The Rockwool Foundation Research Unit

Does Personality Influence Project Participation? Evidence from Rural Malawi

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Study Paper No. 31

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December 2010

Abstract

Development projects often target the poor and vulnerable households for good reasons. However, project participation also tends to be voluntary leading to a high degree of self-selection among project beneficiaries. In addition, project success is likely to depend upon the type of people participating in it. There is a large and still growing literature on how personality traits matter for economic and social outcomes in life. In this paper, we find that there is indeed a strong degree of self-selection on specific personality traits, when it comes to expressing interest in participating in an announced upcoming village savings and loan association (VSLA) in rural Malawi, a largely economic decision.

Keywords: Cognitive and non-cognitive skills, personality traits, self-efficacy, locus of control, risk aversion, impatience, development, micro finance participation, Africa
JEL codes: O12, O16, O22

1 Introduction

Development projects often specifically target the poor and vulnerable households for good reasons. However, project participation also tends to be voluntary leading to a high degree of self-selection among project beneficiaries. In turn, the success of a project may depend upon the type of people who have self-selected into it. Imagine a development project, which has been successful in, say, alleviating poverty. If project participation has been voluntary, the project may largely have attracted people with certain personality traits suitable for participating in project activities. If this is the case, the external validity of the project can be questioned, as its ability to lift the remaining and observationally seemingly similar population out of poverty may in fact be very limited, simply because the success of the project has rested on a certain personality trait of people participating. Despite this, not one paper among the vast amount of randomized impact evaluations present in the development economic literature have, to the best of our knowledge, yet paid attention to the personality traits of the participants.

In recent years, the role of personality traits and non-cognitive skills have received increased attention in explaining a variety of socioeconomic outcomes in developed countries. Among others, James Heckman, in particular, has with a number of different co-authors shown that non-cognitive skills in childhood matter for later economic achievements and that they, just as cognitive capabilities, are "powerful predictors of wages, schooling, participation in crime, health and success in many other aspects of economic and social life", see Cunha & Heckman (2009:6). There is a large and still growing literature on how such personality traits matter for outcomes in life, how best to measure such traits in a convincing fashion and a variety of empirical attempts at doing so, see Lønborg (2010) or Thiel and Thompson (2009) for a detailed review. The literature is clearly very interdisciplinary with substantial contributions from psychology, sociology and, more recently, economics. However, in the development economics literature, the role of personality traits and non-cognitive skills has only received very limited attention.

In this paper, we ask the following question: Does personality influence economic decisions, such as self-selection into a savings and loans project? In particular, are measures of different personality traits important for explaining interest in project participation among rural women in Northern Malawi exposed to an announced upcoming savings and loans intervention?

The intervention is a Village Savings and Loans Association (VSLA), which aims at improving economic status and food security by establishing small savings and loans associations in remote rural areas of Northern Malawi, specifically targeting the poor and vulnerable households in 46 villages. Project participation is voluntary and based on self-selection. The intervention is designed as a randomized controlled trial with a gradual roll-out. Prior to the commencement of project activities in 2009, but shortly after an awareness meeting announcing and explaining the VSLA intervention, we collected household and individual survey data in all

target villages among 834 households. In the survey, female respondents in all households are asked whether or not they are interested in participating in the announced upcoming VSLAs.

We use these data to analyze whether or not different personality trait measures influence the measure of participation interest. The following measures of personality traits are used: risk aversion, impatience, the individual's own perceived locus of control and her own perceived level of self-efficacy. We will return to their exact definintion below. In addition, we control for a series of individual and household characteristics.

We find that there is indeed a strong degree of self-selection on specific personality traits, when it comes to expressing interest in project participation. Half of the surveyed women express such an interest. Both risk aversion, impatience and self-efficacy are strongly significant when it comes to explaining interest in participating in the upcoming VSLA intervention. The results are robust to the inclusion of a variety of control variables characterizing the woman and her household. The individual locus of control score does not seem to matter for whether or not a woman expresses interest in participating. The estimated marginal effect of self-efficacy on participation interest implies that moving from the sample mean to the 85th percentile of the distribution of self-efficacy (a one standard deviation increase) results in a 17.0 percentage point higher probability of being interested in participation. We find similar negative effects of having a high degree of risk aversion or impatience. Interestingly, we find no significant partial effects of schooling or the self-reported ability to read on participation interest.

In the following section, we review the existing evidence on the importance of personality traits and non-cognitive skills for economic achivement from developed countries. In section 3, we describe the VSLA project and the associated data collection. The data are described in section 4 and used for the empirical analysis in section 5. The findings are discussed and proposals for future research are outlined in section 6.

2 Personality Traits

There is a long and well-established literature within economics on the importance of education and cognitive skills for a variety of outcomes, especially within the labour market, see e.g. Mincer (1974). While Mincer focuses on education as specifically enhancing the labour market productivity, and hence being rewarded by the employers, another dimension of this literature has argued that education simply serves as a signal for some underlying abilities or skills which are demanded in the labour market, see e.g. Spence (1973) or Weiss (1995).

Recently, the literature has expanded to also investigating the importance of what is sometimes termed non-cognitive skills or personality traits. Even though early evidence of non-cognitive skills being correlated with labour market outcomes arose 35 years ago (see Andrissani and Nestel, 1976), it is not until the beginning of this millenium that these skills were

more commonly adopted in the economics literature, for instance by Bowles, Gintis and Osborne (2001) and by Heckman, Hsse and Rubinstein (2002). In particular Heckman has, with a number of different co-authors, generated considerable evidence on the importance of non-cognitive skills for economic outcomes over the last decade. Together with Carneiro & Hansen, he has developed a factor structural estimation technique that makes it possible to estimate unbiased causal effects of non-cognitive and cognitive skills on the realized wage distribution of individuals, Carneiro, Hansen and Heckman (2003). Subsequently, this framework has been utilized by numerous authors, see for instance Heckman, Stixrud and Urzua (2006), Flossmann, Piatek and Wichert (2007) and Cunha Heckman and Schennech (2010). In these papers different dimensions of non-cognitive skills, including locus of control, are found to be important for a wide range of economic outcomes such as schooling decisions and subsequent labour market outcomes, but also for outcomes such as health, crime, risky or illicit behaviour.

In this paper, we use four personality trait measures; risk aversion, impatience, locus of control and self-efficacy. The two former are simply measured using the crude standard measures applied in most survey data, with risk aversion assessment taken from Binswanger 1980, and questions assessing the impatience with a simple set of hypothetical questions as used in e.g. Harrison, Lau and Williams (2002)[1]. The latter two are less standard in economic surveys, but common in the literature of psychology. Locus of control was initially developed by Julian Rotter (1966) and measures the degree to which an individual perceives his or her own actions can influence the consequences. The scale measured goes from having 'external' locus of control to 'internal' locus of control, where and individual with external locus of control believe that external factors such as fate, luck or other people control their life. On the contrary, an 'internal' individual perceives his own actions to fully determine the experienced reinforcements, making him capable of controlling his economic situation. Self-efficacy measures the individual's belief in successfully undertaking a specific activity, and is the cornerstone of the social learning theories developed by Albert Bandura, see Bandura (1997). An individual with high self-efficacy believes she will be able to successfully complete e.g. a higher education, while an individual with low self-efficacy will perceive this as impossible. Although locus of control and self-efficacy may be correlated, they are two different concepts. Someone may believe that the outcome of some future event is under their control (internal locus of control), but at the same time also feel incapable of behaving in a way that will produce the desired result (low context-specific self-efficacy), e.g. training to win an athletes competition.

Both of these personality trait measures have been found to be important in explaining economic achievement. Andrissani and Nestel (1976) found locus of control to correlate with a number of labour market outcomes, such as hourly wage, occupational attainment and unemployment status. However, the applied methodology leaves the causality of the findings

[1] See Frederick, Loewenstein and O'Donoghue (2002) for a review of existing evidence on impatience.

questionable, and subsequent studies had problems finding similar results (see e.g. Duncan and Morgan 1981). More convincing evidence of a causal relationship is found more recently by Osborne (2005) using both US and UK data and in a number of studies using German data, see Flossmann, Piatek and Wichert (2007), Heineck and Anger (2010) and Piatek and Pinger (2010). The latter finds evidence of locus of control only affecting wages indirectly through the educational choice using data on relatively young individuals, whereas Heineck and Anger (2010) finds that there is a direct wage penalty for individuals having external locus of control, when investigating a broader age distribution.

Similarly, there are also studies which have investigated the importance of self-efficacy for a wide range of behavioral changes and achivements. DiClemente et al (1991) find a positive effect on smoking cessation; Krishnan & Krutikova (2010) find that it positively affects schooling and aspiration among slum children in Bombay; and a number of papers have found that it is important for reproductive health behaviour and HIV/AIDS prevention mostly in African countries, e.g. Campbell (2000), and Karim et al (2003). It is really only the paper by Krishnan & Krutikova (2010) which also analyzes the effect of personality traits or non-cognitive skills on economic outcomes in a developing context. They find that higher self-esteem and self-efficacy have positive effects on schooling outcomes and initial labour market outcomes among a group of slum children which have undergone a long and intensive programme aimed at strengthening these exact personality traits. We therefore believe that there is still substantial scope for contributions in this area.

3 The Empirical Setting

In order to understand what motivates the participation decision among the women in our sample, it is important to understand what exactly they are invited to participate in and how we have collected the data used for the participation analysis. This is described in the following two subsections.

3.1 The VSLA intervention and the implementation strategy

The specific objective of the VSLA intervention implemented in the Karonga District of Northern Malawi is "to empower and strengthen vulnerable poor households to mobilise savings and access credit to reduce their poverty". The suggested mechanism is a savings-based approach, which builds on and somewhat formalises the widespread ROSCA model of rotating savings and credit associations. The savings are kept in a heavy safety box with 3 padlocks for which 3 different keys are needed. One trusted group member hides the box, three other trusted group members each have a key. The box can thus only be opened in the presence of all four group members. On the VLSA website (www.vsla.net), it states that "by intermediating small local

pools of capital to satisfy household cash-management needs it (a VSLA, red) provides immediately sustainable and profitable savings, insurance and credit services to people who live in places where banks and MFIs do not have a presence." Futhermore, "a VSLA is a self-selected group of people, (usually unregistered) who pool their money into a fund from which members can borrow. The money is paid back with interest, causing the fund to grow. The regular savings contributions to the group are deposited with an end date in mind for distribution of all or part of the total funds (including interest earnings) to the individual members, usually on the basis of a formula that links payout to the amount saved. This lump sum distribution provides a large amount of money that each member can then apply to his/her own needs." The most important part of the intervention from a the implementers point of view is the very strong focus on training. No external capital is injected into the savings groups. That is, "while the methodology is simple, it depends on a very carefully structured system of training. (...) groups learn to form their Associations, define a purpose, elect officials, design their system of savings, insurance and credit and practice running savings and credit meetings. Once this process is completed, Associations can begin to save and to lend, supervised over a period of 9-12 months by field staff who ensure that procedure and systems work properly and that the groups can function independently thereafter. (...) The methodology does not call for the establishment of an institution to handle members' funds and to issue loans: money is handled solely by the groups themselves and all net interest income remains their property."

This particular VSLA project in Karonga District is implemented by a local NGO, Synod Livingstonia in partnership with a Danish NGO, DanChurchAid and with funding from the Rockwool Foundation. It aims at improving the economic status and food security among poor and vulnerable households in 46 villages in the district. Project participation is voluntary and based on self-selection, although there is a strong gender component encouraging female participation. The intervention is designed as a randomized controlled trial with a gradual roll-out. This implies that 23 of the 46 villages were randomly selected to receive the intervention in 2009 and 2010, while the remaining 23 villages have to wait until after the third round of data collection in 2011. The randomization was done shortly after awareness meetings had been held in all 46 target villages announcing and explaining the VSLA intervention. Project activities only started after the collection of baseline data.

3.2 Sampling and survey instruments

Baseline data were collected in 2009 from each of the 46 target villages following the awareness meetings undertaken by Synod Livingstonia. The survey consisted of both individual, household and village questionnaires. The individual questionnaires were developed for female respondents, likely to be future VSLA members. The data collection was done by IKI Malawi in cooperation with the Rockwool Foundation Research Unit and researchers from Oxford

University and the University of Southern Denmark.

During the awareness meetings, field officers noted down names of villagers interested in participating in the announced upcoming VSLAs. Based on these lists, households which had expressed interest in participating were oversampled to ensure enough representation for the future impact evaluation. Out of the 18 households sampled in each village, 14 were sampled randomly from the list of interested participants. The remaining households were sampled outside that list. With a few extra households, we have a total sample of 834 households from 46 villages.

Each household was administered a household head questionnaire and a designated female respondent questionnaire. The designated female respondent would be the woman who had expressed interest in participating in the VSLA at the awareness meeting or the spouse of any man who had expressed such an interest. If the designated female respondent is also the head, she is administered both questionnaire, although preferably not back to back to avoid lengthy interviews. The head questionnaire contains information on general household characteristics, the household roster, assets and modules on agriculture, livestock and fishing (some villages are on the shore of lake Malawi). From the female questionnaire we have information on what knowledge she has of the announced upcoming VSLA project and she is asked directly whether or not she is interested in participating in it and if so, why. We are also able to construct a consumption measure covering approximately 95% of total food consumption[2].

All personality traits are asked of the female respondent. She is administered the crude standard games on risk aversion and time discounting[3]. The structure of the time discounting questions forced consistency in the answers, and from these we were able to calculate the interval of the monthly discount rate for each individual. This was not the case for the risk aversion questions. Risk aversion was assessed using the methodology from Binswanger (1980). Binswanger uses a specified utility function to estimate the partial risk aversion. The questions were made context specific by asking a series of questions of whether the individuals would prefer planting a type of maize which generated a specific yield with certainty, or a different type of maize, where the there was a 50/50 chance of the yield being high or low, with the mean value differing across the questions. There was no forced consistency in the questions, which resulted in some respondents responding inconsistently to the risk aversion questions. This is taken into account in the empirical analysis below.

Finally, the female respondent was asked a set of questions from which we can elicit her own perceived level of self-efficacy and locus of control. Locus of control was measured using a ten question sub-sample of Rotter's 1966 methodology for surveying the internal versus external control of reinforcement. The ten questions were formed as two statements, where

[2]The consumption module is based on the most common consumption items in the Karonga district from the latest LSMS survey in Malawi.

[3]See appendix A for the exact questions measuring personality traits.

the respondent was asked to reply with which of the two statements she agreed the most. An example of such a question could be "a) Many times I feel that I have little or no influence over the things that happen to me, b) I do not believe that chance or luck plays an important role in my life." For each of the ten statements, one of the answers refer to more internal locus of control. We aggregate the number of internal answers by the respondent - i.e. a higher value of the locus of control measure indicates a more internal locus of control.

Another ten questions assesed the perceived self-efficacy, using Schwarzer and Jerusalem's version of questions for The General Self-Efficacy Scale as described in Schwarzer and Jerusalem (1995). Each of these ten questions asked the respondent to assess a single statement using a four-point Likert scale. That is, the respondent could answer whether she felt the statement was 1) not at all true, 2) hardly true, 3) moderately true, or 4) exactly true for her. An example of such a statement could be: "It is easy for me to stick to my aims and accomplish my goals".[4] In the first part of the analysis below we simply aggregated the scores for each of the ten questions, giving a range of the self-efficacy measure of 10-40. A higher value of the measure indicates a higher self-efficacy.

4 Data

After having cleaned the data we loose a few observations due to missing information on key variables. This reduces our sample to 821 observations for the empirical analysis. The summary statistics for relevant variables are shown in table 1. The table contains information on the means and standard deviations for all variables. It also contains the means for different sub-samples, split by interest in VSLA participation, by top and bottom quartile of the self-efficacy distribution, and by top and bottom quartile of the locus of control distribution. Following each split we provide a column of t-tests for whether or not the two sub-sample means are significantly different from each other. These simple statistics provide a first glance at some of the simple correlations that can be found in the data.

[4] See Appendix A for the actual questions used in the questionnaire to assess both self-efficacy and locus of control.

Table 1: Summary Statistics

	# Obs	Mean	Std. Dev.	Min	Max.	By Interest		t	Self-Efficacy 1st Q	Self-Efficacy 4th Q	t	Locus of Control 1st Q	Locus of Control 4th Q	t
Dependent Variable														
Female Respondent Interested in Participating in VSLA	821	0.52	0.50	0	1	0	1	-	0.32	0.69	***	0.52	0.48	
Personality Traits														
Perceived Self-Efficacy	821	29.91	4.55	16	40	28.51	31.21	***	23.76	36.03	-	29.68	30.06	
Perceived Locus of Control	821	4.57	1.56	0	9	4.59	4.55		4.55	4.83	*	2.49	6.46	-
Indicator of having Severe or Extreme risk aversion	821	0.50	0.50	0	1	0.58	0.43	***	0.58	0.37	***	0.51	0.53	
Indicator of having the highest measured time discount rate	821	0.29	0.46	0	1	0.35	0.25	***	0.30	0.28		0.26	0.30	
Individual Characteristics														
Age of female respondent	821	35.25	12.56	13	73	34.75	35.71		36.59	36.29		34.87	35.17	
Indicator of being divorced or separated	807	0.04	0.21	0	1	0.04	0.05		0.04	0.03		0.05	0.04	
Indicator of being Widow	807	0.07	0.26	0	1	0.08	0.07		0.07	0.07		0.09	0.07	
Years of education for female respondent	821	5.74	2.95	0	14	5.65	5.83		5.21	5.73		5.47	5.71	
Indicator of female respondent able to read	821	0.69	0.46	0	1	0.64	0.73	***	0.63	0.66		0.64	0.68	
Indicator of for female in bad health	821	0.02	0.14	0	1	0.03	0.01		0.04	0.01	**	0.01	0.01	
Household Characteristics														
Indicator of household head being female	821	0.12	0.33	0	1	0.12	0.13		0.12	0.11		0.14	0.13	
Number of kids [<15] in household	821	3.11	1.82	0	12	3.03	3.19		3.22	2.98		3.00	3.14	
Dependency ratio (share of kids [<15] and older people [>64] in household)	821	0.52	0.19	0	1	0.51	0.52		0.52	0.50		0.51	0.51	
Any household member in bad health	821	0.09	0.29	0	1	0.10	0.08		0.13	0.06	**	0.08	0.07	
Indicator for Household Head being Catholic	821	0.18	0.39	0	1	0.17	0.19		0.15	0.19		0.14	0.19	
Indicator for Household Head being member of CCAP church	821	0.11	0.32	0	1	0.09	0.14	**	0.11	0.12		0.10	0.12	
Indicator for Household Head speaking Tumbuka as first language	821	0.83	0.38	0	1	0.78	0.87	***	0.76	0.85	**	0.84	0.80	
Land owned (acres)	821	3.31	2.90	0	40	3.19	3.43		3.18	3.19		3.18	3.24	
Value of Land Owned (USD)	821	481	765	0	6,048	453	507		469	402		521	421	
Value of livestock (USD)	821	709	1,305	0	12,330	733	687		643	875		561	801	*
Consumption per Adult Equivalent (USD/week)	821	4.28	2.91	0.17	25.91	4.12	4.42		3.86	4.49	**	4.26	4.20	
Household earning income from any farming	821	0.82	0.39	0	1	0.79	0.84	*	0.79	0.85		0.83	0.83	
Household earning income from fishing	821	0.14	0.34	0	1	0.14	0.13		0.09	0.20	***	0.11	0.11	
Number of Income Generating Activities Within Household	821	2.57	1.23	0	8	2.43	2.71	***	2.51	2.71		2.53	2.63	
Other Variables														
Indicator of female respondent thinking household is better off	821	0.19	0.39	0	1	0.17	0.21		0.13	0.32	***	0.17	0.21	
Indicator of female respondent thinking household is worse off	821	0.46	0.50	0	1	0.46	0.46		0.51	0.38	**	0.49	0.42	
Female respondent speaks at village meetings	821	0.49	0.50	0	1	0.43	0.54	***	0.52	0.40	**	0.48	0.51	
Female respondent has say on large purchases	821	0.36	0.48	0	1	0.40	0.32	**	0.36	0.40		0.31	0.43	***
Female respondent has say on transfers	821	0.58	0.49	0	1	0.58	0.58		0.62	0.57		0.51	0.65	***
Female respondent has say on number of children	821	0.50	0.54	0	2	0.54	0.46	**	0.53	0.46		0.44	0.54	*
Female respondent has say on contraceptive use	821	0.73	0.45	0	1	0.72	0.74		0.67	0.77	**	0.66	0.76	**

Note: *, **, and *** indicate significant differences in sample means at 10, 5, and 1 percent respectively, the 1st quartile of the self-efficacy distribution contains 184 observations, the top quartile contains 180 observations. The 1st quartile of the locus of control distribution contains 201 observations, the 4th quartile 231 observations. All summary statistics are unweighted

Before looking into the differences between the specific sub-samples, let us first of all try to get an understanding of the women we are analysing. Despite the oversampling of interested households in the villages, only half of the women express interest in participating in the announced upcoming VSLA intervention. This is most likely due to the fact that both men and women could sign up as being interested at the awareness meeting, thus although she does not express interest in the interview, her husband may have done so at the awareness meeting.

The average woman has a self-efficacy score close to 30, which is strikingly similar to the findings by Scholz, Doña and Schwarzer (2002), who find an average self-efficacy of 29.55, using data from 19.120 individuals across a wide range of countries using the exact same questions. On average, the combined locus of control score is close to 4.6. While the locus of control questions used in the existing literature differs somewhat from study to study, this level of internality does not seem unreasonable, compared to the findings in Trompenaars (1994). Furthermore, figure 1 and figure 2 display the distribution of the self-efficacy and locus of control scores, respectively. Both with a reasonable degree of variation for us to be able to use them in an empirical analysis. Although, due to questionaire design and the use of a 4 point Likert scale, the self-efficacy score has a much wider range and thus variation than the locus of control score.

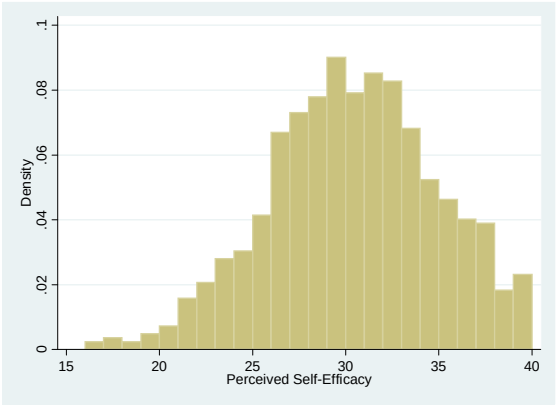

Figure 1: Self-efficacy

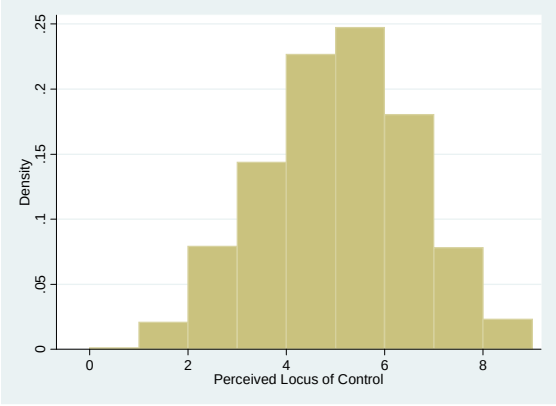

Figure 2: Locus of control

Half of the respondents have a very high measured risk aversion, with their risk aversion being 'severe' or 'extreme' in the notation of Binswanger (1980). This is quite different from the findings by Binswanger (1980) in India, in which at most 15 percent of the individuals were contained in the extreme and severe risk-aversion classes. This discrepancy could be due both to the levels used and the framing of the questions, as we ask individuals to choose between hypothetical lotteries concerning the yield of maize - the primary food source in the area - whereas Binswanger use monetary lotteries. Similarly, 29 percent of the respondents have the highest measured time discount rate, meaning they prefer having MK 2000 today (˜13 USD)

rather than MK 2800 (~19 USD) in one month.

The average woman is 35 years and has 5.74 years of schooling. Primary schooling in Malawi is 8 years, which was recently made compulsory and officially costless. It is quite unlikely that she is in bad health, but quite likely that she is able to read (almost 70 pct of our women self-report that ability). Roughly 12 percent of the female respondents are heading their respective household, which on average has just over 3 members under the age of 15. Almost 10 percent of the households have at least one member in bad health. The vast of household heads speak Tumbuka as their primary language, just as the majority of the household - 82 percent earn some income from farming. An important fraction - 14 percent - also earn some income from fishing, as should be expected due to the location of some of the villages on the shores of Lake Malawi. Each household has, on average, 2.5 income generating activities, not including remittances, pensions and other income sources not requiring the application of physical labour. The average household holds 1,190 USD worth of assets in land and livestock, with the majority of the assets held in livestock. However, the households are very poor; the measured food consumption per adult equivalent in the average household is only 4.28 USD per week.

Almost half our respondents feel their household is worse off than other households in the area, and only one in five respondents think their household is better off than others in the community. Looking at some of the indicators of female empowerment, both within the household and in the village, it is noteworthy that half the respondents feel they are able to speak at village meetings. Similarly, when we investigate the indicators of female empowerment within the household, exactly half the respondents feel they have a say[5] on the number of children to have just as almost three in four respondents feel they have a say on the contraceptive use. Another important indicator of female empowerment is whether the women has influence on the transfers from the household to friends and family, which 58 percent of our respondents feel they have.

The summary statistics becomes increasingly interesting as we compare sub-samples of the surveyed population. When comparing the interested with the non-interested female respondents, we see that the interested have significantly higher self-efficacy, and are significantly less likely to be highly risk avserse or impatient. Another interesting finding is that even though the VSLA concept is developed to reach even the illiterate groups of the population, there is a significantly higher proportion of the interested respondents that are able to read than the non-interested. A larger proportion of the interested respondents are members of a household that already has a connection with the CCAP church that the implementing NGO is associated with. There is also a slight indication that the more entrepreneurial are attracted by the

[5] 'Having a say' is defined as the female respondent being either the sole decision maker or joint decision maker with her husband.

project, as the interested group of respondents are engaged in significantly more income generating activities. Finally, some of the female empowerment indicators are significantly different across the two subgroups. A larger proportion of the interested individuals are confident speaking at village meetings, while a smaller proportion have a say on the transfers and number of children in the household. This might at first seem puzzling: the interested respondents seem to be less empowered using these indicators than those not interested in participating in the project. However, this could be due to the most empowered individuals not needing to spend time and effort in participating in order to make the economic decisions they desire within the household, similar to the argument put forth by Anderson and Baland (2002).

When we compare the bottom and top quartile of the distribution with respect to self-efficacy, a number of interesting significant differences arise. Among the most efficacious individuals a significantly larger proportion are interested in participating in the VSLA project, and the most efficacious individuals have a more internal locus of control compared to the individuals at the bottom of the distribution. Being in the most efficacious quarter also means a smaller proportion have high risk aversion, and a significantly lower proportion of respondents in bad health, as well as any household member in bad health. The share of households earning an income from fishing is significantly higher among the respondents with high self-efficacy, just as the average household of the female respondent in the top quarter of the self-efficacy distribution has significantly higher food consumption per adult equivalent. Finally, a higher proportion among the most efficacious household think their household is better off than the others in the community, while a significantly smaller proportion of respondents with high self-efficacy speak at village meetings, although a greater proportion feel they have a say on contraceptive use.

While there is a number of variables that differ significantly among the top and bottom quartile of the self-efficacy distribution, the image is not as distinct when we investigate difference among the top and bottom quartile of the locus of control distributions. The respondents with most internal locus of control have on average a higher value of livestock at the ten percent significance level. Interestingly, the other group of variables that differ significantly across the individuals with most internal and external locus of control respecitvely are the indicators of female empowerment within the household. The individuals with more internal locus of control seem to be more empowered, in that a significantly larger proportion have a say on both large purchases, transfers, the number of children to have and the contraceptive use.

It could be, however, that the participation decision is not primarily an economic decision for all individuals, but rather a group-effect: "I should probably join, since my neighbours, friends or family join" could also be a rationale behind the interest in the project. For all the individuals who indicated interest in the project, we actually have information on their primary objective with participation. Table 2 below shows the distribution of the interested individuals

across the potential answers:

Table 2: Indicated Reason for Being Interested in VSLA

	# Obs.	Percentage
Safe way of saving money	219	52.02
Potential Source of Credit	182	43.23
Most of family and friends joined	2	0.48
Fear of loosing influence in community	0	0.00
To share ideas/information/news	14	3.33
Other social aspects of participation	1	0.24
Other (specify)	3	0.71
Total	421	100

Hence, the interest in participation seems to stem primarily from economic considerations, which is not unimportant to have in mind in our subsequent empirical analysis.

5 Empirical Results

The key question of interest in this paper is whether an individual's interest for participating in a VSLA, found to be largely an economic decision, is influenced by measures of her personality. That is, we want to know to which extent, if at all, her different cognitive skills (proxied by years of schooling and self-reported ability to read), and her non-cognitive skills and personality traits measured through risk aversion, impatience, self-efficacy and locus of control influence her economic decision. To answer this question, we estimate the following reduced form probit model

$$P(VSLA_i = 1|X_i) = \Phi[\alpha + \beta Z_i + \eta RISK_i + \kappa TIME_i + \mu SE_i + \delta LOC_i] \quad (1)$$

where $VSLA_i$ is an indicator of being interested in participation, Z_i is a vector of control variables, such as personal and household characteristics, $RISK_i$ is an indicator for having high risk aversion, $TIME_i$ is an indicator for having the highest degree of time discounting or impatience, while SE_i and LOC_i are the self-efficacy and locus of control measures, respectively.

The simple statistics in table 1 indicated that both SE_i, $RISK_i$ and $TIME_i$, as well as the ability to read correlate with the participation decision. However, these skills may also correlate with each other, as suggested by the tests in table 1 and also recently shown in Dohmen et al (2010). By estimating the probit model above, we are able to look directly at the partial correlations. We build up the model gradually to see how robust the partial correlations are to the inclusions of other variables.

In table 2, we first show the model above when only including $RISK_i, TIME_i, SE_i$ and LOC_i, see column (1). Subsequently, we expand the model to include other individual char-

acteristics, including proxies of cognitive skills, see column (2) as well as indicators of female empowerment in column (3). We then also include household and village characteristics in column (4), while column (5) and (6) are the result of an estimation of the participation decision without personality traits.

Table 3: Robust Weighted Probit Regression of Participation Interest, Coefficients

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	finterest	finterest	finterest	finterest	finterest	finterest
Personality Traits						
Perceived Self-Efficacy	0.0864***	0.0874***	0.0940***	0.0949***		
	(0.021)	(0.021)	(0.020)	(0.019)		
Perceived Locus of Control	-0.0533	-0.0538	-0.0617	-0.0706		
	(0.048)	(0.048)	(0.048)	(0.050)		
Indicator of having high risk aversion	-0.4629***	-0.4461**	-0.3736**	-0.4440**	-0.5683***	
	(0.175)	(0.176)	(0.182)	(0.188)	(0.179)	
Inconsistency answers to risk aversion questions	-0.3725	-0.3572	-0.3651	-0.3586	-0.3856	
	(0.236)	(0.234)	(0.253)	(0.248)	(0.253)	
Indicator of having the highest measured time discount rate	-0.4764***	-0.4734***	-0.5376***	-0.4915***	-0.5136***	
	(0.177)	(0.176)	(0.173)	(0.142)	(0.131)	
Individual Characteristics						
Age of female respondent		-0.0027	-0.0071	-0.0115*	-0.0071	-0.0086
		(0.006)	(0.007)	(0.007)	(0.007)	(0.007)
Indicator of female respondent able to read		0.1507	0.0387	0.0137	0.0089	0.0984
		(0.282)	(0.282)	(0.253)	(0.256)	(0.252)
Years of education for female respondent		-0.0254	-0.0189	-0.0308	-0.0260	-0.0438
		(0.038)	(0.036)	(0.032)	(0.035)	(0.036)
Indicator of for female in bad health		0.1100	0.0487	0.0048	-0.3547	-0.3437
		(0.383)	(0.374)	(0.356)	(0.375)	(0.350)
Empowerment Indicators						
Female respondent speaking at village meetings			0.4112***	0.2623*	0.1764	0.1931
			(0.155)	(0.153)	(0.152)	(0.159)
Wife has say on large purchases			-0.3278*	-0.2527	-0.2474	-0.2346
			(0.187)	(0.191)	(0.204)	(0.199)
Wife has say on transfers			0.1973	0.4117*	0.3355	0.3037
			(0.248)	(0.248)	(0.248)	(0.223)
Wife has say on number of children			-0.2181	-0.2762	-0.2679	-0.2743
			(0.202)	(0.189)	(0.192)	(0.176)
Wife has say on contraceptive use			0.0472	0.1000	0.2051	0.1776
			(0.200)	(0.223)	(0.208)	(0.198)
Household Characteristics						
Number of household members				0.1199	0.1405	0.1313
				(0.094)	(0.091)	(0.087)
Number of kids [<15] in household				-0.0451	-0.0833	-0.0876
				(0.111)	(0.111)	(0.106)
Indicator of household head being female				0.5678*	0.5234	0.4587
				(0.342)	(0.364)	(0.350)
Number of Income Generating Activities Within Household				-0.0135	0.0060	0.0010
				(0.061)	(0.060)	(0.064)
Household earning income from fishing				0.0678	0.1683	0.2647
				(0.252)	(0.247)	(0.245)
Received any coupon (seed or fertilizer)				0.1826	0.1478	0.1410
				(0.134)	(0.127)	(0.124)
Indicator for Household Head being Catholic				0.1893	0.1856	0.1485
				(0.228)	(0.219)	(0.212)
Indicator for Household Head being member of CCAP church				0.2977	0.3916*	0.4538**
				(0.213)	(0.217)	(0.224)
Household Head speaking Tumbuka as first language				0.2627	0.3429*	0.3861*
				(0.185)	(0.190)	(0.198)
Log value of land owned (MK)				0.1055***	0.1034***	0.1085***
				(0.037)	(0.035)	(0.035)
Log value of livestock (MK)				-0.0654***	-0.0594**	-0.0533*
				(0.025)	(0.027)	(0.028)
Log consumption per AE (MK/week)				0.0271	0.0171	0.0601
				(0.129)	(0.125)	(0.131)
Village Characteristics						
Number of Households in Village				-0.0009	-0.0013	-0.0020*
				(0.001)	(0.001)	(0.001)
Constant	-2.0367***	-1.9432**	-2.0539**	-3.3494**	-0.9382	-1.5285
	(0.655)	(0.836)	(0.835)	(1.439)	(1.077)	(1.126)
Observations	821	821	821	821	821	821
Pseudo R^2	0.109	0.110	0.136	0.197	0.139	0.095

Robust standard errors in parentheses, taking clustering at village level into account. Observations weighted using inverse probability of being sampled

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

Table 4: Robust Weighted Probit Regression of Participation Interest, Marginal Effects

VARIABLES	(1) finterest	(2) finterest	(3) finterest	(4) finterest	(5) finterest	(6) finterest
Personality Traits						
Perceived Self-Efficacy	0.0342***	0.0346***	0.0371***	0.0374***		
	(0.008)	(0.008)	(0.008)	(0.007)		
Perceived Locus of Control	-0.0211	-0.0213	-0.0244	-0.0278		
	(0.019)	(0.019)	(0.019)	(0.020)		
Indicator of having high risk aversion	-0.1815***	-0.1751***	-0.1469**	-0.1735**	-0.2215***	
	(0.067)	(0.067)	(0.070)	(0.072)	(0.067)	
Inconsistency answers to risk aversion questions	-0.1427*	-0.1371	-0.1398	-0.1365	-0.1469	
	(0.087)	(0.086)	(0.093)	(0.091)	(0.092)	
Indicator of having the highest measured time discount rate	-0.1830***	-0.1819***	-0.2051***	-0.1871***	-0.1959***	
	(0.066)	(0.065)	(0.063)	(0.052)	(0.048)	
Individual Characteristics						
Age of female respondent		-0.0011	-0.0028	-0.0045*	-0.0028	-0.0034
		(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Indicator of female respondent able to read		0.0593	0.0153	0.0054	0.0035	0.0387
		(0.110)	(0.111)	(0.099)	(0.101)	(0.099)
Years of education for female respondent		-0.0100	-0.0075	-0.0121	-0.0103	-0.0173
		(0.015)	(0.014)	(0.013)	(0.014)	(0.014)
Indicator of for female in bad health		0.0437	0.0193	0.0019	-0.1339	-0.1303
		(0.153)	(0.148)	(0.140)	(0.133)	(0.125)
Empowerment Indicators						
Female respondent speaking at village meetings			0.1617***	0.1031*	0.0696	0.0762
			(0.060)	(0.060)	(0.060)	(0.063)
Wife has say on large purchases			-0.1280*	-0.0986	-0.0968	-0.0920
			(0.072)	(0.074)	(0.079)	(0.077)
Wife has say on transfers			0.0776	0.1595*	0.1309	0.1188
			(0.097)	(0.094)	(0.095)	(0.086)
Wife has say on number of children			-0.0862	-0.1087	-0.1057	-0.1084
			(0.080)	(0.075)	(0.076)	(0.070)
Wife has say on contraceptive use			0.0186	0.0392	0.0802	0.0696
			(0.079)	(0.087)	(0.080)	(0.077)
Household Characteristics						
Number of household members				0.0472	0.0554	0.0519
				(0.037)	(0.036)	(0.034)
Number of kids [<15] in household				-0.0178	-0.0329	-0.0346
				(0.044)	(0.044)	(0.042)
Indicator of household head being female				0.2232*	0.2062	0.1813
				(0.130)	(0.139)	(0.135)
Number of Income Generating Activities Within Household				-0.0053	0.0024	0.0004
				(0.024)	(0.024)	(0.025)
Household earning income from fishing				0.0268	0.0668	0.1051
				(0.100)	(0.098)	(0.097)
Received any coupon (seed or fertilizer)				0.0714	0.0581	0.0555
				(0.052)	(0.050)	(0.049)
Indicator for Household Head being Catholic				0.0750	0.0737	0.0589
				(0.091)	(0.087)	(0.084)
Indicator for Household Head being member of CCAP church				0.1182	0.1552*	0.1794**
				(0.084)	(0.085)	(0.087)
Household Head speaking Tumbuka as first language				0.1013	0.1315*	0.1477**
				(0.069)	(0.070)	(0.072)
Log value of land owned (MK)				0.0415***	0.0408***	0.0429***
				(0.015)	(0.014)	(0.014)
Log value of livestock (MK)				-0.0257***	-0.0234**	-0.0210*
				(0.010)	(0.010)	(0.011)
Log consumption per AE (MK/week)				0.0107	0.0068	0.0237
				(0.051)	(0.050)	(0.052)
Village Characteristics						
Number of Households in Village				-0.0003	-0.0005	-0.0008*
				(0.000)	(0.000)	(0.000)
Observations	821	821	821	821	821	821
Pseudo R^2	0.109	0.110	0.136	0.197	0.139	0.095

Robust standard errors in parentheses, taking clustering at village level into account. Observations weighted using inverse probability of being sampled

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

Table 2 above shows the estimated coefficients from our weighted probit estimations on the indication of interest in participation in the VSLA project, while table 3 shows the estimated marginal effects at the sample mean. The first column shows the estimations including only our four measures of personality: perceived self-efficacy, perceived locus of control, an indicator of having high risk aversion and an indicator of being impatient. All, but the measured locus

of control are statistically significant at the one percent level, and have signs as would be expected. Having higher self-efficacy results in a higher probability of indicating interest in participation, while being very risk averse and impatient decreases the probability. On the other hand, not answering consistently does not have a significant effect on the participation decision - i.e. they are not significantly more or less likely to be interested in participation than the individuals that do not have a high risk aversion. The only puzzling fact from the first column, is that the measured locus of control is not a significant determinant of participation. From the estimated marginal effects at the sample mean shown in table three, it is evident that a one standard deviation increase in self-efficacy from the sample mean results in a 15.6 percentage point increase in the probability of being interested. Hence the personality measures have a considerable effect on the interest probability.

In the second column we include individual characteristics as controls. These characteristics are some easily observable, which could be thought to be used to characterize participation and economic achievement in a more standard data sample. However, none of the variables are significant determinants of participation, including the - admittedly crude - measures of cognitive skills namely the years of education of the respondent and the self-reported ability to read. The estimated coefficients and marginal effects of the four personality measures are very similar to those found in the first regression.

Third we include the female empowerment indicators: whether the individual speaks at village meetings and whether she has a say in the household decisions on important issues such as large purchases, transfers, the number of children to have and contraceptive use. Indicating being able to speak at village meetings has a significant positive effect on the probability of being interested, while having a say on large purchases in the household has a significant negative effect. While the first result is quite intuitive, the latter might seem more counter-intuitive. However, as we briefly argue in the description of the dataset in the previous section, this could be due to the participation decision by the individual being seen as a way to impose the preferences of the female household member on the household. But if the female member is already part of the household decisions on e.g. transfers, this may reduce the probability of participating, since participation comes at a cost of time. Again, it is strinking how little the estimated coefficients and marginal effects of the personality measures change in this specification compared to the two earlier models. All are still statistically significant at the one percent level.

In the fourth column we include a set of household characteristics as well as a measure of the village size. While a number of the control variables are insignificant in this regression, this is still our preferred specification, since a number of the included variables could be thought to be used as identifying interested individuals in a survey not taking personality traits into account. However, the size of the household, the number of kids, number of income generating activities,

earning income from fishing, receiving a government subsidized coupon for seed or fertilizer and religion has no significant effect on the interest probability. Since the project is targeting the poor and vulnerable households, it is somewhat comforting that the measured food consumption is not a significant determinant of participation - at least the poor measured by weekly food consumption are not less likely to participate than others, and female headed households are significantly more likely to be interested at the ten percent level. Especially interesting are the estimated coefficients on the value of land and livestock owned by the household. Having more land has a positive impact on the probability of participating while having more livestock decreases the probability of participating. At first this may seem surprising, but due to the focus on savings in the VSLA project, livestock could be a substitute to participation: An alternative to having monetary savings which could be improved by participating in the VSLA - through both increased safety and a higher return - could be to have savings in the form of livestock, which would be unaffected by the VSLA participation.

Once again, the estimated coefficients and marginal effects of three of our four personality measures are still very significant and similar to the earlier specifications, while locus of control is consistently insignificant in all specifications. In this model with all control variables, a one standard increase in the perceived self-efficacy from the sample mean - equivalent to moving to the 85th percentile of the distribution - results in a 17.0 percentage point higher probability of being interested. Similarly, the effects of risk aversion and impatience are not negligible: being highly risk averse reduced the probability of being interested with 17.3 percentage points, while being very impatient reduces the probability of being interested with 18.7 percentage points. Interestingly, our empowerment indicators are also affected by the inclusion of household characteristics. Speaking at village meetings is still significantly positive - albeit now at the ten percent level. This could be due to the variable being more an indicator of household empowerment in the community, rather than female empowerment within the household[6]. Furthermore, having a say on large purchases, which was marginally significant in the previous specification is now no longer significant, while having a say on transfer has now become marginally significant.

Finally in columns (5) and (6) of table 2 and 3 we see how well our model performs when we exclude the personality measures. In column 5 we only exclude the perceived self-efficacy and locus of control, while we in column 6 exclude all four personality variables. Not many of the other variables are significant in these two models: the value of land and livestock are still significant and with opposing signs, while the indicators of being a member of the CCAP church and speaking Tumbuka as a first language now becomes marginally significant. It is striking, however, how much worse these two specifications are at explaining the interest of

[6] We do not find evidence that the inclusion of village size only affects the effect of the variable, which could be an alternative specification (results not shown here but available upon request).

the respondents. While we were able to explain 19.7 percent of the variation in our preferred specification using all four personality measures, this drops to 13.9 percent when excluding the self-efficacy and locus of control and to 9.5 percent when excluding all four personality measures.

While we do not explicitly investigate the implications of not taking the self-selection on personality traits into account in an impact evaluation in this paper, it should leave the reader with some room for thought. Specifically, if the personaltiy traits are important for the actual individual outcome - as we would expect from the existing literature - not taking the self-selection on personality traits into account would overestimate the impact of the project. We will not encounter this problem in our future impact evaluation due to the randomized implementation, but it could have great importance for existing and future impact evaluations relying on more traditional evaluation techniques, where the main problem is the selection of a comparable control group. However, there is little evidence to suggest that the general self-efficacy measure used in this analysis should be specifically important with respect to a savings based microfinance project compared to other development projects involving active participation by the participants. Thus, the self-selection bias potential in an impact evaluation of this specific project could easily be extended to a wide range of delveopment projects.

6 Discussion and Future Research

Development projects often target the poorest and most vulnerable households. However, most projects also rely on some degree of voluntary participation, causing individuals and households to self-select into treatment. As such, even if projects are successful in attracting the poorest households measured in daily consumption levels per household member, the participating households may still be a select subsample of the most able individuals. Indeed, the local implementing NGO associated with the particular project of this paper stress in one of their quarterly narrative reports that "Self-selection process is very important for successful implementation of VSLAs", (5^{th} Narrative Report, p.22). If this self-selection is primarily done on unobservables, the external validity of the project becomes questionable because it will require expanding the project to other sub-populations with a similar skills-mix. It is therefore important not to be blinded by the success of the project and thus tempted to expand it to the remaining part of the village population, which did not self-select into the project in the first place.

In this paper, we find that there is indeed a strong degree of self-selection on what would typically be unobservables in standard impact evaluations. Using information on 821 households, we show that individuals with higher self-efficacy, less risk aversion and less impatience are more likely to be interested in participating in a VSLA, even when controlling for other

individual characteristics as well as household food consumption and wealth. This suggest that personality traits seem highly influencial when it comes to economic decision making. Self-efficacy has an effect on the probability of being interested in participation similar in magnitude to that of being highly risk averse or highly impatient: a one standard deviation increase in perceived self-efficacy increases the probability of being interested with 17 percent at the sample mean. Given these findings, it is somewhat surprising that we are unable to find any significant effect of locus of control, since this measure has been found to be important in several studies examining labour market achivement and educational choice in developed countries. We do believe that this may be due to the phrasing of the questions, which might require more local adaptation than the self-efficacy questions.

Having found that personality traits, and self-efficacy in particular, are important for the economic decision of participaing in a VSLA, the next obvious research question is of course, why? What are the underlying mechanisms resulting in this outcome? We can think of four possible channels through which self-efficacy may affect the participation decision. First of all, self-efficacy may have a positive effect on the individual's expected probability of actually complying with the set rules for VSLA membership, thus increasing the expected benefit of participation. Second, individuals with high levels of self-efficacy seem to have higher consumption levels, suggesting that they may also have higher indirect costs in terms of foregone earnings from having to sit in the (bi-)weekly VSLA meetings (which would generate a negative effect of self-efficacy on participation). Third, individuals with high levels of self-efficacy may also, in expectation, be able to make better use of this newly gained access to credit and savings possibilities and therefore have a higher expected future gain from participating. Finally, there is some suggestion that self-efficacy correlates with risk aversion. Although our measure of risk aversion is far from perfect, and may be seen more as a measure of gambling aversion than fluctuation aversion with respect to consumption, it could be that the combination of being less risk averse and with high self-efficacy, is exactly what makes an entrepreneurial individual willing to make new investments with potentially high returns. This could also, in expectation, for these individuals make their expected gain from participating even higher.

Obviously the underlying mechanism of how self-efficacy affects the participation decision is not straightforward. The exact mechanism can only be determined by developing and testing a more structural theoretical economic model, where the different channels can be tested against each other. This is material for future research. In this paper, we have merely aimed at providing some initial evidence on the importance of personality traits and non-cognitive skills when it comes to economic decision making in developing countries.

References

[1] Anderson, S, J. M. Baland (2002) The Economics of ROSCAs and Intrahousehld Ressource Allocation. *The Quarterly Journal of Economics*. 117(3) pp. 963-995.

[2] Andrisani, P., G. Nestel (1976). Internal-External Control as Contributor to and Outcome of Work Experience. *Journal of Applied Psychology.* 61(2) pp. 156-165.

[3] Ashraf, N., D. Karlan, W. Yin (2007). Tying Odysseus to the Mast. Evidence from a Commitment Savings Product in the Philippines. *The Quarterly Journal of Economics.* 121(2) pp. 673-697.

[4] Bandura, A. (1997). *Self-Efficacy: The Exercise of Control*. New York, W. H. Freeman

[5] Binswanger, H. P. (1980). Attitudes Towards Risk: Experimental Measurement in Rural India. *American Agricultural Economics Association.* 63(3). pp. 395-407.

[6] Bowles, S., H. Gintis, M. Osborne (2001) The Determinants of Earnings: A Behavioral Approach. *Journal of Economic Literature.* 39(4) pp. 1137-1176.

[7] Campbell, C. (2000). Selling Sex in the Time of AIDS: The Psycho-Social Context of Condom Use by Sex Workers on a Southern African Mine. *Social Science and Medicine*, 50, pp. 479-494.

[8] Carneiro, P., K. T. Hansen, J. J. Heckman (2003) Estimating Distribution of Treatment Effects with an Application to the Returns to Schooling and Measurement of the Effects of Uncertainty on College Choice. *International Economic Review.* 44(2) pp. 361-422.

[9] Cattell, R. B. (1966). Scree Test for Number of Factors. *Multivariate Behavioral Research.* 1(2) pp.245-276.

[10] Cunha, F., J. J. Heckman (2009). The Economics and Psychology of Inequality and Human Development, *Journal of the European Economic Association*, MIT Press, vol 7(2-3) pp. 320-364

[11] Cunha, F., J. J. Heckman, S. M. Schennach. (2010). Estimating the Technology of Cognitive and Noncognitive Skill Formation. Econometrica, 78, 3, pp. 883-931.

[12] DiClemente, Prochaska, Fairhurst, Velicer, Velasquez and Rossi (1991): The Process of Smoking Cessation: An Analysis of Precontemplation,Contemplation and Preparation Stages of Change. *Journal of Consulting and Clinical Psychology.* 59(2) pp. 295-304.

[13] Digman, J. (1989). Five Robust Trat Dimensions: Development, Stability, and Utility. *Journal of Personality.* 57(2) pp. 195-214.

[14] Duncan, G., J. Morgan (1981). Sense of Efficacy and Subsequent Change in Earnings - A Replication. *Journal of Human Resources.* XVI (4) pp. 649-657.

[15] Flossmann, A. L., R. Piatek, L. Wichert (2007). Going Beyond Returns to Education: The Role of Noncognitive Skills on Wages in Germany. *Unpublished Working Paper, University of Konstanz.*

[16] Harrison, G. W., M. I. Lau, M. B. Williams (2002). Estimating Individual Discount Rates in Denmark: A Field Experiment. *American Economic Review.* 92(5) pp. 1606-1617.

[17] Heckman,J., J. Hsse, Y. Rubinstein (2002). The GED is a 'Mixed Signal'. The Effect of Cognitive and Non-Cognitive Skillds on Human Capital and Labor Market Outcomes. *Presented at AEA Meeting, Boston, Massachussets, January 2000*

[18] Heckman, J. J., J. Stixrud, S. Urzua (2006). The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior. *Journal of Labor Economics.* 24(3) pp. 411-482.

[19] Heineck, H., S. Anger (2010). The Returns to Cognitive Abilities and Personality Traits in Germany. *Labour Economics* vol. 17, pp. 535-546

[20] Kaiser, H. F. (1960) The Application of Electronic Computers to Factor Analysis, *Educational and Psychological Measurement,* 20 pp. 141-151.

[21] Krueger, N. F. (2000). The Cognitive Infrastructure of Opportunity Emergence. *Entrepreneurship. Theory and Practice* Spring, pp. 5-23.

[22] Lee, S., H. J. Klein (2002) Relationships Between Conscientiousness, Self-Efficacy, Self-Deception, and Learning Over Time. *Journal of Applied Psychology.* 87(6) pp. 1175-1182.

[23] Lønborg, J. H. (2010). Does Personality Matter for Economic Achievement? A Literature Review. *Unpublished Working Paper.*

[24] Martocchio, J. J., T. A. Judge (1997). Relationship Between Conscientiousness and Learning in Employee Training: Mediating Influences of Self-Deception and Self-Efficacy. *Journal of Applied Psychology.* 82(5) pp. 764-773.

[25] Mincer, J. A. (1974). *Schooling, Experience and Earnings.* Columbia University Press.

[26] Mulaik, S. A. (2010). *Foundations of Factor Analysis.* Boca Raton, Taylor and Francis Group, LLC.

[27] Noe, R. A. (1986). Trainees' Attributes and Attitudes: Neglected Influences on Training Effectiveness. *Academy of Management Review.* 11(4) pp. 736-749.

[28] Phillips, J. M., S. M. Gully (1997). Role of Goal Orientation, Ability, Need for Achievement, and Locus of Control in the Self-Efficacy and Goal Setting Process. *Journal of Applied Psychology.* 82(5) 792-802.

[29] Piatek, R., P. Pinger (2010) Maintaining (Locus of) Control? Assessing the Impact of Locus of Control on Education Decisions and Wages. *IZA Discussion Paper,* no. 5289, pp 1-50.

[30] Rotter, J. (1966). Generalized Expectancies for Internal Versus External Control of Reinforcement. *Psychological Monographs.* 80(1) pp. 1-28.

[31] Scholz, U., B. G. Doña, S. Shonali, R. Schwarzer (2002). Is General Self-Efficacy a Universal Construct? Psychometric Findings from 25 Countries. *European Journal of Psychological Assessment.* 18(3) pp. 242-251.

[32] Schwarzer, R., M. Jerusalem (1995) Generalized Self-Efficacy Scale, in J. Weinman, S. Wright and M. Johnson, *Measures in Health Psychology, A User's Portfolio. Casual and Control Beliefs.* (pp. 35-37). Windsor, UK: NFER-NELSON.

[33] Spence, M. (1973). Job Market Signaling. *Quarterly Journal of Economics,* 87(3) pp. 355-374.

[34] Thiel, H., S.L. Thompson (2009). Noncognitive Skills in Economics: Models, Measurement and Empirical Evidence. *FEMM Working Paper* No. 37, November 2009.

[35] Trompenaars, F. (1994). *Riding the Waves of Culture - Understanding Cultural Diversity in Business.* Burr Ridge, Irwin Professional Publications.

[36] Weiss, A. (1995). Human Capital vs. Signalling Explanations of Wages. *Journal of Economic Perspectives.* 9(4) pp. 133-154.

A Assessing Personality Traits

The following section of the questionnaire was used to assess the self-efficacy and locus of control of the respondent.

Now I would like to ask you some questions about how you feel about your life so far. I am going to read you two statements, and I want you to tell me which of them is more true for you.

		ANSWER
1.	a) Many times I feel that I have little influence over the things that happen to me. b) I do not believe that chance or luck plays an important role in my life	
2.	*a)* As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control b) By taking an active part in political and social affairs the people can control world events	
3.	*a)* Who gets to be the boss often depends on who was lucky enough to be in the right place first. *b)* Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.	
4.	*a)* Most people don't realize the extent to which their lives are controlled by accidental happenings. b) There really is no such thing as "luck"	
5.	a) Without the right breaks one cannot be an effective leader. b) Capable people who fail to become leaders have not taken advantage of their opportunities.	
6.	a) Being successful in life is a matter of hard work; luck has little or nothing to do with it b) Getting a good job depends mainly on being in the right place at the right time.	
7.	a) In the long run, people get what they deserve in this world. b) Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.	
8.	*a)* In my case getting what I want has little or nothing to do with luck. *b)* Many times we might just as well decide what to do by flipping a coin	
9.	a) The average citizen can have an influence in government decisions. b) This world is run by the few people in power, and there is not much the little guy can do about it	
10.	*a)* When I make plans I am almost certain that I can make them work. b) It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.	

Now I am going to read you some statements. I would like you to state whether you think the statements are "Not at all true", "Hardly true", "Moderately true" or "Exactly true"

		1. Not at all true 2. Hardly true 3. Moderately true 4. Exactly true
11.	I can always manage to solve difficult problems if I try hard enough	
12.	If someone opposes me, I can find the means and ways to get what I want	
13.	It is easy for me to stick to my aims and accomplish my goals.	
14.	I am confident that I could deal efficiently with unexpected events.	
15.	Thanks to my resourcefulness, I know how to handle unforeseen situations.	
16.	I can solve most problems if I invest the necessary effort.	
17.	I can remain calm when facing difficulties because I can rely on my coping abilities.	
18.	When I am confronted with a problem, I can usually find several solutions.	
19.	If I am in trouble, I can usually think of a solution	
20.	I can usually handle whatever comes my way.	

The following questions were used to asses the risk aversion and time discount rate of the respondents.

Risk Aversion

Suppose that you receive a free gift of seeds for a small part of your land. You have the choice between two types of seeds of maize. Both need the same labour and fertilizer and taste the same. One type of maize yields 20 tins of maize for sure. The yield of the other one can change from year to year.		
Would you choose the crop that yields 20 tins of maize for sure, or the crop that yields a 50-50 percent chance to receive 40 tins but with a 50/50 chance has a yield of 0 tins	1. 20 tins for sure 2. 50-50 chance for 40 tins and otherwise receive 0	
Would you choose the crop that yields 20 tins of maize for sure, or the crop that yields 13.5 tins for sure and a 50-50 percent chance to receive another 27.5 tins.	1. 20 tins for sure 2. 13.5 tins for sure and a 50/50 chance to get another 27.5 tins	
Would you choose the crop that yields 20 tins of maize for sure, or the crop that yields 18 tins for sure and a 50-50 percent chance to receive another 22 tins	1. 20 tins for sure 2. 18 bags for sure and a 50/50 chance to get another 22 bags	
Would you choose the crop that yields 20 tins of maize for sure, or the crop that yields 10 tins for sure and a 50-50 percent chance to receive another 30 tins	1. 20 tins for sure 2. 10 tins for sure and another 50-50 chance to get another 30 tins	

Intertemporal Discount Rates

Imagine you had won in a lottery, and the prize is 2000 Kwacha. The lottery allows you two options. You can either receive 2000 Kwacha now or 2000 Kwacha in one month. Imagine it is guaranteed that you will receive the money in one month if you choose the second option.

ID0	Would you prefer to have the 2000 Kwacha now or in one month.	1. 2000 Kwacha now 2. 2000 Kwacha in one month >> NEXT SECTION	
ID11	Would you prefer to have the 2000 Kwacha now or 2300 in one month.	1. 2000 Kwacha now 2. 2300 Kwacha in one month >>ID21	
ID12	Would you prefer to have the 2000 Kwacha now or 2800 in one month.	1. 2000 Kwacha now >>Next Section 2. 2800 Kwacha in one month	
ID13	Would you prefer to have the 2000 Kwacha now or 2400 in one month.	1. 2000 Kwacha now 2. 2400 Kwacha in one month >>NEXT SECTION	
ID21	Would you prefer to have the 2000 Kwacha now or 2150 in one month.	1. 2000 Kwacha now 2. 2150 Kwacha in one month >>ID23	
ID22	Would you prefer to have the 2000 Kwacha now or 2225 in one month.	1. 2000 Kwacha now >> NEXT SECTION 2. 2225 Kwacha in one month >> NEXT SECTION	
ID23	Would you prefer to have the 2000 Kwacha now or 2075 in one month.	1. 2000 Kwacha now 2. 2075 Kwacha in one month	