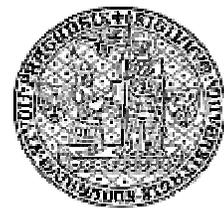


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Does Education Matter in Patience Formation? Evidence from Ugandan Villages

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Does Education Matter in Patience Formation? Evidence from Ugandan Villages

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Abstract:

The paper aims to contribute to the understanding of why there is a lack of domestic saving and investment in rural parts of sub-Saharan Africa. It focuses on heterogeneity in inter-temporal preferences as a possible explanation of this important puzzle. The study is based on a unique experimental data set collected from 856 respondents in Ugandan villages and scrutinizes how individual patience – measured by the discount rate – is formed.

The results suggest that Ugandan respondents are substantially less patient than their counterparts in similar experimental studies undertaken in developed countries and South Asia. We find a strong negative association between the level of education and the individual discount rate. Furthermore, we took advantage of the Ugandan education reform in 1996 and varying school frequency to demonstrate the causal relationship stemming from education to patience. The estimates suggest that an additional year at school decreases the discount rate on average by 35 percentage points after controlling for other characteristics (age, income group, sex, marital status and clan linkage).

Our findings strongly accord with patience understood as a non-cognitive ability which needs to be taught by parents, learnt at school and promoted by social norms. The Ugandan responses, therefore, propose a new way in which education may influence development in sub-Saharan Africa – by shaping individual patience.

Keywords: Time preference, patience, discount rate, education, savings, economic development, field survey, sub-Saharan Africa

JEL: C93, D91, O12

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1 Introduction and Hypotheses

There is hardly any bigger puzzle for development economists and policy-makers than the question of why there is not more indigenous saving and investment in poor countries. Especially in the context of the persistent poverty in mostly agricultural sub-Saharan Africa, it is striking how local people do often not respond to the high rates of return on productive investments in agriculture. These instances are well documented. McKenzie and Woodruff (2003) estimated African rates of return to be 15% per month for amounts of USD 200. Goldstein and Udry (1999) estimated the rate of return to the production of pineapple in Ghana. The rate of return associated with switching from traditional maize and cassava to pineapple are estimated to be in excess of 1,200%. However, very few people have decided to grow pineapple even though doing so requires only a moderate initial investment which could easily be covered by a loan collateralized by the land owned by these farmers. Similarly, Duflo, Kremer and Robinson (2003) find that less than 15% of maize farmers in the area where they conducted field trials on the profitability of fertilizer report that they have used fertilizer in the previous season, despite an estimated rate of return in excess of 150%. The limited responsiveness to high marginal product in poor countries is usually attributed to credit constraints, government failures and insurance market failures (for a survey see Banerjee and Duflo, 2004). Recently, growing attention has been paid to behavioral issues and psychological factors that limit saving and investment decisions not by affecting the constraints, but by changing the decision-making process itself.¹

Back in 1914, Böhm-Bawerk (in Becker and Mulligan, 1997: 731) highlighted the importance of differences across individuals in the degree of patience: *“The intensity of the preference for present gratifications varies greatly from person to person, as is attested by that famous scale which ranges from the American Indian who will sell the ancestral hunting grounds for a dram of ‘firewater’ to the sober, provident and educated scion of Europe’s cultured peoples.”* Our research is, among other reasons, inspired and motivated by a simple but telling story which happened in the area where we organized the survey and which has a number of common features with Böhm-Bawerk’s observation.² In 2004, a large proportion of Ugandan farmers were growing vanilla and as there was a boom in the international vanilla market farmers had a substantially higher income (approx. US\$ 200,000, or USD 110, per month) than they expected and were used to earning. However, virtually no one made any precautionary savings or invested some proportion in better tools or fertilizers. The additional

¹ For interesting articles which try to identify this research agenda, see Ray (2003), Duflo (2003) or Mullainathan (2005).

² These observations stem from the half-year which the authors spent teaching and researching in Ugandan villages.

money was immediately spent on nice t-shirts, alcohol and coke, and men paid bride-prices for new wives. After several lucrative months the price of vanilla decreased rapidly and the same people were left with no money for health care for family members or school fees for their children.³

The aim of this paper is to study the determination of an individual's patience, as we think a different perception of time has the capacity to explain a number of observable phenomena in sub-Saharan Africa. Within the traditional focus on constraints, the high time preference and lack of saving in sub-Saharan Africa is usually attributed to lack of discretionary income above the subsistence level and it is argued that individuals do not have enough money to save (see, for example, Sachs, 2004, or, for a survey, Azariadis and Stachurski, 2004). Similarly, Chakraborty (2004), Chakraborty and Das (2005), and Haaparta and Puhakka (2004) argue that a lack of income prevents people from investing in health and that their consequently low life expectancy distorts saving. However, these theoretical advances have not been followed by micro-level evidence. In contrast to the substantial body of experimental literature on the subjective discount rate in developed countries (for a comprehensive survey see Frederick, Loewenstein and O'Donoghue, 2002) we have not found any field experiment from rural parts of sub-Saharan Africa linking patience with individual characteristics.

In this paper, we summarize the results of a field survey conducted in Ugandan villages which focuses on the subjective discount rate. To understand the determinants of patience, we also collect a variety of background data (age, sex, education, profession-income, clan linkage and marital status). The empirical results suggest that the roots of the high time preference may go further than just a lack of income. Non-cognitive skills linked to education and social norms seem to play an important role. In the experiment Ugandan respondents were asked to choose between an additional unexpected amount of Ugandan shillings equivalent to \$110 right now and higher amounts one year later. Even though the respondents were clearly not constrained by subsistence, the subjective discount rate still turned out to be extremely high (385% annually). Interestingly, a substantial part of the variation can be explained by level of education, age and clan-related social norms after controlling for other variables. Our estimates show that an additional year of education lowers the discount rate by 35 percentage points.

In the seminal economics article on the subject, Strotz (1956: 177) expressed the view that people are born with certain discount functions, but the true discount function becomes sublimated by parental teaching and social pressure. Many psychological studies demonstrate that humans are born impatient (Mischel, Shoda and Rodriguez, 1989). Learning to be future-oriented and to choose actions whose reward is postponed in time is an essential part of our upbringing and educational process. Without such learning people would live solely in the present without much will to resist current temptations and would simply omit future pleasures from their decision-making process (Deopke and Zilibotti, 2005; Shonkoff and Phillips, 2000). Additionally, Becker and Mulligan (1997) argue that education can be understood as an investment in patience. Education can help in forming a mental picture of one's future pleasures and difficulties in life and enhances the process of anticipation. In addition, through repeated practice at problem-solving education helps one to learn the art of

³ A similar attitude to the future can be found in the main Ugandan English lecture book English in Use II for secondary schools in an exercise for practicing the conditional clause. Mbogo and Ndege are employees of Bwana Matata (English in Use: 95): "Mbogo: If Bwana Matata paid me my wage three months in advance, I could have another wife. Ndege: But if you spent all your money for a new wife, you would not have any money for living. Mbogo: If I didn't have any money, my wife would go and work on a field. Ndege: If she knew it, she would not marry you. Mbogo: If she really loved me, she would surely marry me. Ndege: Anyway, I don't think old Matata would agree. If he gave the money to you, all the others would like to have it as well."

scenario simulation. Thus, education may be understood as a tool which helps people to reduce the remoteness of future pleasures. To summarize these advances we can, again, rely on the writing of Böhm-Bawerk: *“The present always gets its rights. It forces itself upon us through our senses. To cry for food when hungry occurs even to a baby. But future we must anticipate and picture... We must be able to form a mental picture of what will be the state of our wants, needs, feelings, at any particular point of time.”*

The remainder of the paper is organized as follows. In Section 2, we describe the survey design, sample and major variables. In Section 3, we show the relationship of the discount rate to individual characteristics and demonstrate the causal effect of education on patience. Section 4 concludes.

2 Survey Design, Sample and Major Variables

This study is based on data from a questionnaire survey that was conducted in ten villages in rural areas of the Mukono district (in the southern part of Uganda) under the auspices of the Institute of Economic Studies, Charles University in Prague and the Uganda Czech Development Trust (UCDT) – a Czech NGO associated with Caritas. People usually grow maize, vegetables, green bananas, cassava, vanilla and coffee. The vast majority of households are very poor by any standards, with the average per capita income less than USD 300 a year and life expectancy at birth 46 years, largely because of malaria and HIV/AIDS. As 85% of Ugandan inhabitants live in rural areas with similar characteristics (WDI, 2005) and our respondents are not considerably better or worse off than other rural Ugandans, this area can be considered representative of much of Uganda. The questionnaires were distributed in the following ten villages: Kikube, Busagazi, Kateete, Buikwe, Nakifuma, Bweyogerere, Kasolo, Kygaya, Lugasa and Kirugu.

A total of 910 respondents participated in the study and all questionnaires were completed during the first two weeks of November 2005. The respondents were assured that their responses would be anonymous. In all, 54 questionnaires were not filled out completely – 28 respondents did not answer the question on the discount rate, and another 26 answered the question on the discount rate but did not give information on one of the individual characteristics (usually age, as not knowing one’s precise date of birth is quite common in the area). The incomplete questionnaires were put aside and not included in the statistical analysis. Our sample size is thus 856 respondents.

Admittedly, completely random selection of respondents in the Ugandan rural population is an impossible task, as there are no lists of residents available for rural areas. The questionnaires were distributed by 30 UCDT social workers who live in the particular villages and who have a very deep knowledge of local people. Three social workers were responsible for distributing questionnaires in each village and they were instructed to approach a sample of respondents who are as representative of the village as possible.

Most of the respondents are farmers; others are mostly students, housewives, drivers, teachers or shopkeepers. The resulting structure of our sample in terms of age, education, marital status and other individual characteristics is illustrated in Table 2. The average educational attainment in our sample is higher than for Uganda as a whole, where the secondary school enrollment rate is 23% (WB, 2006), whereas one half of our respondents experienced at least one year at secondary school. The questionnaires were bilingual – in English and Luganda –

to allow us to approach less educated people who speak only Luganda⁴; however, illiterate Ugandans could not participate. The Ugandan illiteracy rate among people aged over 15 years is 31% (WDI, 2005). Illiteracy partly explains why our respondents are more educated and slightly younger than the Ugandan average. The selected sample is to a large extent representative of the literate rural population in Uganda.

The survey focused not only on time preference, but also on desired fertility, which is not analyzed in this paper. The questionnaire had 7 pages, but the length was doubled by the inclusion of the Luganda translation. The respondents were not time-constrained when filling out the questionnaires. Most of them did not have previous experience with filling out such questionnaires (besides voting sheets) and they approached the task very responsibly. On average they spent one and a half hours answering the questions.

Table 1: Respondents and schools by villages

	Kikube	Busagazi	Kateete	Buikwe	Nakifuma	Bweyogerere	Kasolo	Kygya	Lugasa	Kirugu
Frequency										
N	103	41	130	147	45	95	81	49	117	48
Proportion in sample	12%	5%	15%	17%	5%	11%	9%	6%	14%	6%
Education accessibility										
Number of primary schools	12	3	9	10	12	16	12	8	12	7
Number of secondary schools	2	2	4	3	3	8	6	4	5	4

Table 2: Descriptive statistics: total, by sex and age group

	Total	Sex		Age group				
		Man	Woman	15-18	19-23	24-28	29-34	35-70
Frequency								
N	856	465	391	271	181	146	99	159
Fraction in sample	100%	54%	46%	32%	21%	17%	12%	19%
Education								
Fraction who completed P4	93%	94%	92%	97%	97%	95%	92%	83%
Fraction who completed P7	70%	74%	66%	80%	78%	71%	67%	46%
Fraction who completed S2	49%	51%	47%	36%	69%	64%	55%	31%
Fraction who completed S6	7%	9%	6%	0%	3%	18%	24%	4%
Age (mean)	26	26	25	16	21	26	31	44
Family								
Single	487	274	213	259	144	60	10	14
Married or divorced	369	191	178	12	37	86	89	145
Respondents with strong clan linkage	161	117	44	46	30	22	13	50
Income								
Lowest income group	246	110	136	19	34	46	40	107
Middle income group	485	277	208	249	126	54	25	31
Highest income group	125	78	47	3	21	46	34	21

For eliciting the individual discount rate we will use question which is increasingly being used in the studies where also less educated respondents participate (Coller and Williams, 1999 and Harrison, Lau and Williams, 2002) in contrast to earlier studies conducted only among graduate students in laboratory conditions (Thaler, 1981 or Benzion a Yagil, 1989).

⁴ The official language in Uganda is English. The different local languages reflect the tribal divisions within Uganda. Luganda is the language of the Baganda people – the largest tribe in Uganda.

In similar experimental studies in developed countries the subjective discount rate was typically (e.g. Thaler, 1981 or Benzion and Yagil, 1989) inferred from a future amount which a respondent states as being equally desirable as a different amount right now. We increasingly popular question used by Collier and Williams (1999) and Harrison, Lau and Williams (2002). It is extremely simple: Do you prefer US\$ 200,000 (USD 110) now or US\$ 200,000 + X one year later, where X is some positive amount? We posed five such questions, each question increasing X by some amount. As we increase X we expect more individuals to select the future option. The point at which a given respondent switches from the current amount to the future amount provides a range for his/her discount rate. The exact wording of this question is given in the Appendix.

The advantages and disadvantages of this type of experimental study noted in the literature (for details, see, for example, Benzion and Yagil, 2001) apply to this study as well. The first issue relates to proper understanding of the questions, as the majority of local people do not have any experience with such exercises. In order to limit systematic misunderstanding there were three rounds of pre-testing with 10 respondents, and the questionnaires were adjusted based on follow-up discussions. In addition, 30 local employees of the Uganda Czech Development Trust were trained and worked as instructors when individually distributing the questionnaires to the respondents.

Secondly, in experiments with hypothetical rewards there is a concern that respondents will have little incentive to work hard or thoughtfully on their responses and hence the responses may not reflect their actual economic decisions (Harrison et al., 2005). However, Chabris, Laibson and Schuldt (2006) reviewed recent experiments that study both real choices and hypothetical choices among the same respondents and show that systematic differences in the discount rate in response to real and hypothetical choices are typically not found. Also, Camerer and Hogarth (1999: 8), who reviewed the issue of financial incentives on 74 earlier experiments with differing levels of financial incentives, conclude: “the overwhelming finding is that increased incentives do not change average behavior substantively (although the variance of responses often decreases).”

In traditional communities the person or organization that organizes the experiment is a very important parameter in terms of how local people approach the assigned tasks. The high social status of, and respect for, the instructors (social workers) within the village community also helped to mitigate the possible problem of missing monetary incentives and we therefore believe that the respondents were positively motivated and completed the questionnaire with the necessary care and diligence.

Thirdly, another issue relates to binary choices, as the range between the lowest (0%) and highest discount rate (650%) may not be sufficient to cover the preferences of some of the respondents. Although we increased the range upwards after pre-testing, the upper bound was still not high enough for 437 respondents, who chose the current option even in the last pair where the future option was highest. In the statistical analysis we employed 650% as a censoring value for these responses. As consequence the estimates of the discount rate may be biased downwards.

Fourthly, high inflation – or experience of it – might drive the absolute values of the discount rates, as the rewards were in local currency. However, Uganda is quite a low-inflation country and its inflation levels do not differ significantly from those in developed economies⁵, hence any such effect should be rather moderate.

⁵ The average inflation rate for the period 2000–2004 was 4.3 percent (WDI, 2005).

The questionnaire inquired about the following characteristics: education, age, sex, marital status, clan linkage and income. For details on the descriptive statistics of the sample see Table 2. Five values are assigned to five different age groups: the first cohort is of age 15–18, the second cohort is 19–23, the third cohort is 24–28, the fourth is 29–34 and the oldest cohort is 35 years and over. Sex is a standard dummy variable where women are equal to 1. Marital status is also a dummy that distinguishes single respondents from those married, divorced and widows.

The level of education was measured by the number of school classes completed by the respondent. At some points in the text we also refer to lower primary school (P1–P4), higher primary school (P5–P7), lower secondary school (S1–S2), higher secondary school (S3–S6) and above secondary school education level (diploma, bachelor or other university education).

The respondents also indicated their village of residence. This information allowed us to assign each respondent a level of geographical proximity to education facilities as measured by the number of primary and secondary schools in the given village area (see Table 1).

Strength of clan is a dummy variable that attempts to reflect the individual's embeddedness within family structures. A clan is a subunit of a tribe and consists of families that believe they have the same ancestor. The respondents were asked whether their decision-making process was largely influenced by their clan links or not. Although we are aware that the clan dummy is far from being a perfect approximation of the strength of traditional social norms perceived by an individual, it may at least partially reflect its effects on patience.

Measuring income with a question on monetary units is usually avoided in an economic environment based on subsistence farming and non-monetary character of the income. Therefore, we asked about profession and divided the respondents into three groups. The lowest-income group comprises farmers and housewives. The middle-income group consists of shopkeepers⁶, students and other-than-stipulated professions. The high-income group accommodates teachers, drivers and employees of NGOs or public bodies. The income group variable has three values: lowest = 1, middle = 2, and highest = 3.

3 The Discount Rate and its Determinants

Average Discount Rate

Experimental studies on discount rates suggest that the rate is not constant and may differ due to the effect of delay, size and sign of the amount in question (Frederick et al., 2002). Even though comparing the absolute values from developed countries and Ugandan villages is a tricky and rather vague exercise, we still believe a rough and rather illustrative comparison is useful after taking into account the above-mentioned effects.

As shown originally by Thaler (1981) the discount rate seems to be inversely related to the size of the amount in question. The smaller the amount (e.g. USD 5 compared to USD 50) the higher the discount rate. Thaler also found that losses and gains are perceived differently in his research on “reference based preferences.” Thaler's study demonstrated that discount rates for losses are lower than discount rates for gains, over similar time periods and with similar amounts in question. Thirdly, discount rates seem to be higher for short delays – e.g. three days – than for long delays – e.g. one year.

⁶ Village shops are usually small shelters or huts where agricultural products and some small number of basic commodities are sold.

If we control for the delay effect in the review of Frederick et al. (2002) and pick the studies which measure the one-year discount rate as in our study, we find an average of 39% for developed countries. Experimental studies from developing countries are still very rare. Pender (1996) measured discount rates in Indian villages and found a median discount rate of less than 50%. Anderson et al. (2004) empirically tested the discount rates in Vietnam and found no significant differences in patterns of discount rates between individuals in Vietnam as a representative of a poorer country and empirical evidence from other research conducted in more affluent countries. Interestingly, in the concluding section they point out: “*What does seem plausible, however, is that they have less formal financial management experience and education and fewer opportunities or options to develop control mechanisms to manage present consumption biases. Unfortunately, we did not collect data on education....*”

The average discount rate across our sample is 385%. The respondents were deciding about a relatively high amount (US\$ 100,000, which at the time of the research was 1.5 times the average monthly income) which they were supposed to gain and about an alternative amount with a one-year delay. We decided to employ five binary choices (six possible outcomes) to ensure that they were understood. However, this decision eliminated the possibility of quantifying the above-mentioned effects of size, sign and delay, because, as we found from pre-testing, a questionnaire involving more types of binary choices would be too demanding for the respondents. Therefore, there may be some downward effect stemming from the size of the amount and the censoring of the highest discount rates, and an upward effect stemming from different perceptions of gains vs. losses.

Even though we acknowledge how precarious the comparison across different studies is, we feel safe in claiming that based on the evidence collected the discount rate in Ugandan villages is substantially higher than in developed countries or in South Asia. The discount rate turned out to be roughly ten times higher. In any case, none of the caveats expressed above should be systemic across the demographics in the Ugandan study. Hence we hope they should not substantially affect the significance of the possible relations between socio-demographic characteristics and the discount rate, which are the focal point of this paper.

Model Specification

We share the view of Anderson et al. (2004: 880) that we know surprisingly little about how discount rates are formed. Although the discount rate is perhaps biologically determined to some degree, it is reasonable to regard it as not immutable. As mentioned above we collected data on a variety of respondent characteristics and we will now explore how these characteristics are associated with the discount rate.

In our analysis we will mostly rely on comparison of means and results of regressions based on the following specification:

$$DR = C + \beta_0 EDU + \beta_1 AGE + \beta_2 SEX + \beta_3 FAM + \beta_4 CLAN + \beta_5 INC + \varepsilon \quad (1)$$

where DR = discount rate, C = constant, EDU = years of education, AGE = age cohort, SEX is clear, FAM = family status, CLAN = clan linkage, INC = income group and ε is the error term. The resulting betas measure how the given variable is associated with the discount rate.

The statistical results are summarized in Table 3, and Table 4 presents the regression results. Besides running simple OLS we tried to address three major possible drawbacks of our data. Firstly, to deal with the fixed effects of the specific villages where the data were collected we included clustering in the OLS regression. The resulting standard errors and significance levels were not substantially different from those of OLS without clustering. Secondly, we

employed multinomial ordered PROBIT, as the inferred discount rate is not a continuous variable (it consists of six values) as a consequence of the binary-choice type of question. TOBIT deals with the truncation of the data, as binary choices create a left-censoring limit (discount rate = 0.0) and a right-censoring limit (discount rate = 6.5).

Table 3: Discount rate: means and standard deviations for subgroups

		Mean	Standard deviation	95% conf. Interval	
Education	lower PS	4.61 (0.35)	3.93	5.29	
	higher PS	4.51 (0.19)	1.14	4.87	
	lower SS	3.91 (0.22)	3.49	4.33	
	higher SS	3.45 (0.15)	3.14	3.75	
	above SS	3.22 (0.35)	2.53	3.91	
Age cohort	15-18	3.32 (0.18)	2.98	3.67	
	19-23	3.82 (0.21)	3.40	4.24	
	24-28	4.08 (0.22)	3.64	4.52	
	29-34	3.92 (0.29)	3.35	4.48	
	35-70	4.54 (0.22)	4.12	4.96	
Sex	Men	3.79 (0.13)	3.53	4.05	
	Women	3.93 (0.14)	3.65	4.21	
Clan	Strong linkage	3.72 (0.11)	3.50	3.93	
	Weak linkage	4.43 (0.21)	4.03	4.84	
Income group	Lowest income	4.32 (0.18)	3.97	4.66	
	Middle income	3.61 (0.13)	3.35	3.86	
	Highest income	3.89 (0.26)	3.39	4.39	

Table 4: OLS, PROBIT and TOBIT results for discount rate

	(1) OLS	(2) OLS cluster	(3) Ordered Probit	(4) Tobit
Intercept	4.00 *** (0.45)	4.00 *** (0.65)		6.18 *** (1.28)
Education (years)	-0.16 *** (0.04)	-0.16 *** (0.04)	-0.06 *** (0.02)	-0.44 *** (0.12)
Age cohort	0.28 *** (0.09)	0.28 ** (0.10)	0.12 *** (0.04)	0.90 *** (0.27)
Sex (woman=1)	0.19 (0.20)	0.19 (0.19)	0.05 (0.08)	0.42 (0.57)
Family status (married/div.=1)	-0.05 (0.28)	-0.05 (0.23)	0.00 (0.12)	-0.23 (0.82)
Clan linkage (strong=1)	0.47 * (0.26)	0.47 (0.28)	0.19 * (0.11)	1.15 (0.74)
Income group	0.26 (0.19)	0.26 (0.21)	0.10 (0.08)	0.72 (0.53)
Prob > F, chi2	0.00	0.00	0.00	0.00
Observations	856	856	856	856

Note: Standard deviations are in parentheses.
 *** Indicates significance at the 1% level.
 ** Indicates significance at the 5% level.
 * Indicates significance at the 10% level.

Education

The first interesting outcome is a robust negative association between the level of education and the discount rate. Respondents with higher primary school education have a discount rate 100 percentage points higher than respondents with higher secondary school education. According to the OLS estimates there is on average a decrease of 16% for each additional year at school after we control for other variables (age, sex, family, clan and income). Education remains a significant variable at the 1% level for all types of regressions.

Although the Ugandan empirical results strongly comply with the view that educated people are better equipped to resist the temptation of current gratification (see Shefrin and Thaler, 1992), the data still do not provide an answer to the equally important question regarding mutual causality. Does education affect inter-temporal choices, or is an individual's patience affected by some omitted variable (e.g. inborn characteristics) and, due to the lower discount rate, the individual goes to school more?

A standard solution to the problem of causal inference is the instrumental variables method, where the existence of an observable covariate that affects schooling choices but is uncorrelated with ability factors (in our case inborn capabilities) is posited. Recent research in labor economics (for a survey see Card, 1998) on schooling usually employs the institutional features of the schooling system as a source of credible information for disentangling the causal effects of schooling. The institutional sources of variation in schooling may be attributable to tuition costs or geographic proximity of schools.

Long distance to school and school fees are widely regarded as major obstacles to higher school attendance in sub-Saharan Africa (World Bank, 2002) and many studies (e.g. Duflo, 2001) have demonstrated an increase in education after an increase in school availability. UCDT runs its development programs in ten village areas where subsistence farming is a major economic activity.⁷ Three social workers – instructors for the purposes of this survey – are responsible for each village area, because the village areas are of similar geographical size and similar population density. Therefore, we were able to approximate the distance to school by the number of primary and secondary schools in the respondent's village area. The higher is the number of schools in the region, the lower should be the distance to school and the easier should be the access to education. Assuming an equal distribution of abilities (discount rate) across the population⁸, a higher level of school proximity should lead to higher education levels. Indeed, we found a 1% significant positive correlation between educational attainment and the number of both primary and secondary schools in the given region (0.15 for primary schools and 0.10 for secondary schools).

In addition, we took advantage of an education reform implemented by the Ugandan government in 1996 which abolished school fees for public primary schools. This reform can also be understood as an exogenous factor that substantially increased the Ugandan enrollment ratio at primary schools.⁹ The average age of P7 students (the last year of study at primary school) in our sample is 17 years¹⁰, and in 2005 they were 26 years old. We divided the sample into those who were affected by the reform (less than 26 years old) and those who were not (more than 26 years old). To approximate the individual exposure to the reform we

⁷ The term "village" is not very appropriate for Ugandan rural areas. As people are usually subsistence farmers with small fields around their houses, they live all around the countryside. There are no villages in the classical sense, but rather inhabited areas assigned to certain "villages."

⁸ This plausible assumption implies that people born with a low discount rate would not be concentrated in particular villages.

⁹ For more details on the effect of the Ugandan education reform on enrollment ratios see World Bank (2002).

¹⁰ Primary school study usually takes longer than the expected seven years, as most children have to interrupt their studies in years when their parents are not in a position to pay their school fees.

multiplied the dummy variable for age eligibility by the share of public schools in total primary schools in the respondent's region. The correlation between this instrumental variable and years of completed education was positive (0.12) and significant at the 1% level, which indicates that increased exposure to the reform indeed increased years of completed education.

As institutional factors like the number of schools and education reform exposure stand a reasonable chance of satisfying the strict exogeneity assumptions (in our case not being correlated with the discount rate), we apply these variables as instruments for years of education in a 2SLS regression in order to address the possible ability bias in the correlation between the discount rate and education.

Table 5: 2SLS results for discount rate

	2SLS	
Intercept	4.95 ***	(1.01)
Education (years)	-0.35 **	(0.17)
Age cohort	0.30 ***	(0.10)
Sex (woman=1)	0.12	(0.21)
Family status (married/div.=1)	-0.02	(0.26)
Clan linkage (strong=1)	0.24	(0.32)
Income group	0.74 *	(0.44)
Prob > F	0.00	
Observations	856	

Note: Instrumented: Education (years)

Instruments: Number of primary schools, number of secondary schools, variable measuring reform exposure

The 2SLS regression results (see Table 5) demonstrate a negative effect of education on the discount rate which is significant at the 5% level. Interestingly, the instrumental variables estimate the effect of education substantially above the corresponding OLS estimate. The results suggest that after controlling for other variables each additional year at school lowers the individual discount rate on average by 35%.

Age

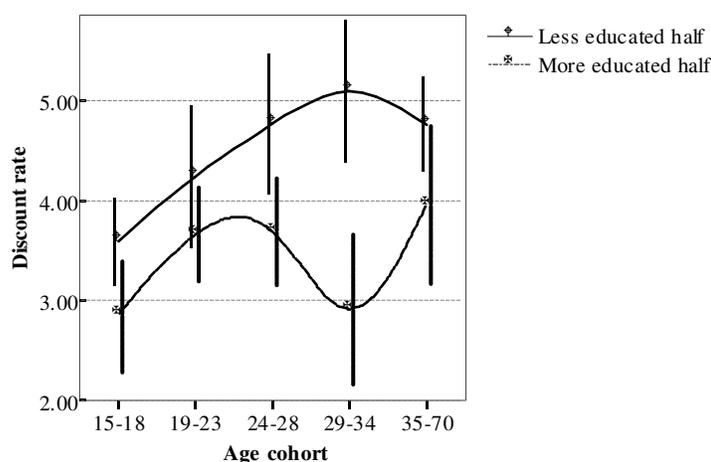
The age of our respondents ranges from 15 to 70 years, with an average of 26. The life expectancy of the youngest cohort in the sample (15–19) is 56 years (WHO, 2002). In the traditional economic theorizing based on the permanent income hypothesis, people are assumed to closely reflect their current life expectancy in their inter-temporal decisions. The shorter is the expected time to death, the higher should be the individual time preference. On average we do indeed observe this pattern, as age appears to be a significant variable with a positive slope. Older Ugandans seem to have a higher time preference than their younger counterparts.

In addition, experimental studies from developed countries have suggested that discount rates do not increase linearly throughout the lifetime and have found that discount rates are even

inversely correlated with age within cohorts of young and middle-aged adults (Davies and Lea, 1995) due to the fact that people learn to be future-oriented during their youth from their parents and at school. In the Ugandan sample we did not find any significant relationship between the discount rate and age within these age groups.

However, the link between our pattern and the pattern observed in developed countries becomes sharper if the sample is divided into a less educated half and a more educated half of respondents (more than two years at secondary school) and if we compare the means across the age groups separately. Between the ages of 22 and 33 years we observe a negative correlation significant at the 1% level between age and the discount rate within the more educated group. This contrasts with no significant change in the discount rate within the less educated group. Chart 1 illustrates the difference. The difference reaches 200 percentage points for the cohort aged between 29 and 34 years.

Chart 1: Discount rate, age cohorts and education



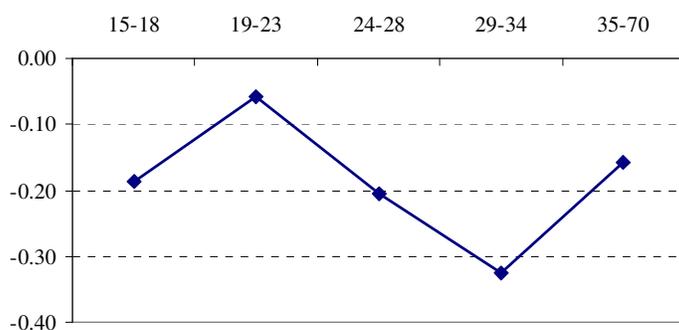
Note: Error bars show 95% confidence interval of mean

The same effect can also be demonstrated after controlling for other characteristics. After interacting age cohorts as dummies with education in the OLS regression according to the specification in eq. (2) we calculated the effect of education for different age cohorts.

$$DR = C + \beta_0 EDU + \sum_{i=1}^5 \beta_i AGE_i + \sum_{j=6}^{10} \beta_j AGE_j EDU + \beta_{11} SEX + \beta_{12} FAM + \beta_{13} CLAN + \beta_{14} INC + \varepsilon \quad (2)$$

The resulting coefficients are shown in Chart 2.

Chart 2: OLS results: Coefficients of education for different age cohorts



We suggest two explanations which may well complement each other for increasing patience for middle-aged cohorts. The first follows the traditional argument of Strotz (1956) and the evidence of Mischel, Shoda and Rodriguez (1989) that learning to be future-oriented is part of our upbringing and educational process and as an individual grows this type of learning overwrites our “inborn” (high) discount rate. In developed countries education up to secondary level is a standard which most people uniformly achieve. Consequently, we observe a high discount rate for children, a lower discount rate for more mature individuals and then an increasing discount rate due to shortening lifespan. More educated Ugandans follow this pattern as well.

The second explanation relies on variations in the exogenous risk of HIV/AIDS infection. Lyons (1998) and Isaksen, Songstad and Spissoy (2002) document that there is a dramatic increase in the rate of HIV infection when young people become sexually active and that in sub-Saharan Africa the majority of new HIV infections occur among those aged 15–24 years. After this critical age, when people mostly have established families and a lower level of sexual activity, the probability of survival increases until people get old and the probability of survival starts decreasing again. As a consequence of HIV/AIDS the mortality risk in Uganda with respect to age is not a simple increasing function, but it can be approximated by a U-shaped curve. The shape of the curves in Charts 1 and 2 suggests that more educated respondents reflect the development of mortality risks in their discount rates considerably more than their less educated counterparts. As a result more educated people discount future pleasures substantially less during the period of their life when they are most economically active and when they make most important decisions about sending children to school, saving money for future needs or investing in better tools and equipment.

One further implication is worth noting. The varying level of association between the discount rate and education for middle-aged cohorts (23–45) is difficult to reconcile with the causal direction from inborn discount to the level of education. In that case the difference in discount rates between the more educated half and the less educated half would remain constant for all age cohorts. The data suggest rather the opposite. The two explanations offered above have to rely on the causal effect of education towards the discount rate, which has something to do with either learning to be future-oriented or enhancing one’s ability to evaluate exogenous health risks, or both.

Sex

There is almost no evidence on how discount rates vary by gender in developing countries. Usually women are considered to be more patient than men (Davis and Lea, 1995; Yunus, 2002). In the context of the poorest countries, Gugerty (2001) emphasizes that if women need

to perform the daily tasks of feeding and caring for the family, they may be more concerned with meeting today's needs rather than planning for tomorrow. In their Vietnam study Anderson et al. (2004) did not find any significant differences between men and women. In our study the average discount rate for Ugandan men is 376%, whereas for women it is 397% and the difference is not significant after controlling for other characteristics (see Tables 3 and 4). Ugandan men and women thus do not seem to have substantially different time preferences.

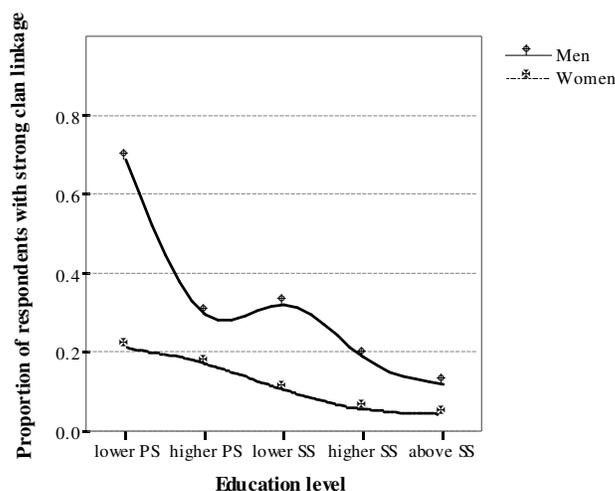
Clan

Some psychological studies (Mullainathan, 2005) show that close ties within clans may discourage members from saving and having free funds and encourage them to spend money as soon as they can. The reason is that they might be worried about pressure from their family or neighbors to share their income or to help out if someone else is in a difficult financial situation. Similarly, people with a strong clan linkage may consider their clan embeddedness to be a form of insurance and feel less need to create precautionary savings. These social norms may therefore contribute to higher discount rates among people who are more embedded in the traditional structures of the clan than among those with weaker clan links.

Some other authors (Harrison, 2000, and Etounga-Manguelle, 2000) continue in the Weberian tradition that exalts protestant ethics and emphasize that African traditional tribal societies focus on the past and present and not on the future, in contrast to other cultures. African author Etounga-Manguelle (2000: 69) writes that a typical African is deeply rooted in the culture of his ancestors and considers his ways as being a result of an omnipresent higher will and is thus very weakly interested what the future will bring. Even though the reasoning is very different to the preceding approach the outcome should be the same: the higher the clan influence, the higher the discount rate.

We found a positive difference of 70 percentage points between the respondents who stated that their decision-making process is strongly influenced by clan and those with a weaker clan linkage. The difference is stable for all age cohorts. Again, clan loyalty seems to be closely associated with level of education. Clans are predominantly masculine structures and our data provide rare empirical evidence on how notable is the decrease in the proportion of men with a strong clan linkage as they attend primary school. This proportion decreased by 40 percentage points (see Chart 3). The question remains whether it is education which makes traditional social norms less attractive in the eyes of the respondents, or whether people with a stronger clan linkage are less inclined to go to school and prefer to rely on their clan.

Chart 3: Proportion of people with strong clan linkage and education levels



After controlling for other variables the positive relationship between clan loyalty and the discount rate is significant at around the 10% level, depending on the type of regression employed. The results suggest that traditional social norms may play a role in Ugandan patience formation; however, questions about the exact mechanism and direction of the causality remain to be explored.

Income

There are a number of studies linking the discount rate to wealth in both developed and developing countries. Richer people are considered to be more patient, as they are not pressed by basic needs. Hausman (1979) and Lawrence (1991) found discount rates to be negatively correlated with wealth in the United States. The studies from developing countries mentioned above yielded more mixed results. On the one hand Pender (1996) found a negative relation between income and the discount rate in Indian villages, but on the other hand Vietnamese data in Anderson et. al (2002) did not show any link between these two variables.

The correlation between the discount rate and income groups in the Ugandan sample does not reveal a significant relationship. The regression coefficient for income is positive but insignificant in the OLS, PROBIT and TOBIT regressions. In the 2SLS regression (see Table 5) income emerged as positive and even significant at the 5% level. Besides saying that the results are difficult to reconcile with the hypothesis that poorer people in sub-Saharan Africa have to behave more impatiently than richer people, we do not feel confident to conclude anything more. The results might be influenced by the fact that the vast majority of respondents have an income of less than USD 1/day, making them poor by most standards, and there may be too little income variation within the sample to obtain clearer results. Alternatively, profession may have not been an adequate measure for defining income groups. Nevertheless, all other measures of income in the context of subsistence farming are largely disputed within the experimental literature as well.

4 Conclusions

The paper aimed to contribute to the understanding of why there is lack of domestic saving and investment in rural parts of sub-Saharan Africa. It focuses on heterogeneity in inter-temporal preferences as a possible explanation of this important puzzle and scrutinizes how individual patience – measured by the discount rate – is formed. The study is based on a unique experimental data set collected from 856 respondents in Ugandan villages, which is to large extent representative of the literate population in many parts of sub-Saharan Africa in terms of education, health conditions, social norms and structure of economic activities.

We found an extremely high average discount rate amounting to 385% annually. Even though there might be some upward and downward biases due to the sign and size effects of the amount in question, based on the existing evidence Ugandan respondents seem to be substantially less patient than their counterparts in developed countries and Asia.

Importantly, regressions unveiled a robust association between education and individual patience after controlling for other variables (age, sex, income, marital status and clan linkage). In addition, to address the possible endogeneity between education and the discount rate we instrumented the level of education by the exogenous number of schools in the respondent's village area and exposure to the Ugandan education reform in 1996 (abolishing school fees for public primary schools). Estimates suggested a significant causal effect of education on the discount rate and showed that an additional year of education lowers the individual discount rate on average by 35 percentage points. We did not detect any significant differences between the discount rates of men and women. Interestingly, the estimates did not show a negative correlation between income and the discount rate as is often suggested. The traditional social norms within large groups of families (clans) seem to matter for the discount rate, as respondents with a stronger clan linkage were on average more impatient than respondents with weaker clan loyalty.

We hope that this study provides a further stimulus for studying behavioral issues and psychological factors as part of the efforts to understand the behavior of people in sub-Saharan Africa, and that it contributes to a realization that the growth prospects of the region may be hindered by more than just income and institutional constraints. The results presented above are consistent with patience understood as an ability which needs to be taught by parents, learnt at school or promoted by social norms. The estimates showed a remarkable capacity of additional years of education to deliver the abilities necessary for more forward-looking behavior among Ugandan respondents.

The high correlation between education and subsequent growth (one year of additional schooling attainment is associated with 0.30 percent faster annual growth over the period 1960–1990) observed in cross-sectional data is well documented¹¹. As argued in Banerjee and Duflo (2004) and Bils and Klenow (2000) this correlation is too high to be explained by the standard causal effect of education on individual productivity. Similarly, World Bank (2006) acknowledges that “*education impact on economic growth is well-established; precisely how this happens is less well-understood.*” The discount rate plays a fundamental role in saving, investment and willingness to cooperate, which are all necessary ingredients for economic development. Although a number of questions remain open, the Ugandan findings may start teasing the minds of researchers and policy-makers with the proposition that there might be a new way in which education influences development in sub-Saharan Africa – by shaping individual patience.

¹¹ See, for example, Barro (1991), Benhabib and Spiegel (1994), and Barro and Sala-i-Martin (1995)

References

- Anderson, C. Leigh, Maya Dietz, Andrew Gordon and Marieka Klawitter. 2004. "Discount Rates in Vietnam." *Economic Development and Cultural Change* 52(4): 873–888.
- Azariadis, Costas and John Stachurski. 2004. *Poverty Traps*. Prepared for the *Handbook of Economic Growth* (Aghion, Philippe and Steven Durlauf, eds.).
- Banerjee, Abhijit Vinayak and Esther Duflo. 2004. "Growth Theory Through the Lens of Development Economics." In *Handbook of Economic Growth* (Aghion, Philippe and Steven N. Durlauf, eds.). Elsevier.
- Barro, Robert J. 1991. "Economic Growth in a Cross Section of Countries." *Quarterly Journal of Economics* 106(2): 407–443.
- Barro, Robert J. and Xavier Sala-i-Martin. 1995. *Economic Growth*. New York: McGraw Hill.
- Becker, Gary S. and Casey B. Mulligan. 1997. "The Endogenous Determination of Time Preference." *Quarterly Journal of Economics* 112(3): 729–758.
- Benhabib, Jess and Mark M. Spiegel. 1994. "The Role of Human Capital in Economic Development: Evidence from Aggregate Cross-Country Data." *Journal of Monetary Economics* 34(2): 143–174.
- Benzion, Uri and Joseph Yagil. 2001. "Decisions in Financial Economics: An Experimental Study of Discount Rates [online]." Available from: <http://econ.bgu.ac.il/papers/166.pdf> [Accessed 3 September 2006].
- Bils, Mark and Peter Klenow. 2000. "Does Schooling Cause Growth?" *American Economic Review* 90(5): 1160–1183.
- Card, David. 1998. "The Causal Effect of Education on Earnings." Prepared for the *Handbook of Labor Economics* (Ashenfelter, Orley and David Card, eds.).
- Camerer, Colin and Robin Hogarth. 1999. "The Effects of Financial Incentives in Economics Experiments: A Review and Capital-Labor-Production Framework." *Journal of Risk and Uncertainty* 19: 7–42.
- Chabris, Christopher F., David I. Laibson and Jonathan P. Schuldt. 2006. "Intertemporal Choice." To appear in: *The New Palgrave Dictionary of Economics*. Durlauf, Stephen and Lawrence Blume, eds. 2007. Palgrave Macmillan: London.
- Chakraborty, Shankha. 2004. "Endogenous Lifetime and Economic Growth." *Journal of Economic Theory* 116: 119–137.
- Chakraborty, Shankha and Mausumi Das. 2005. "Mortality, Human Capital and Persistent Inequality." *Journal of Economic Growth* 10: 159–192.
- Coller, Maribeth and Melonie B. Williams. 1999. "Eliciting Individual Discount Rates." *Experimental Economics* 2: 107–127.
- Davies, Emma and Stephen E. G. Lea. 1995. "Student Attitudes to Student Debt." *Journal of Economic Psychology* 16: 663–679.
- Deopke, Matthias and Fabrizio Zilibotti. 2005. "Patience Capital, Occupational Choice, and the Spirit of Capitalism [online]." Available from: <http://www.iies.su.se/~zilibott/patience.pdf> [Accessed 3 September 2006].
- Duflo, Esther. 2006. "Poor but Rational." In *Understanding Poverty*, eds. Abhijit Vinayak Banerjee, Roland Benabou and Dilip Mookherjee. Oxford University Press.
- Duflo, Esther, Michael Kremer and James Robinson. 2003. "Understanding Technology Adoption: Fertilizer in Western Kenya, Preliminary Results from Field Experiments." Mimeo, MIT.
- Duflo, Esther. 2001. "Schooling and Labor Market Consequences of School Construction in Indonesia: Evidence from an Unusual Policy Experiment." *American Economic Review* 91(4): 795–813.
- Etounga-Manguelle. 2000. "Does Africa Need a Cultural Adjustment Program?" In Harrison and Huntington 2000.
- Frederick, Shane, George Loewenstein and Ted O'Donoghue. 2002. "Time Discounting and Time Preference: A Critical Review." *Journal of Economic Literature* 40: 354–401.

- Goldstein, Markus and Christopher Udry. 1999. "Agricultural Innovation and Resource Management in Ghana." Mimeo, Yale University; Final Report to IFPRI under MP17.
- Gugerty, Mary Kay. 2001. "Savings, Sanctions and Support: Essays on Collective Action and Community Organizations in Kenya." Ph.D. diss., Harvard University.
- Haaparta, Pertti and Mikko Puhakka. 2004. "Endogenous Time Preference, Investment and Development Traps." BOFIT Discussion Paper No. 4.
- Harrison, Glen W., Morten I. Lau, Elisabeth Rutström and Melonie B. Sullivan. 2005. "Eliciting Risk and Time Preferences Using Field Experiments: Some Methodological Issues." In: Carpenter, J., et al., eds. *Field Experiments in Economics*. Greenwich, CT: JAI Press, Research in Experimental Economics, Volume 10, 2005.
- Harrison, Glen W., Morten I. Lau and Melonie B. Williams. 2002. "Estimating Individual Discount Rates in Denmark: A Field Experiment." *American Economic Review* 92(5): 1606–1617.
- Harrison, Lawrence E. and Samuel P. Huntington, eds. 2000. *Culture Matters*. New York: Basic Books.
- Hausman, Jerry A. 1979. "Individual Discount Rates and the Purchase and Utilization of Energy-Using Durables." *Bell Journal of Economics* 10(1): 33–54.
- Isaksen, Jan, Nils Gunnar Songstad and Arild Spissoy. 2002. "Socio-Economic Effects of HIV/AIDS in African Countries." A study commissioned by NORAD.
- Laibson, David. 1997. "Golden Eggs and Hyperbolic Discounting." *Quarterly Journal of Economics* 112: 443–477.
- Lawrence, Emily. 1991. "Poverty and the Rate of Time Preference: Evidence from Panel Data." *Journal of Political Economy* 99: 54–77.
- Loewenstein, George and Jon Elster. 1992. *Choice over Time*. New York: Russell Sage.
- Lyons, Miriam. 1998. "The Impact of HIV and AIDS on Children, Families and Communities: Risks and Realities of Childhood during the HIV Epidemic." UNDP – HIV and Development Programme, Issues Paper No. 30 [online]. Available from: www.undp.org/hiv/publications/issues/english/issue30e.html [Accessed 3 September 2006].
- McKenzie, David and Christopher Woodruff. 2003. "Do Entry Costs Provide an Empirical Basis for Poverty Traps? Evidence from Mexican Enterprises." Working Paper 2003-20, Bureau for Research in Economic Analysis of Development.
- Mischel, Walter, Yuichi Shoda and Monica L. Rodriguez. 1992. "Delay of Gratification in Children." In Loewenstein and Elster 1992.
- Mullainathan, Sendhil. 2005. "Development Economics Through the Lens of Psychology [online]." Available from: <http://www.economics.harvard.edu/faculty/mullainathan/papers/lens%20of%20psychology.pdf> [Accessed 3 September 2006].
- Pender, John L. 1996. "Discount Rates and Credit Markets: Theory and Evidence from Rural India." *Journal of Development Economics* 50: 257–296.
- Sachs, Jeffrey et al. 2004. "Ending Africa's Poverty Trap." *Brookings Papers on Economic Activity* 1: 117–240.
- Shefrin, Hersh M. and Richard H. Thaler. 1992. "Mental Accounting, Saving, and Self-Control." In Loewenstein and Elster 1992.
- Shonkoff, Jack and Deborah Phillips, eds. 2000. *From Neurons to Neighborhoods: The Science of Early Childhood Development*. Washington, D.C.: National Academy Press.
- Strotz, Richard. 1956. "Myopia and Inconsistency in Dynamic Utility Maximization." *Review of Economic Studies* 23: 165–180.
- Thaler, Richard H. 1981. "Some Empirical Evidence on Dynamic Inconsistency." *Economic Letters* 8: 201–207.
- United Nations. 2005. World Development Indicators. New York.
- Yunus, Muhammad. 2002. "Toward Eliminating Poverty from the World: Grameen Bank Experience." In *Making Progress – Essays in Progress and Public Policy*, eds. C. Leigh Anderson and Janet W. Looney. Lanham, MD: Lexington Books.

World Bank. 2006. Web page “Economics of Education” [online]. Available from: <http://www.worldbank.org/education/economicsed/> [Accessed 3 September 2006].

World Bank. 2002. “Achieving Universal Primary Education in Uganda: The ‘Big Bang’ Approach.” [online] <http://www.worldbank.org/education> [Accessed 3 September 2006].

Appendix

Imagine that someone trustworthy comes with 200,000 Ugandan shillings for you for free. But he promises to give you more than that in 1 year's time if you don't take the 200,000 shillings right now.

Fumitirizamu singa omuntu akuletera emitwalo amakumi abiri ag'ensimbi za Uganda Kubwerere. Naye n'akusubiza okukuwa ezisingawo oluvanyuma Lw'omwaka gumu singa obeera tozitwaliddewo mu kiseera ekyo.

What would you prefer? (select only one answer)

Kiki ky'osinga okwagala? (Londako ekituufu kimu kyokka)

- 200,000 Ugandan shillings right now.
200,000 ensimbi za Uganda kati kati.
- 250,000 Ugandan shillings 1 year later.
250,000 ensimbi za Uganda oluvanyuma lw'omwaka gumu.

What would you prefer? (select only one answer)

Kiki ky'osinga okwagala? (Londako ekituufu kimu kyokka)

- 200,000 Ugandan shillings right now.
200,000 ensimbi za Uganda kati kati.
- 500,000 Ugandan shillings 1 year later.
500,000 ensimbi za Uganda oluvanyuma lw'omwaka gumu.

What would you prefer? (select only one answer)

Kiki ky'osinga okwagala? (Londako ekituufu kimu kyokka)

- 200,000 Ugandan shillings right now.
200,000 ensimbi za Uganda kati kati.
- 800,000 Ugandan shillings 1 year later.
800,000 ensimbi za Uganda oluvanyuma lw'omwaka gumu.

What would you prefer? (select only one answer)

Kiki ky'osinga okwagala? (Londako ekituufu kimu kyokka)

- 200,000 Ugandan shillings right now.
200,000 ensimbi za Uganda kati kati.
- 1,200,000 Ugandan shillings 1 year later.
1,200,000 ensimbi za Uganda oluvanyuma lw'omwaka gumu.

What would you prefer? (select only one answer)

Kiki ky'osinga okwagala? (Londako ekituufu kimu kyokka)

- 200,000 Ugandan shillings right now.
200,000 ensimbi za Uganda kati kati.
- 1,500,000 Ugandan shillings 1 year later.
1,500,000 ensimbi za Uganda oluvanyuma lw'omwaka gumu.

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