup>*</sup> (0.972)	-1.9679 (1.426)	-1.4403 (2.685)	-0.9354 (2.507)	0.0852 (2.755)	0.4209 (2.913)
Observations	738	738	738	738	729	729	729	729
R-squared	0.011	0.079	0.079	0.106	0.150	0.158	0.205	0.212
Standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

**Table A17: Formal Sector Earnings with and without Controls**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conscientiousness Zscore	0.1035 (0.570)	0.0991 (0.484)	0.0706 (0.560)	0.0542 (0.506)	0.2086 (0.644)	0.1951 (0.532)	0.3729 (0.455)	1.8435** (0.852)
Extraversion Zscore	0.0302 (0.561)	0.0414 (0.494)	0.0457 (0.494)	0.1259 (0.608)	-0.1587 (0.645)	-0.1392 (0.741)	-0.3408 (0.633)	-1.1655 (0.908)
Openness to Experience Zscore	0.7422** (0.366)	0.7418** (0.343)	0.7569*** (0.279)	0.8492** (0.400)	0.7308+ (0.492)	0.7116+ (0.457)	-0.8755* (0.465)	-1.1423 (0.848)
Agreeableness Zscore	-0.1300 (0.400)	-0.1391 (0.430)	-0.1349 (0.433)	-0.1479 (0.509)	-0.1039 (0.423)	-0.1240 (0.458)	-0.0886 (0.452)	-0.1667 (0.779)
Neuroticism Zscore	0.0256 (0.417)	0.0250 (0.332)	0.0133 (0.385)	0.0757 (0.368)	0.0767 (0.366)	0.0264 (0.408)	0.0724 (0.375)	1.4900** (0.582)
Selection Term	0.2331** (0.109)	0.2405** (0.096)	0.2213** (0.090)	0.3109* (0.178)	0.1160 (0.240)	0.2401 (0.235)	0.1717 (0.245)	0.0018 (0.363)
Instrumented Cognitive Test Score		-0.0591 (0.351)	-0.6802 (0.822)	-0.8617 (1.059)	-1.2254 (1.265)	-1.3244 (0.979)	-0.9694 (1.473)	-3.7845 (2.738)
Instrumented Grade			0.2001 (0.220)	0.2114 (0.268)	0.2855 (0.373)	0.2002 (0.345)	0.2634 (0.409)	0.9554* (0.548)
Age of Job Entry				-0.0757 (0.133)	-0.0506 (0.162)	-0.1078 (0.139)	-0.0750 (0.160)	-0.0461 (0.238)
Male					1.1714+ (0.780)	1.1012* (0.660)	1.2351** (0.608)	7.0041 (5.338)
Age					0.2695 (0.248)	0.2821+ (0.189)	0.2285 (0.218)	0.3257* (0.182)
2004 Household Asset Index					-0.1825 (0.234)	0.0592 (0.392)	0.0028 (0.377)	0.0233 (0.396)
Mother's Highest Grade					-0.0634 (0.106)	-0.0456 (0.114)	-0.0680 (0.081)	-0.0192 (0.142)
Father's Highest Grade					0.1688+ (0.117)	0.1941* (0.120)	0.1816* (0.106)	0.2298*** (0.082)
Years at Job					0.1338 (0.449)	0.1865 (0.420)	0.3000 (0.414)	0.2862 (0.436)
Years at Job Squared					-0.0692 (0.068)	-0.0812 (0.062)	0.0893+ (0.061)	-0.0804 (0.064)
Urban						0.4496 (0.949)	0.5235 (0.930)	0.8668 (1.084)
2012 Community Health Index						0.8763 (0.743)	2.6194** (1.231)	2.5128* (1.303)
2012 Community Infrastructure Index						-0.9116* (0.526)	1.1242** (0.442)	1.1520** (0.489)
Regional Dummies							YES	YES
Male X Conscientiousness								-1.9337+ (1.275)
Male X Extraversion								0.7097 (1.297)
Male X Openness								0.6887 (0.947)

Male X Agreeableness								0.4667 (1.027)
Male X Neuroticism								2.0078*** (0.603)
Male X Cognitive Test Score								2.4106 (2.406)
Male X Grade								-0.7442 (0.559)
Male X Age at First Job								0.0585 (0.179)
Constant	8.6960*** (0.489)	8.7404*** (0.495)	7.0331*** (1.935)	8.7339** (3.622)	1.6520 (6.944)	3.4923 (5.611)	2.4405 (5.916)	-6.8370 (9.228)
Observations	228	228	228	228	221	221	221	221
R-squared	0.036	0.036	0.039	0.041	0.116	0.143	0.178	0.243

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1