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Private Returns to Education for Wage-employees and the Self-employed in Uganda

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Abstract

The paper investigates the differences in private marginal returns to education between wage-employees and the self-employed in Uganda, using the Mincerian framework with pooled regression models. The study uses a two wave panel (2005/06 UNHS and 2009/10 UNPS) to estimate homogenous and heterogeneous private returns to education for the employed and self-employed. We find similar marginal returns to an additional year of schooling for both types of workers. We investigate the shape of the education-earnings profile and find it is linear but the returns to levels of educational attainment are convex. In this paper we also find the marginal returns to education have decreased over time. With regard to heterogeneous returns to education we employ quantile regression models and find returns to education decreasing with quantile for both worker types, and conclude that investment in education in Uganda is income equalising.

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Outline

1. Introduction
2. Literature review
3. Theoretical framework
4. Empirical strategy
5. Data sources and descriptive statistics
6. Discussion of results
7. Conclusion and recommendations

1.0 Introduction

Education plays a key role in economic and social development and many developing countries have used it as a policy tool to reduce poverty. With the objective of reducing poverty and improving human development, Uganda has made substantial investments in education through implementing universal primary education (UPE) in 1997 and the universal secondary education (USE) in 2007, becoming the first country in sub-Saharan Africa to introduce USE. Many studies provide evidence of the positive impact of education on earnings (Schultz, 2003; Psacharopoulos and Patrinos, 2004)[2] with returns increasing with level of education in many developing countries (Söderbom et al, 2005; Rankin, Sandefur and Teal, 2010; Leyaro et al, 2012) and decreasing with quantile (Patrinos et al, 2006; Kingdon and Söderbom, 2007). Thus the available evidence suggests that investment in education enhances an individual's income and can be instrumental in reducing poverty and promoting income equality.

Conventionally education plays a key role in determining wages. Many studies provide evidence that more educated workers receive higher wages, work in better paying firms, sectors and occupations than their counterparts with less education (Schultz, 2003; Psacharopoulos, 2004)[3]. While there is overwhelming evidence of a positive correlation between education and labour market outcomes, scholars are hesitant to draw inferences on the causal impact of schooling on earnings. This is because there is uncertainty as to whether more educated workers earn higher wages due to formal education or due to unobserved characteristics such as the innate ability. The literature presents two major theories to explain differences in labour earnings; human capital theory (Becker, 1962) and the signalling theory (Spence, 1973). Human capital theory explains wage differentials as a result of an individual's productivity level enhanced by investment in formal education, health and training while the signalling theory assumes wage differentials are due to an individual's innate abilities that are signalled by an individual's characteristics which includes educational attainment.

This paper focuses on the effect of human capital variables on earnings as suggested by the human capital theory. The human capital theory posits that education is an investment which

[2] These studies provide a summary of the empirical literature on returns to education

[3] These two studies provide a summary of empirical literature on returns to education

improves a worker's productivity and influences future income by raising a worker's lifetime earnings (Becker, 1962). The theory relates the worker's knowledge levels to their formal schooling levels implying that more schooling would lead to higher productivity and wages. In this theory, workers acquire education to maximise the present value of lifetime earnings and the private returns are used to explain the demand for different levels of education.

According to human capital theory, the law of diminishing returns applies to human capital accumulation whereby each successive year of schooling yields less marginal returns. This relationship would suggest a concave schooling-earnings function, implying that earnings increase with schooling but at a decreasing rate. However most recent studies for developing countries (Söderbom et al, 2005; Kingdon and Söderbom, 2007; Quinn and Teal, 2008; Rankin et al, 2010) provide evidence in contrast to theory where returns to education are highest at the upper-end of the education profile. As Fasih et al (2012) note, the convexity of returns to education in developing countries could be due to both supply and demand factors where the supply of individuals with low education has increased more than their demand and conversely the supply of individuals at the upper education profile has grown slower than their demand.

In our analysis we investigate both the homogenous and heterogeneous returns to education separately for wage-employees and the self-employed in Uganda. Many studies have documented high returns to education especially in developing countries (Schultz, 2003) however most studies consider only homogenous returns and provide mean returns to education, including earlier studies for Uganda (Appleton 2000 and 2001). Nevertheless the pattern of dispersion of the returns matters and considering only the homogenous returns may mask the effects, yet individuals are not identical but earn different incomes and occupy different positions along the earnings profile. If individuals at the upper earnings profile have higher returns, then further investment in education may worsen the existing income inequality. But if the returns to education are higher for individuals at the lower earnings profile, then further investment in education would reduce income inequality in any country.

In the literature few studies have estimated returns to education in Africa, particularly SSA, and only three for Uganda. Two of the three studies which have investigated private returns at different levels of education in Uganda find returns at primary level higher than at secondary and increasing over time (Bigsten and Kayizzi-Mugerwa, 1992 cited in Appleton

2000; Appleton, 2001[4]). The third study by Appleton and Balihuta (1996 cited in Appleton 2000) found returns to education increasing with level of education and highest at university. Therefore the available evidence for the pattern of returns to education along the education profile in Uganda is mixed and this study seeks to provide more evidence using most recent data; the 2005/06 and 2009/2010 panel survey data and disaggregating it by worker type. Further none of these studies investigates heterogeneous returns to education which we address in this paper.

Our motivation for this study is to estimate the returns to education for the self-employed that form the largest proportion of Uganda's labour force (two-thirds) and the analysis for this group is scanty in literature and none for Uganda. We think few studies in developing countries have estimated returns to education for the self-employed because of data limitations. Our view is that the self-employed are major players in the labour markets of developing countries, who deserve attention and in Uganda they form a large proportion of the working poor and thus constitute a target group for poverty reduction strategies.

2.0 Literature review

Studies which analyse the returns to education typically adopt the Mincerian framework (e.g. Card, 2001; Appleton, 2001; Psacharopoulos and Patrinos, 2004; Girma and Kedir, 2005; Kingdon and Söderbom 2007) based on human capital theory. The basic model consists of a semi-log linear function regressing log earnings on years of schooling (which measures the human capital acquired in formal education) and experience (which measures the human capital acquired in employment)[5]. The parameter estimate on the years of schooling is refered to as the marginal rate of return which gives the approximate percentage change in earnings per extra year in education. Since the earnings-schooling relationship is concave, each additional year of schooling should yield lower marginal returns.

[4] He finds such results for the 1992 data but obtains the reverse for the 1999/2000 survey data

[5] Although over time researchers have included more variables such as age, gender, occupation, location and family background variables such as parent's education and occupation. However Psacharopoulos (2004) notes that variables which are conditioned on education such as occupation and firm size should not be included in the model since they take away part of the impact of education on earnings.

There are two problems encountered in estimating returns to education, the endogeneity and selection bias problem. The endogeneity problem is caused by the workers' unobserved ability (the error term) systematically correlating with both the independent variables and the dependent variable (earnings). Therefore the OLS results would be biased representing a correlation between ability on one hand and education and earnings on the other, instead of the casual effect of education on earnings. When the variable of interest is endogenous then the researcher may not establish the causal relationship and may require use of an instrumental variable that is correlated with the endogenous variable (schooling) but uncorrelated with unobserved ability. Several scholars (e.g. Card, 2001; Heckman et al, 2006; Kerr and Quinn, 2010; Leyaro et al, 2010; Rankin Sandefur and Teal, 2010) have dealt with the endogeneity problem by estimating returns to education using instrumental variable estimation techniques such as the two-stage least squares (2SLS) and the control function. All these studies find a downward bias in OLS estimates of returns to education. However Heckman et al (2006) note that the results need to be interpreted with caution since the instrumental variable estimators do not estimate the average causal effect but instead measure the local average treatment effect (LATE): this estimates the returns for individuals induced to vary their schooling level by the change in the instrument. These individuals may not have the same rate of return to education as the average individual.

Selection bias arises from estimating the earnings function on separate sub-samples which may not be a random draw from the population. This is because we only observe earnings for those who have a job (or in our case self-employed) which is normally a non-random subsample of all those who took education. To correct for selection bias, researchers have used the Heckman two-stage model (e.g. Kingdon and Söderbom 2007; Rankin Sandefur and Teal, 2010; Leyaro et al, 2010) that first estimates the probit model for selection into employment or occupation to derive the selectivity term in the earnings function.

The estimates for returns to education vary from one study to another. The general observation is that the estimates for developing countries (8-17%) are higher than for developed countries (6-7%)[6], although most studies may not be directly comparable because they include different variables in the model and employ different estimators. This difference in returns to education is an empirical question but can be attributed to differences in levels of

[6] Estimates compiled from different studies

educational attainment in the various countries. Recent studies which have analysed returns to education in developing countries particularly in SSA find a convex education earnings relationship. Rankin, Sandefur and Teal (2010) investigated the role of learning in labour market outcomes in Ghana and Tanzania using the Urban Panel survey data and found convex returns for both the wage and self-employed in Ghana and the self-employed in Tanzania. They note that addressing the selection and endogeneity problem matters since convexity becomes more pronounced with estimates incorporating controls. However Kingdon and Söderbom (2007) using the Ghana Living Standards Survey 1998—99 found a convex education-earnings relationship in only wage employment and weakly convex for men in agriculture.

Sandefur, Serneels and Teal (2006) analysed earnings and mobility in three countries: Ghana, Tanzania and Ethiopia using household worker surveys (Ghana and Tanzania, 2004 and 2005 rounds) and Ethiopia's urban labour force survey for 2000 and 1994. They find a convex education earnings relationship in Ghana and Tanzania in both the wage-employed and self-employed sectors while for Ethiopia convexity was observed only in self-employment. On the contrary Kerr and Quinn (2010) find concave returns to education in Tanzania using cross section data of 2001 and 2006 while controlling for endogeneity using educational reforms.

In Uganda's case, Appleton (2001) using household survey data for 1992 and 1999/2000 estimated private returns for wage earners within the Mincerian framework at three levels of education: primary, secondary and university for those aged 15-59 years. He regressed sex, age and dummies for educational attainment on the logarithm of real annual earnings with two OLS models: without and with cluster fixed effects (accounted for variations in local demand for labour) and found larger coefficients on education in the former ranging between 7-30 percent. However Appleton (2001) found conflicting results: for the 1992 data he found returns at secondary higher than at primary and the reverse for the 1999/2000. Further he found an increase in returns to education over time, though it was only the returns to primary that were statistically significant.

Studies which have investigated the returns to education using the quantile regression for developed countries (e.g. Harmon, Oosterbeek and Walker, 2000; Pereira and Martins, 2003)

find that returns increase with earnings quantile, while studies for developing countries[7] (e.g. Patrinos et al, 2006; Kingdon and Söderbom, 2007) find that returns decrease with earnings quantile. The explanation for the observed differences in outcomes is the complementarity between education and ability which is influenced by the education system and quality of education. Regarding gender and age disparities, in most studies marginal returns to education for women are higher than for men (e.g. Schultz, 2003; Kingdon and Söderbom, 2007 for Pakistan). This disparity implies that the supply of educated women is growing less than their demand: which mirrors the constraints faced by women in accessing education in most developing counties that enables them attract higher returns. Studies (e.g. Schultz, 2003; Kingdon and Söderbom, 2007) which have analysed returns to education for different age groups especially for developing countries find mixed results.

Psacharopoulos (2004) highlights various challenges to estimating returns to education, including the limited sample coverage that normally is not a representative sample of the population. Another problem is the pooling of wages for different workers: such as wages for public sector workers which are normally above the market wage with the subsistence wages for workers in the informal sector leading to the underestimation of public sector wages. He notes two methodological problems. First, researchers using the Mincerian framework consider the raw coefficients on education in the extended (dummy-form) function as the returns to education but these are more appropriately interpreted as wage effects because they do not take into account the cost of education. However it is important to note that the Mincerian model assumes that opportunity cost is the only cost of education which is plausible for countries where government provides free education. The second methodological problem is that many researchers include all possible independent variables they have in the data set, yet variables that are conditional on the education level such as occupation, sector and firm size tend to take away part of the effect of education on wages and should be excluded from the model.

[7] Particularly low-income countries

3.0 Theoretical framework

The analysis in this study is based on the human capital framework developed by Mincer (1974). In this framework education is an investment of current resources for future earnings. Therefore individuals choose an amount of schooling (*S*) to maximise their expected present value of a stream of future earnings up to retirement at date T, net of the cost of education (C_s). At the optimum schooling choice (*S*), the present value (*PV*) of the S^{th} year of schooling will be equal to the cost of the S^{th} year of schooling given the equilibrium:

$$\sum_{t=1}^{T-S} \frac{Y_S - Y_{S-1}}{(1+r_S)^t} = Y_{S-1} + C_S \qquad (1)$$

Where *Y*- is earnings and *r* - is the internal rate of return.

If T is large then equation (1) can be rewritten as:

$$\frac{Y_S - Y_{S-1}}{r_S} = Y_{S-1} + C_S \qquad (2)$$

If C_S is small then equation (2) can be written as:

$$r_S = \frac{Y_S - Y_{S-1}}{Y_{S-1}} \approx \log Y_S - \log Y_{S-1} \qquad (3)$$

The expression in equation (3) implies that the return to the S^{th} year of schooling is approximately the difference in log earnings between leaving in the S^{th} and at the $(S\text{-}1)^{th}$ year of schooling. Thus one would estimate the returns to *S* by seeing how log earnings vary with *S*. Further assumptions are made to simplify the estimation of the returns to education. For instance r_S is assumed to be constant, where $r = \Delta Y_t / h_t Y_t$, Y_t is potential earnings and h_t is the proportion of period *t* spent acquiring human capital. Thus during schooling h_t =1 and $Y_S = Y_0 e^{rs}$, meaning that individuals do not earn while in school. Mincer assumes that h_t declines linearly with experience where $h_t = h_0 - (h_0 / T)_t$. Assuming that Y_0 can be captured as a linear function of characteristics *X*, such that $Y_S = Y_0 e^{rs} = X\beta^{rs}$. We then write the expression for earnings after *x* years of schooling as: $Y_x = Y_0 e^{rs} \exp r\left[h_0 x - \frac{h_0}{2T} x^2 \right]$. Taking the

logarithm, $\log Y_x = \log Y_0 + rS + rh_0 x - (\frac{rh_0}{2T})x^2$. Since actual earnings are $Y_x = (1-h_x)Y_x$, we obtain the Mincer specification:

$\log Y_x = X\beta + rS + rh_0 x - \left(\frac{rh_0}{2T}\right)x^2 + \log(1-h_x)$ which leads us to the empirical functional form of the human capital framework given as:

$$\log w_i = X_i\beta + rS_i + \rho x_i + \gamma x_i^2 + \varepsilon_i \qquad (4)$$

Where w_i – is the level of earnings of individual *i* such as per hour or month. S_i – is the amount of their schooling x_i – is measure of experience[8], X_i – the vector of other variables assumed to affect earnings, ε_i is the disturbance term representing other unobserved variables, assumed to be independent of X_i and S_i. A quadratic term of experience is included to capture the concavity of the earnings profile.

Note that Mincer assumes that the only cost of schooling is the foregone earnings[9], thus *r* can be assumed as the private financial return to schooling and the effect of schooling on earnings. The private return is gross since it does not include a deduction of taxes on earnings.

4.0 Empirical strategy

Using the Mincerian human capital earnings framework the study will estimate a pooled regression model, we pool data from two waves the 2005/06 UNHS and the 2009/10 UNHS for wage and self-employed workers:

$$\ln wage_{it} = \beta_0 + \beta_{1j} sch_{it} + \beta_{2j} \exp_{it} + \beta_{3j} \exp_{it}^2 + \beta_{4j} fem_{it} + \beta_{5j} yr_{it} + \varepsilon_{it} \qquad (5)$$

Where *t* is time period 1 and 2, $lnwage_{it}$ is log of calculated monthly wage for individual *i* in period *t* which we estimate separately for the two employment types denoted as *j*, β_0 is the intercept, β_{1j}- β_{6j} are parameters to be estimated, *sch* is a measure of years of schooling, *exp*

[8] In the absence of a variable to capture experience, Mincer suggested use of potential experience which is equivalent to A-(S+6), where A is age and S is years of schooling (which begins at the age of six).

[9] Assumes there are no tuition fees.

measures potential experience which is age minus education minus six years, exp^2 is experience squared which is an indicator for an individual's earnings over lifetime, *fem* is dummy for female gender, *yr* is year dummy and ε is the error term assumed to be normally distributed. In our model we exclude all explanatory variables which are likely to be a channel through which education affects earnings such as sector of employment, occupation, residence and firm size.

The study will investigate the non-linearity in returns to education by including a quadratic schooling term in the model and estimate the following model:

$$\ln wage_{it} = \beta_0 + \beta_{1j} sch_{it} + \beta_{2j} sch_{it}^2 + \beta_{3j} \exp_{it} + \beta_{4j} \exp_{it}^2 + \beta_{5j} fem_{it} + \beta_{6j} yr_{it} + \varepsilon_{itj} \quad (6)$$

Where sch^2 is the square of years of schooling, if β_{2j} is negative (positive) then there is concavity (convexity) in marginal returns to schooling.

Scholars have argued that qualifications matter more than years of education such that the 6th year of education is significantly different from the 7th year (completed primary). This hypothesis is known as the 'sheepskin effect' that shows existence of a wage premium for completing the final year of each level of education (e.g. high school and university). Therefore we will estimate returns to levels of educational attainment to further test the non-linearity of returns to education along the education profile conditional on the years of schooling as specified in equation 7:

$$\ln wage_{it} = \beta_0 + \beta_{1j} prim_{it} + \beta_{2j} \sec_{it} + \beta_{3j} dip_{it} + \beta_{4j} \deg_{it} + \beta_{5j} \exp_{it} + \beta_{6j} \exp_{it}^2 + \beta_{7j} fem_{it} + \beta_{8j} yr_{it} + \varepsilon_{ij} \quad (7)$$

Where *prim* refers to primary level education, *sec* – secondary level education, *dip* – diploma level education and *deg*- degree level educational attainment. Individuals with uncompleted primary are the reference group.

We will further investigate individual heterogeneity by estimating returns to education along the earnings profile using the quantile regression method. Specifications (5-7) measure mean returns to education for an individual with mean earnings. However returns could be heterogeneous across individuals especially along the earnings distribution. Such heterogeneity has implications for the inequality-reducing role of education and policy

implications on investment in education. If the distribution of earnings is dispersed then the mean estimate may not be reliable thus the need to consider quantile estimates particularly the median. The aim is to find out whether the influence of schooling on earnings varies along the distribution of the dependent variables. Workers at the high percentile will be regarded as the high ability individuals and those at the low percentile as low ability individuals. The following will be estimated;

$$Q_\tau(w_{ij} / X_{it}) = \alpha(\tau) + X_{it}^{'}\beta(\tau) \qquad (8)$$

Where $Q_\tau(w_{it} / X_{it})$ denotes the τ^{th} quantile of log wages on a vector of variables (X_{it}). The conditional quantile function (Koenker and Basset, 1978) solves the following minimizing problem:

$$\min_{\beta} \frac{1}{n}\left[\mathop{\mathrm{E}}_{i:w_i > X_i^{'}\beta}(\tau / w_{it} - X_{ij}^{'}\beta_\tau)/ + \mathop{\mathrm{E}}_{i:w_i < X_i^{'}\beta}((1-\tau)/ w_{it} - X_{it}^{'}\beta_\tau)/ \right] \qquad (9)$$

$$= \min_{\beta} \frac{/}{n} \mathop{\mathrm{E}}_{i=1}^{n} \rho_\tau(u_{\tau i}) \qquad (10)$$

Where $\rho_\tau(u) = (\tau - 1)(u \le 0)u$ if $u_{\tau i} < 0$ known as a 'check function'

Therefore if $\tau = 0.5$ then $Q_\tau(w_{it} / X_{it})$ will be the conditional median return to education.

In the previous estimations we treat education as an exogenous variable which is widely disputed since it is not clear whether educated workers earn more because of their education or other unobserved factors such as ability or family background. When education is correlated with unobserved variables (omitted variables) then it is difficult to infer the casual effect of education on earnings. As noted by Card (2001) higher ability individuals may acquire more education and possibly benefit more from it thus causing an upward bias of OLS estimates. One of the solutions to the endogeneity problem is to use the instrumental variable method which we estimate using the following earnings function:

$$E[\ln w_{it} / z_{it}] = \alpha + E(\beta sch_{it} / z_{it}^{'}\pi) + E(\varepsilon_{it} / z_{it}) \qquad (11)$$

Where Z_{it} are the instrumental variables that must satisfy the following orthogonality conditions:

$$E[\alpha / z_{it}] = 0 \qquad E[(\beta_i / z_{it}] = 0 \qquad E[\varepsilon_{it} / z_{it}] = 0$$

And the instrumental variable affecting sch_{it} only through:

$$E[sch_{it} / z_{it}] = z_{it}^{'}\pi$$

Where π is a vector of reduced form coefficients and consequently the instrumental variable estimation will produce consistent results. In the estimations we will use the two-stage least squares (2SLS) estimator.

Since we estimate the returns to education on a sub-sample of individuals with reported earnings that are a non-random draw from our sample (as confirmed by the t-test for the sample means for two sub-samples- educated with earnings and educated without earnings), we re-estimate the returns to education while controlling for selection bias. Specifically we employ the Heckman full information maximum likelihood model which estimates the selection model from a latent variable Z* in the first stage:

$$Z_{it}^{*} = Y_{it}^{'}\alpha + u_{it} \qquad (12)$$

$$Z_{it} = 0 \quad if \quad Z_{it}^{*} \le 0$$

$$Z_{it} = 1 \quad if \quad Z_{it}^{*} > 0$$

Where Z_{it} is the participation variable equal to 1 if the individual is a wage-employee or self-employed and 0- otherwise. The Y_{it} is a vector of exclusion variables including; marital status and number of children which we think affect the reservation and not the market wage.

In the second stage the wage equation is modelled as:

$$E(\ln w_{it} / z_{it}^{*} > 0) = X_{it}^{'}\beta + \lambda(\Gamma) + \varepsilon_{it} \qquad (13)$$

Where $\lambda = \frac{\phi(z_{it})}{\Phi(-z_{it})}$ is the inverse Mills ratio which is a monotonic decreasing function of the probability that an observation is selected into the sample, φ is the density function and Φ the cumulative distribution function for a standard normal variable

5.0 Data Sources and Descriptive Statistics

5.1 Data Sources

The study uses panel data from the 2005/06 Uganda National Household Survey (UNHS) and the 2009/10 Uganda National Panel Survey (UNPS) waves collected by the Uganda Bureau of Statistics. The 2005/06 UNHS is the baseline survey which was conducted between May 2005 and April 2006, while the 2009/10 UNPS is the first panel wave in a series of planned annual panel surveys in Uganda conducted between May 2009 and April 2010. We specifically use data from the socio-economic (household) module for the 2005/06 wave and for the 2009/10 our main data is from the labour force module. In both waves individuals reported earnings (in cash and kind equivalent) in Uganda shillings over varying time periods which we convert in dollar equivalent as shown in Tables 8 and 9 in the appendix. In total the sample has 2,384 wage-employees and 865 self-employed individuals with reported earnings. Also in both surveys individuals reported their highest education grade attained, age, sex, marital status, children (below 18 years) in the household, residence (rural or urban), region, district, whether a household received non-labour income and the value as well as parental background such as mother's and father's education and father's occupation.

5.2 Descriptive Statistics

Our dependent variable is the logarithm of monthly earnings which we obtain by converting the different earnings reported in various time periods into monthly earnings which was the most frequent period. Given that reported earnings are over many different periods as shown in Tables 8 and 9 (in the appendix), we calculate a monthly wage in consideration of the reported days worked per month (for those who reported a daily wage) and hours worked per day (for those who reported hourly pay). We note that hours worked per day and days worked per month were reported only in 2005/06. Consequently we compute the average

hours of work which is approximately eight hours (7.58) and average days worked per month which is approximately 19 days (18.85) which we use to estimate monthly wages for the 2009/10 wave where such data is missing. In case of individuals who reported hourly pay, their earnings were multiplied by the number of hours worked per day and days worked in a month (or used average hours or days for the 2009/10 wave). Similarly for individuals who reported daily pay, their earnings were multiplied by the number of days worked in a month (or average days for the 2009/10 wave). For individuals who reported weekly pay we multiplied their earnings by 52/12 (since some months have more than four weeks) while individuals who reported a pay for every two weeks or twice monthly the wage was multiplied by two to obtain the monthly pay.

Evident in these tables are the outliers such as the daily earnings for individuals in 2009/10 which are outrageously high and very low annual earnings in 2005/06. Since the data has outliers we trim it at 1 percent at the top and bottom and present the summary statistics in Table 1. It is evident that the calculated monthly wage varies across waves with a general increase in wage over time and a higher monthly pay for wage-employees than the self-employed. For example in the pooled data wage-employees earn more than the self-employed by 58 percent. We also note a wide dispersion between the mean and median wages for both types of workers with the greatest variation among the self-employed.

Over time the wages have increased with the highest increment among wage-employees (the data has a relatively small number of the self-employed with reported earnings in 2009/10). Generally there are fewer observations for self-employed individuals with reported earnings which could be as a result of the highly flexible wages in this sector making it difficult for such workers to precisely report earnings or workers may not be willing to report low pay due to the stigma attached to poor remuneration. A comparison between the calculated monthly earnings in Table 8-9 (in the appendix) and Table 1 shows that the calculated earnings are higher than the reported earnings which we further analyse in figure 1.

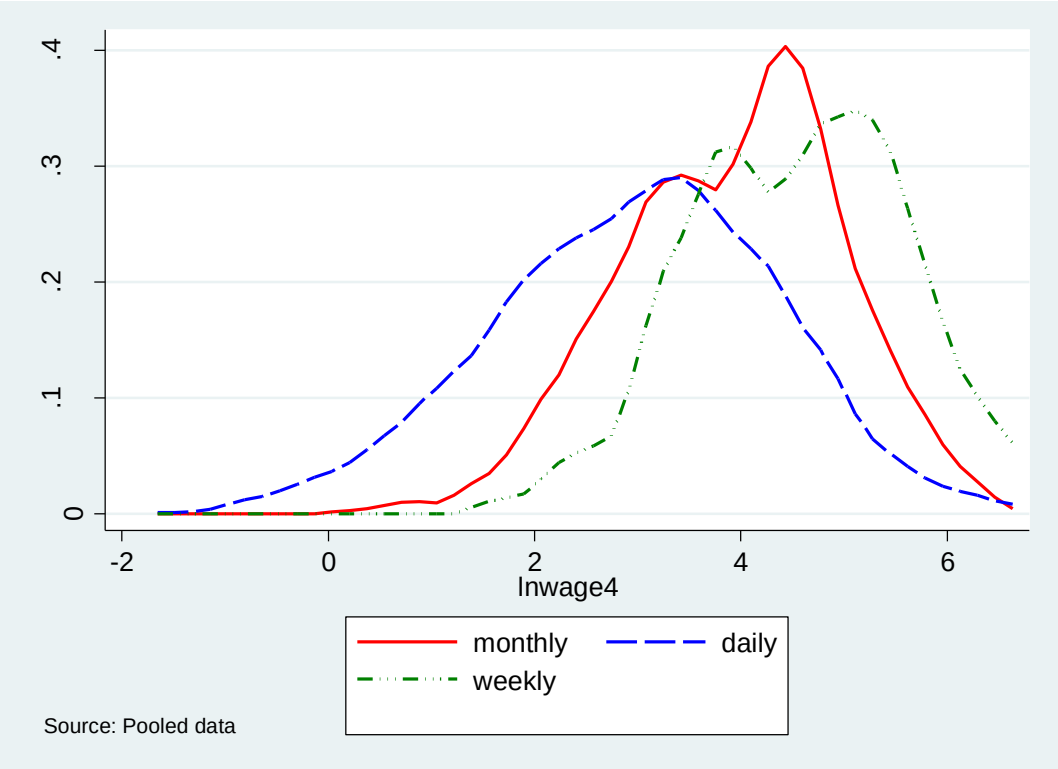
Table 1: Distribution of individuals with calculated monthly earnings

	Pooled			2005/06			2009/10		
	Obs	**Mean ($)**	**Median ($)**	**Obs**	**Mean ($)**	**Median ($)**	**Obs**	**Mean($)**	**Median ($)**
Wage	2,344	88.12	41.19	1,299	66.53	32.96	1,046	114.96	51.36
		(481.71)			(118.18)			(708.59)	
Self	855	55.73	24.64	570	53.19	19.5	285	60.81	32.04
		(136.23)			(157.67)			(77.21)	
Total	3,199			1,869			1,331		

Source: Pooled data, earnings are reported in US dollars equivalent to UShs./US$ exchange rate of 1,820.6 in 2005/06 (Bank of Uganda statistics) and 2,028.9 in 2009/10 (Uganda Bureau of Statistics Key Economic Indicators, 2011/2012) and standard deviation in parentheses

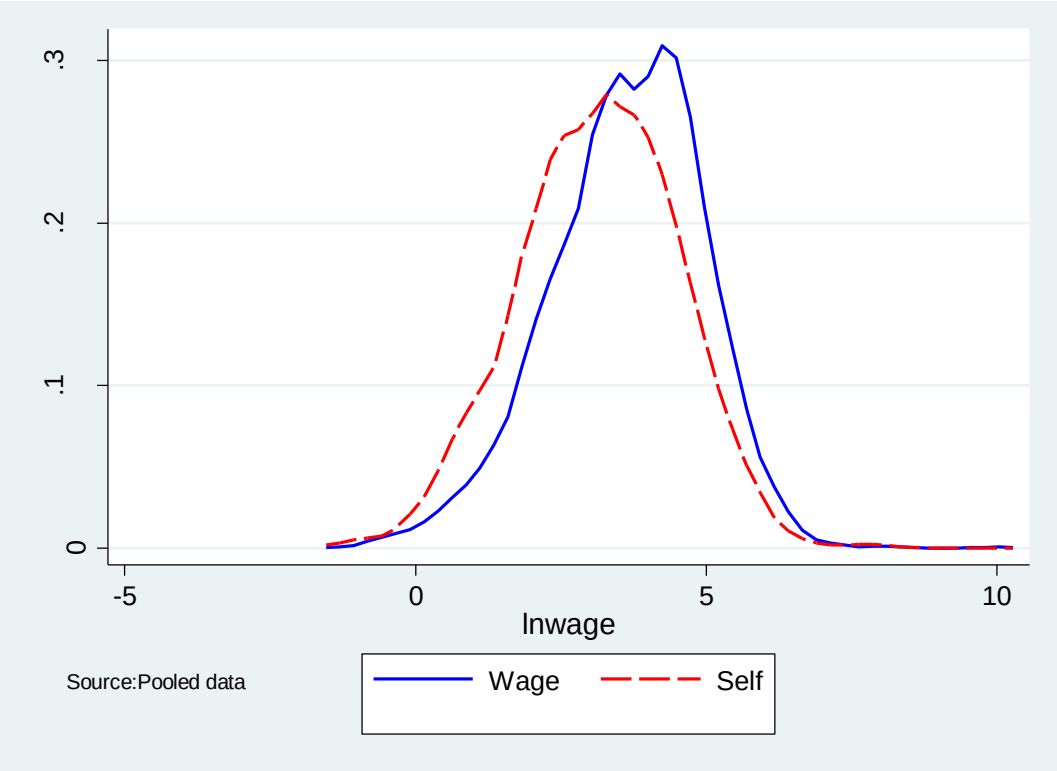
In Figure 1, after trimming the data we compare reported monthly earnings with calculated monthly earnings, for wage-employees who reported a daily and weekly pay to find out whether the distributions are similar using a Kennel density distribution. We observe similar distributions among the three types of earnings depicting relatively higher earnings for those paid weekly and low earnings for individuals paid daily which mirrors the distribution in the raw data where we notice higher pay rates for individuals paid weekly and lower pay rates for individuals paid daily.

Figure 1: Calculated monthly earnings. The figure shows the distribution of monthly earnings separated by reporting period.



In figure 2 we present the distribution of log earnings for both wage-employees and the self-employed using a Kennel density distribution. The results are consistent with earlier observations where the highest earnings are amongst wage-employees who have a bimodal distribution and the least earnings earned by the self-employed with more spread earnings.

Figure 2: Distribution of log-earnings by employment type



We observe wage gaps by gender, residence and age-group as illustrated in Tables 10-12 in the appendix. In Table 10, it is clear that there is a gender wage gap which is wider among wage-employees than the self-employed. The distribution of monthly earnings for wage-employees and the self-employed by residence (rural/urban) is presented in Table 11. It is evident there is a rural-urban wage gap which surprisingly is wider for the self-employed than wage-employees. We attribute this imbalance to higher incomes and volume of economic activities in urban areas that induce higher returns for private firms located in urban areas enabling them to offer higher wages and also as a compensation of the higher cost of living in urban areas (Harris and Todaro, 1983). Further the wages in the formal sector, particularly the public sector are standardised across the country which explains the smaller rural-urban wage gap for wage-employees. Table 12 presents the distribution of monthly earnings for wage-employees and the self-employed by age group, divided into the "old" (30 years and above) age cohort and "young" (less than 30 years) age cohort. The statistics in Table 12 reveal a wider wage gap between the "old" and the "young" for wage-employees than the self-employed. This outcome can be attributed to the institutional framework within the

formal sector which rewards experience (accumulated human capital) that is acquired over an individual's lifetime and has a bearing on the earnings of the "old" age cohort.

The summary statistics for the different explanatory variables are presented in Table 2. The statistics suggest that wage-employees are more schooled but relatively younger with less experience and children than the self-employed. Over time, average levels of education have increased for both types of workers, with the greatest increment among diploma holders in the case of wage-employees and holders of secondary school certificates for the self-employed. Also we note more women are self-employed than wage-employees which is not surprising but could be signalling restricted entry of women into wage than self-employment. As expected there is a greater concentration of wage-employment in urban areas and the capital city- Kampala than self-employment which perhaps is a result of the imbalance in economic development between rural and urban areas in Uganda.

Table 2: Summary statistics of key explanatory variables

	Wage-employees			Self-employed		
Variable	**Pooled**	**2005/06**	**2009/10**	**Pooled**	**2005/06**	**2009/10**
Education	8.32	7.83	8.94	7.28	7.04	7.79
Uncompleted	0.39	0.43	0.34	0.51	0.53	0.46
Primary	0.15	0.15	0.15	0.13	0.13	0.14
Secondary	0.31	0.30	0.33	0.25	0.24	0.27
Diploma	0.11	0.08	0.14	0.08	0.08	0.08
Degree	0.03	0.03	0.04	0.02	0.02	0.04
Experience	18.02	18.03	18.02	20.22	19.99	20.70
Age	32.10	31.9	32.36	33.12	32.97	33.43
Female	0.32	0.33	0.31	0.41	0.39	0.44
Urban	0.42	0.39	0.46	0.28	0.29	0.27
Married	0.57	0.6	0.52	0.63	0.63	0.62
Children	2.78	2.74	2.83	3.14	2.96	3.48
Non-labour income	0.29	0.42	0.12	0.37	0.46	0.20
Kampala	0.17	0.17	0.18	0.08	0.09	0.07
Father education	0.19	0.18	0.22	0.12	0.11	0.11
Mother education	0.07	0.07	0.08	0.03	0.02	0.03

Source: Pooled data

6.0 Discussion of results

6.1 Returns to an additional year of schooling

First as highlighted in the empirical strategy we estimate returns to an additional year of schooling separately for wage employees and the self-employed when education is considered exogenous and present the results in Table 3 but later address the problem of endogeneity and selection bias in section 6.5 and 6.6 respectively. A Chow test cannot reject the hypothesis that returns to education are equal in the two sectors. For both sectors an individual's extra year of schooling is associated with an increase in earnings of 15 percent. The returns are high but compare with returns in other African countries, for example Girma and Kedir (2005) document an average return to education of 15 percent in Ethiopia and Leyaro et al (2010) estimate the average return to education at 13 percent in Tanzania. Our results are also consistent with similar studies that investigate the returns between wage and self-employment. For instance; Kingdon and Söderbom (2007) find similar returns to education for the agricultural workers, wage-earner and the self-employed among the older cohort in Pakistan. However our results contrast with findings for Ghana (Kingdon and Söderbom, 2007) where the returns to education for wage employment are higher than self-employment. The results are plausible for Uganda because they signal similar human productivity in these two sectors of employment and in support of the human capital theory rather than the signalling theory since the effects of education to the self-employed can only be human capital effects considering that there are no information asymmetries when a person is self-employed.

We also find evidence of a concave age-earnings relationship among wage-employees but not for the self-employed. These results indicate that earnings for wage-employees increase at a decreasing rate over a worker's lifetime which could be because of the retirement age policy that does not apply in self-employment. In addition the results show lower earnings to females than males for both sectors with a greater gender gap in wage-employment (consistent with the descriptive statistics). Interestingly the year dummy shows a higher increment in earnings over time for self than wage-employment, perhaps due to rigid wages in the formal sector and highly flexible wages in self-employment.

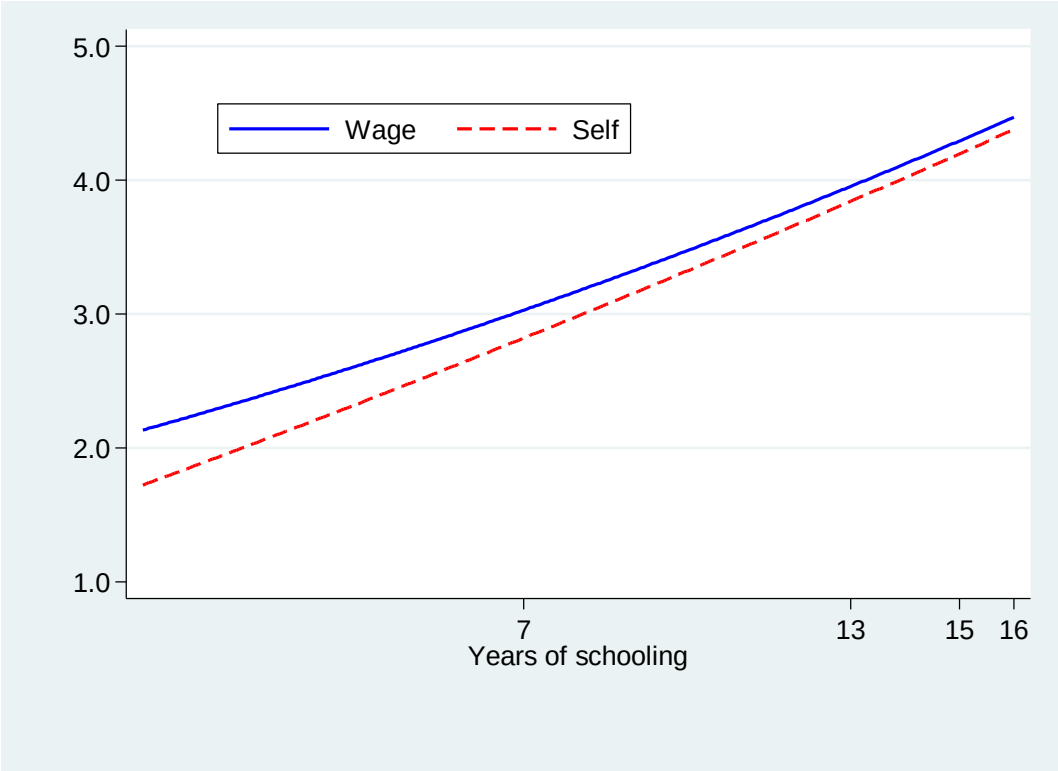
Table 3: Returns to an additional year of schooling by employment type

Dependent variable: log monthly wage				
	Wage		**Self**	
	Coef	**SE**	**Coef**	**SE**
Years of schooling	0.154***	0.005	0.161***	0.010
Experience	0.042***	0.007	0.033**	0.015
Experience squared	-0.001***	0.000	-0.001	0.000
Female	-0.406***	0.052	-0.328***	0.086
Year dummy	0.394***	0.043	0.448***	0.086
Intercept	1.985***	0.094	1.682***	0.176
R-squared	0.332		0.282	
Observations	2,038		700	

SE are Clustered standard errors, * p < 0.10, ** p < 0.05, *** p < 0.01.

To establish the shape of the schooling-earnings function we include a quadratic term for education in the estimation. We find the returns to education are linear for both types of workers after fitting the predicted coefficients as illustrated in figure 3 (the coefficient estimates are provided in Table 13 in the appendix). This implies similar marginal returns to an additional year of schooling to workers along the education profile. We note that the gap between the returns to education for the two worker types is larger at the bottom than at the top of the education profile which suggests that individuals with lower education are much better off in wage compared to self-employment.

Figure 3: Change in predicted wages due to changes in education with a quadratic term



6.2 Trend of returns over time

During the study period 2005-2010, the average years of schooling increased as presented in the descriptive statistics. According to theory this increase is expected to result in a reduction in the returns to education if we assume that the relative demand for educated workers remained constant. We find our results are consistent with theory showing a decrease in returns to education over time as shown by the flatter (less steep) slope of the schooling-earnings profile in 2009 than in 2005 in figure 4 and 5. Remarkably, for both wage and self-employment the intercept has increased over time which suggests the earnings have increased but for reasons other than those captured in our model. A large increase of salaries for public sector workers in 2006 may have encouraged increases in pay in other sectors. In addition Uganda has enjoyed robust economic growth for over two decades which is expected to result in increased wages. However our results are in contrast with Appleton's (2001) findings of an increase in returns to education to workers in wage employment in Uganda between 1992 and 2000 (although it was only the returns to primary education which were statistically significant). We think this contrast is due to differences in average levels of educational

attainment which were much lower in the periods preceding the implementation of the UPE in 1997 and USE in 2007.

Figure 4: Change in predicted wages due to changes in education over time for wage-employees

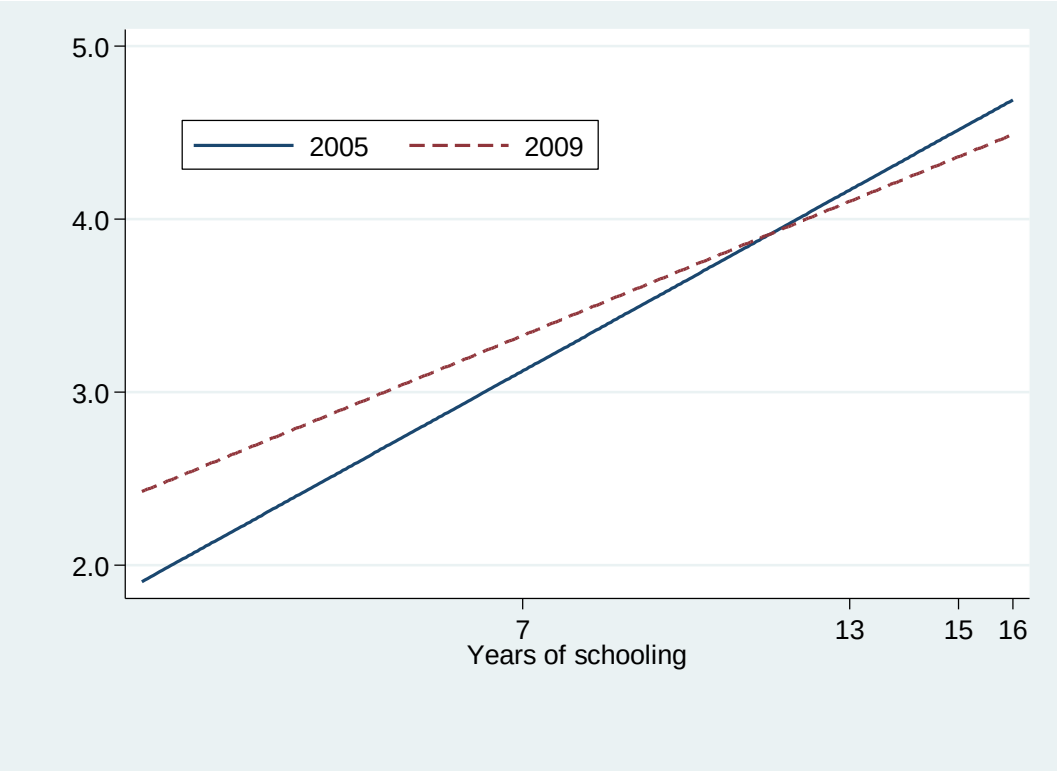
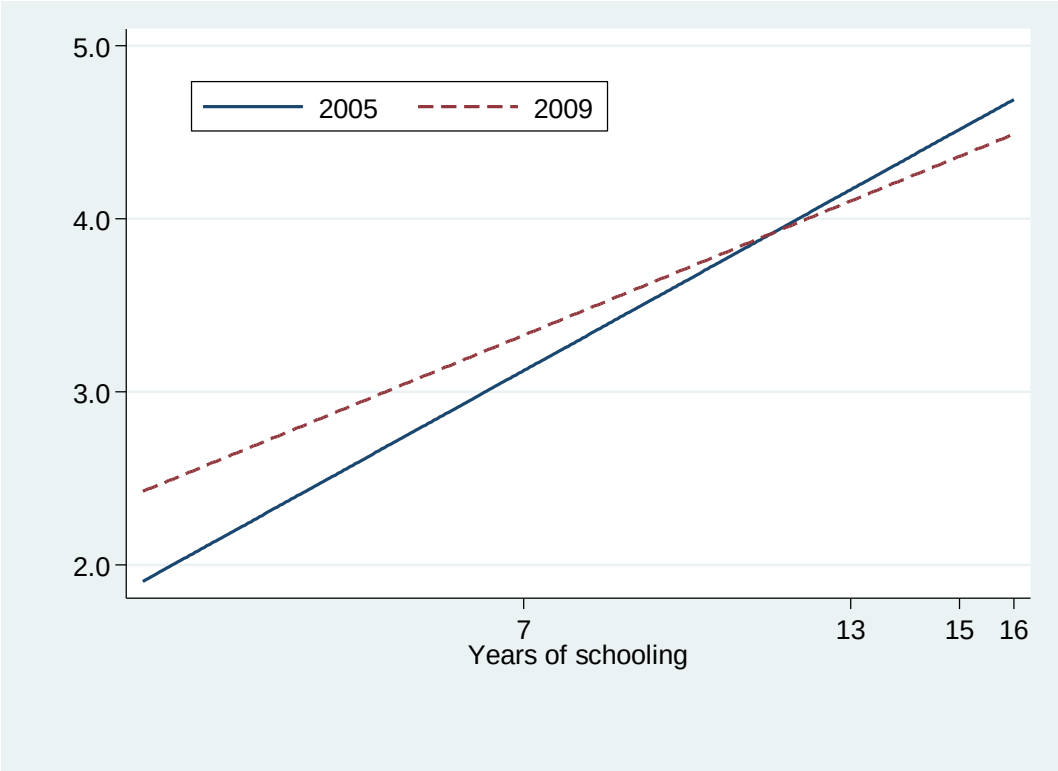


Figure 5: Change in predicted wages by education over time for the self-employed



6.3 Returns to levels of educational attainment

We re-estimate the Mincerian model but replace years of schooling with dummies for levels of education to test for non-linearities in returns to education along the education profile. We find convex returns to education as shown in Table 4 and illustrated further in Table 14 in the appendix, where we compute the marginal effect in consideration of years of schooling for each level of education attainment. These results are similar to Söderbom et al (2005) who found higher returns at higher levels of education in Kenya and Tanzania. Interestingly we find very low returns to primary education for both types of workers and when we estimate returns for single waves we find no significant returns at primary for self-employment. We think these results show evidence of the "sheepskin effect" where wages are dependent on credentials (signalling effect) than human capital productivity. Perhaps to employers, primary education does not signal adequate levels of productivity and thus attracts low remuneration. This casts doubt on the impact of primary education on an individual's productivity and employability especially in self-employment.

Surprisingly, we find higher returns to education at secondary and diploma level for self compared to wage employment but find higher returns to degree educational for wage than self-employment. This may be due to a combination of demand and supply factors where on the demand side the skills for self-employment are lower than wage employment and on the supply side these individuals (especially diploma holders) possess relevant practical skills required in the work place.

Consistent with the findings for an additional year of schooling, the returns at all levels of education have decreased over time with the greatest reduction at the top of the education profile for both worker types. These results could be signalling the lack of relevant jobs to absorb more qualified workers (diploma education and above), who eventually accept jobs that require lower qualifications.

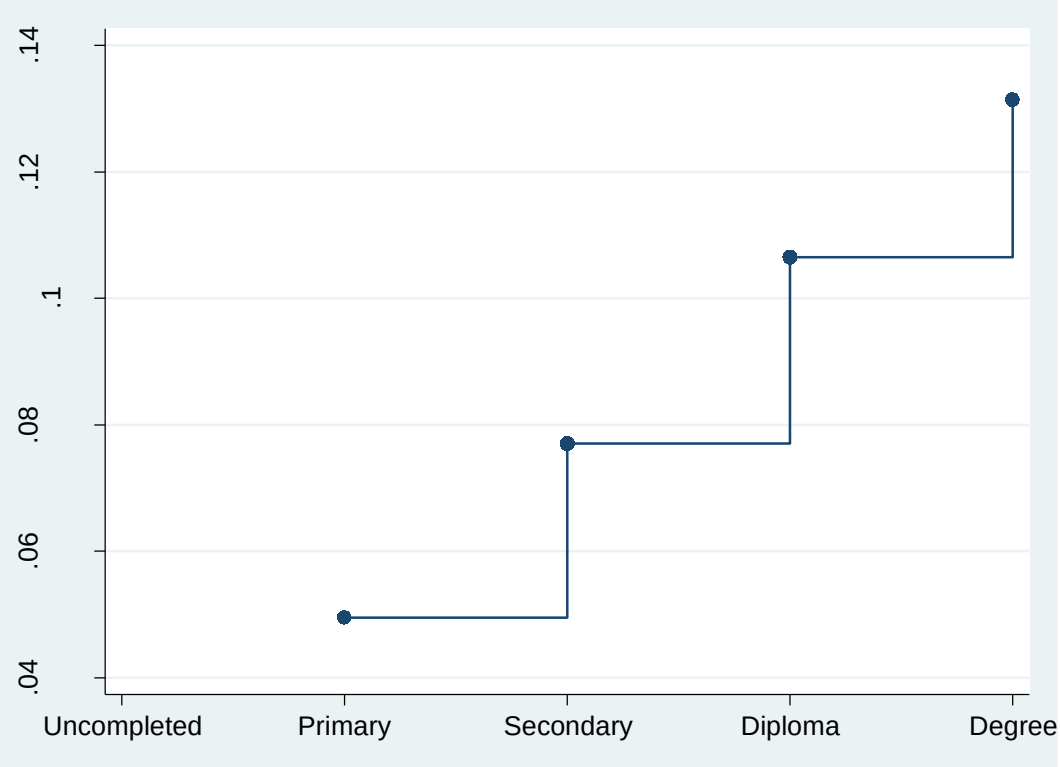
Table 4: Returns to levels of educational attainment by employment type

Dependent variable: log monthly Earnings						
		Wage			**Self**	
	Pooled	**2005/06**	**2009/2010**	**Pooled**	**2005/06**	**2009/2010**
Primary	0.346***	0.398***	0.233**	0.291**	0.273	0.228
	(0.080)	(0.110)	(0.102)	(0.144)	(0.187)	(0.213)
Secondary	1.001***	1.151***	0.778***	1.136***	1.218***	0.900***
	(0.058)	(0.079)	(0.074)	(0.108)	(0.134)	(0.177)
Diploma	1.598***	1.787***	1.369***	1.742***	1.975***	1.253***
	(0.073)	(0.094)	(0.096)	(0.128)	(0.137)	(0.248)
Degree	2.103***	2.429***	1.732***	1.687***	2.102***	1.198***
	(0.114)	(0.165)	(0.146)	(0.231)	(0.316)	(0.264)
Experience	0.044***	0.039***	0.056***	0.031**	0.029	0.023
	(0.008)	(0.011)	(0.009)	(0.015)	(0.020)	(0.019)
Experience squared	-0.001***	-0.001***	-0.001***	-0.001	-0.001	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	-0.438***	-0.498***	-0.340***	-0.365***	-0.488***	-0.119
	(0.053)	(0.075)	(0.064)	(0.089)	(0.112)	(0.141)
Year dummy	0.417***			0.479***		
	(0.043)			(0.088)		
Intercept	2.669***	2.679***	3.037***	2.407***	2.446***	2.938***
	(0.088)	(0.126)	(0.106)	(0.166)	(0.212)	(0.244)
R-squared	0.312	0.285	0.290	0.262	0.267	0.174
Observations	2,038	1,141	897	700	477	223

Clustered standard errors in parentheses, * p < 0.10, ** p < 0.05, *** p < 0.01, uncompleted primary is the reference group.

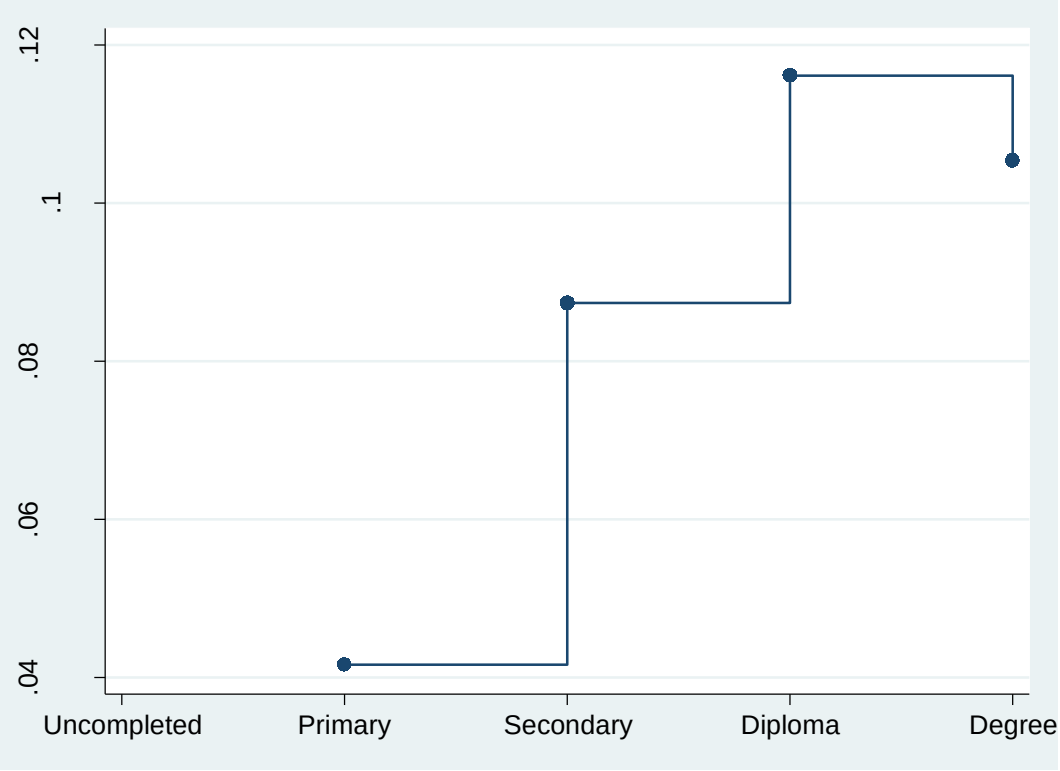
The returns to an extra year of schooling for each level of educational attainment for wage-employees are illustrated in Figure 6. The figure shows a step-wise marginal returns to an additional year of schooling for each level of educational attainment. The marginal returns progressively increase as an individual proceeds to the next level. This is evidence that the return to each successive year of schooling along the education profile for wage-employees, when we consider qualifications is convex with the greatest increment from secondary to diploma level.

Figure 6: Marginal returns to an extra year at each educational level for wage-employees



A similar diagram for marginal return to an extra year of schooling for each education level is drawn for the self-employed in figure 7. The diagram shows an increment in returns along the education profile highest from primary to secondary, but with a decline in returns at degree education. These results suggest that education is rewarding at lower levels of education for the self-employed but not at higher levels of education, in particular degree education. The results further suggest the low skill demand in this sector and individuals with degree education are likely to be over qualified for tasks and remuneration in self-employment in Uganda.

Figure 7: Marginal returns to an extra year at each educational level for self-employed



6.4 Quantile regression

The Mincerian model assumes individuals are homogenous and provides an estimate for an average individual but individuals may be heterogeneous with different rates of return to education along the earnings profile. We test for this heterogeneity along the earnings profile by estimating quantile regressions which is flexible and allows the returns in each quantile to be independent from another. As illustrated in Table 5, the returns to education along the earnings distribution vary for both wage and self-employment. Overall the earnings premium reduces with quantile where education is more beneficial to individuals at the lower quantiles than those at the upper quantile. The explanation for these outcomes is that education and ability are substitutes where individuals with less education but of high ability have higher marginal returns to education. Our results are similar to Kingdon and Söderbom (2007) who found that returns to education decrease with quantile among women in Pakistani and for both women and men in wage-employment in Ghana. Similarly Girma and Kedir (2005) found education more beneficial to the less able (individuals at the lower earnings profile) in

Ethiopia. Given these results we conclude that investment in education in Uganda is more beneficial to the less able (poor) than the more able (rich) individuals and therefore can be effective in reducing income inequality. Notably the mean and median returns to education for both types of workers are similar and thus the OLS results are a fair estimate.

Table 5: Quantile regression by employment type

	0.1		0.25		0.5		0.75		0.9	
	Wage	**Self**	**Wage**	**Self**	**Wage**	**Self**	**Wage**	**Self**	**Wage**	**Self**
Years of schooling	0.180***	0.194***	0.179***	0.184***	0.153***	0.159***	0.139***	0.143***	0.119***	0.137***
	(0.011)	(0.015)	(0.007)	(0.014)	(0.007)	(0.011)	(0.008)	(0.017)	(0.008)	(0.018)
Pseudo R^2	0.217	0.183	0.234	0.185	0.222	0.185	0.162	0.146	0.117	0.139
Observations	2,038	700	2,038	2,038	700	2,038	2,038	700	2,038	700

Bootstrapped standard errors in parentheses, * p < 0.10, ** p < 0.05, *** p < 0.01, other controls include; experience, experience squared , female, year dummy and an interaction term between year and education.

6.5 Controlling for endogeneity

As earlier discussed it is not possible to infer causality of education on earnings because of the likelihood of the unobservables in the wage equation (e.g. ability) correlating with earnings. To address this endogeneity or omitted variable bias problem we re-estimate the wage equations using the 2SLS estimator with father's education as the instrument in the model for wage-employees and both mother's and father's education in the model for self-employment.[10] The earnings premium increases to 25 percent for the wage-employees and to 24 percent for the self-employed as shown in Table 6. These results are consistent with many studies that find a downward bias in OLS estimates for returns to an additional year of schooling (Card, 1999; Psacharopolous and Patrinos, 2004; Girma and Kedir, 2005; Söderbom et al, 2005; Kahyarara and Teal, 2006). Several reasons are given for higher IV returns to education which include: invalidity of instruments, attenuation bias arising from measurement errors in reported schooling levels and IV estimates regarded as a local average treatment effect (LATE)[11]. We checked for the validity of instruments by running a first stage regression diagnostics and obtained an F-statistic of 107.58 (wage-employees model) and in

[10] These instruments may not be valid if parental education is correlated with the error term in the earnings model.

[11] LATE provides estimates for individuals affected by the instrument (Angrist and Pischke, 2009)

the case of the self-employed we used two instruments; mother's and father's education which are valid according to the Sagan test. We therefore conclude that there could be attenuation bias and the effect of LATE which bias the results either way depending on the relative magnitudes of these biases. We tested for endogeneity of education using the Hausman test which rejected the hypothesis that all our variables in the model are exogenous, implying the OLS estimates are biased.

Table 6: Returns to an additional year of schooling when schooling is endogenous

Dependent variable: log monthly wage				
	Wage		**Self**	
	Coef	**SE**	**Coef**	**SE**
Years of schooling	0.246***	0.025	0.238***	0.042
Experience	0.029***	0.011	0.020	0.019
Experience squared	-0.000	0.000	-0.000	0.000
Female	-0.432***	0.064	-0.377***	0.098
Year dummy	0.276***	0.072	0.463***	0.118
Intercept	1.273**	0.267	1.179***	0.445
R-squared	0.287		0.270	
Observations	1,395		524	

SE are cluster standard errors, * p < 0.10, ** p < 0.05, *** p < 0.01

6.6 Selectivity corrected returns to education

Given that we estimate returns to education on a sub-sample of individuals who are not a random draw, the OLS estimates are likely to be biased. To correct this bias we re-estimate wage equations for the wage and self-employed using the Heckman full information maximum likelihood model with the number of children and marital status as the exclusion restriction and the results are presented in Table 7. Indeed we find evidence of selection bias for the returns to wage-employees where we reject the hypotheses of no correlation between the error term in the outcome and selection equations. We find the error terms are negatively correlated which is consistent with theory that individuals with a higher reservation wage are not observed in the wage equation for wage-employees. With regard to the self-employed we find no evidence of selection bias and thus the OLS estimates are not biased by selectivity.

Table 7: Selectivity corrected returns to education

Dependent variable: log monthly wage

	Wage		Self	
	Coef	**SE**	**Coef**	**SE**
Years of schooling	0.148***	0.006	0.160***	0.010
Experience	0.037***	0.007	0.031**	0.015
Experience squared	-0.001***	0.000	-0.000	0.000
Female	-0.375***	0.052	-0.324***	0.085
Year dummy	0.401***	0.043	0.451***	0.086
Inverse Mills Ratio	-0.813***	0.193	-0.167	0.248
Intercept	3.494***	0.385	2.113***	0.670
Observations	17,364		17,515	

SE are cluster standard errors, * p < 0.10, ** p < 0.05, *** p < 0.01

7.0 Conclusion and recommendations

This paper has analysed the differences in marginal returns to education for wage-employees and the self-employed using the Mincerian framework with pooled regression models. We have not taken advantage of the panel element of our data because our key variable of interest; education is time invariant. In addition we have not addressed the problem of attrition bias because of data limitations such as few waves and observations.

In the descriptive statistics, we observe a wider gender gap among wage-employees than the self-employed. We attribute these differences to low levels of education among females which is evident in the data (where females have six mean years of schooling while males have seven mean years of schooling) than discrimination at workplace, although we cannot rule out the latter in some situations. As an area of further research, we intend to further investigate this scenario by decomposing the gender wage gap to gain insight in the likely factors influencing the observed wage gap.

We find similar marginal returns to an additional year of schooling for wage-employees and the self-employed where each extra year of schooling is associated with a rise in wages of 15 percent. Thus more schooling induces more earnings for a worker. However we note that we are only able to observe a correlation between education and earnings not a causal

relationship since we are unable to observer similar individuals with and without specified levels of education to infer the casual relationship between education and earnings.

These results are encouraging, suggesting that education is equally rewarding in the less preferred sector; informal sector (because of the low wages and poor working conditions in this sector) which employs two-thirds of Uganda's labour force. However when we investigate the shape of the education-earnings profile we find it linear for both worker types when the education variable is continuous but with levels of education the returns are convex. Therefore if employers consider credentials (which is more plausible in Uganda's case) not years of schooling then higher levels of education are associated with higher returns for both types of employment.

Another key finding in this paper is the reduction of marginal returns to education over time. Our results are consistent with theory which predicts a decline in marginal returns when the levels of educational attainment increase. Lastly, we find marginal returns to education decrease with quantile which suggests that the less able (poor) individuals at the lower earnings distribution for both worker types have higher marginal returns to education. These results are encouraging since investment in education can redistribute income from the "rich" to the "poor" and thus investment in education in Uganda is income equalising.

In conclusion we find high marginal returns to education in Uganda which implies that investment in education in Uganda is still viable and attractive. We propose continued investment in education by the Government of Uganda, if possible to extend it to university education where returns are highest. Although there is need to further investigate why education and ability are substitutes and not complementary. The possible explanation for the link between education and ability in Uganda could be related to the quality and type of formal education provided which perhaps does not adequately nurture an individual's innate ability. In this regard we propose a review of the education curriculum which aims at developing an individual's innate ability. Finally the convex marginal returns to levels of educational attainment suggest that higher levels of education would induce higher wages for the two types of employment (though the returns are highest at diploma level for self-employment). This suggests increased demand for higher skills in the two sectors with degree education inducing higher wages only in wage-employment. Therefore the Government of

Uganda needs to expand the formal sector and encourage the formalisation of the informal sector to absorb the increasing number of graduates in the country.

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9.0 Appendix

Table 8: Reported earnings for wage-earners

	2005/06			2009/10		
	Reported		Monthly wage	Reported		Monthly wage
Period	Obs	mean ($)	mean ($)	Obs	mean ($)	mean ($)
Hourly	13	8.60	403.21	3	50.6	7691.52
Daily	586	2.03	38.66	302	3.77	71.67
Weekly	105	9.47	123.18	100	15.63	203.15
Fortnight	15	25.56	51.13			
Monthly	588	100.33	100.33	628	111.38	111.38
Quarterly	4	681.92	227.31			
Yearly	3	100.70	8.39			
Other				37	34.36	72.96
Total	1,314			1,070		

Source: Pooled data earnings are reported in US dollars equivalent to UShs./US$ exchange rate of 1,820.6 in 2005/06 (Bank of Uganda statistics) and 2,028.9 in 2009/10 (Uganda Bureau of Statistics Key Economic Indicators, 2011/2012)

Table 9: Reported earnings for the self-employed

	2005/06			2009/10		
	Reported		Monthly wage	Reported		Monthly wage
Period	Obs	mean ($)	mean ($)	Obs	mean ($)	mean ($)
Hourly	7	0.49	74.54	1	0.49	67.03
Daily	301	1.94	36.93	74	2.87	48.8
Weekly	45	19.21	249.68	40	13.02	52.10
Fortnight	14	10.58	21.17			
Monthly	200	70.46	70.46	141	78.98	78.98
Quarterly	5	90.13	30.04			
Yearly	1	49.43	4.12			
Other				36	108.76	99.39
Total	573			292		

Source: Pooled data earnings are reported in US dollars.

Table 10: Distribution of monthly earnings by gender

	Wage-earners			Self-employed		
	Obs	**Mean**	**Median**	**Obs**	**Mean**	**Median**
Females	761	59.21	27.46	351	40.53	19.71
		(87.11)			(58.04)	
Males	1583	102.02	49.29	504	66.31	28.56
		(582.6)			(169.98)	

Source: Pooled data, standard deviation in parentheses

Table 11: Distribution of monthly earnings by residence

	Wage-earners			Self-employed		
	Obs	**Mean**	**Median**	**Obs**	**Mean**	**Median**
Urban	984	104.7	65.91	241	84.18	43.94
		(154.78)			(144.58)	
Rural	1360	76.12	28.09	614	44.56	16.76
		(618.37)			(131.26)	

Source: Pooled data, standard deviation in parentheses

Table 12: Distribution of monthly earnings by age group

	Wage-earners			Self-employed		
	Obs	**Mean**	**Median**	**Obs**	**Mean**	**Median**
Old	1253	111.84	54.93	477	66.67	25.14
		(652.76)			(169.89)	
Young	1091	60.88	32.78	378	41.92	21.97
		(89.25)			(72.5)	

Source: Pooled data, standard deviation in parentheses

Table 13: Marginal returns to education with quadratic term for schooling

Dependent variable: log monthly wage		
	Wage	**Self**
Years of schooling	0.114***	0.150***
	(0.027)	(0.046)
Schooling squared	0.002	0.001
	(0.001)	(0.002)
Experience	0.042***	0.033**
	(0.007)	(0.015)
Experience squared	-0.001***	-0.001
	(0.000)	(0.000)
Female	-0.417***	-0.332***
	(0.052)	(0.087)
Year dummy	0.394***	0.449***
	(0.042)	(0.086)
Intercept	2.133***	1.722***
	(0.135)	(0.244)
R-squared	0.333	0.282
Observations	2,038	700

Clustered standard errors in parentheses, * p < 0.10, ** p < 0.05, *** p < 0.01.

Table 14: Marginal returns for additional year of schooling at levels of educational attainment

Dependent variable: log monthly Earnings						
	Wage			**Self**		
	Pooled	**2005/06**	**2009/2010**	**Pooled**	**2005/06**	**2009/2010**
Primary	0.049***	0.057***	0.033*	0.042**	0.039	0.033
	(0.011)	(0.016)	(0.015)	(0.021)	(0.027)	(0.030)
Secondary	0.077***	0.089***	0.06***	0.087***	0.094***	0.069***
	(0.004)	(0.006)	(0.006)	(0.008)	(0.010)	(0.014)
Diploma	0.107***	0.119***	0.091***	0.116***	0.132***	0.084***
	(0.005)	(0.006)	(0.006)	(0.009)	(0.009)	(0.017)
Degree	0.131***	0.152***	0.108***	0.112***	0.131***	0.075***
	(0.007)	(0.010)	(0.009)	(0.014)	(0.020)	(0.017)
R-squared	0.312	0.285	0.290	0.262	0.267	0.174
Observations	2,038	1,141	897	700	477	223

Clustered standard errors in parentheses, * p < 0.10, ** p < 0.05, *** p < 0.01 uncompleted primary is the reference group.