

EDUCATIONAL INVESTMENT RETURNS FOR WOMEN AND MEN AT HIGHER EDUCATION IN UGANDA

A. Niringiye
Makerere University,
Kampala Uganda

Abstract

This study set out to estimate the rate of returns to educational investment for females and males at higher education in Uganda. The study utilised the most commonly used model, that is, the semi-logarithmic Mincerian (1974) earnings function to estimate the impact of gender, educational attainment, and experience, on the rate of returns to educational investment. Findings indicate that the overall rate of returns to educational investment per year for diploma and degree holders is 29.9 per cent for females and 50.7 per cent for males. A close scrutiny of the data shows no evidence of wage discrimination in pay, instead, the data shows that most females specialise in less paying professions compared to males. To close this gender gap in the rate of returns, there is need to increase the enrolment of females in the high rewarding courses.

Introduction

Returns to investment in education, have been estimated since the late 1950s. The rise in earnings inequality experienced during the 1980s and 1990s in many countries led to the renewed interest in estimates of returns to schooling (Murphy, and Welch, 1992). Human capital type earnings equations, which have now been estimated for a wide range of occupations and countries, consistently show a positive return to formal educational investment. The findings that education increases private earnings is robust for both developed and developing countries (Smith, 1995). The results, however, can also be used to address the economics of education debate on gender impact or to find out if educational investments yield the same earnings for men and women in the public sector at higher education levels. Up to now we know little about the impact of gender and other factors such as experience and educational attainment, in determining educational investment returns in Uganda.

Larger gender disparity in enrolment, drop out rates, literacy rates, educational attainment, and work participation are the critical features of the education system and labour market in Uganda. Although most Ugandan children enter primary school, it is estimated that only 48 per cent of boys and 29 per cent of girls complete the primary cycle (World Bank, 1995). The disparity in enrolment between boys and girls progressively increases as the level becomes higher. The proportionate share of girls in secondary school enrolment is even lower, that is, 41 per cent. At the university level, their share is 38 per cent and in other tertiary institutions, they constitute only 30 per cent of the student body.

The low participation rates of females in school education in Uganda have led to the widely held belief that education of females may not be profitable (Duraismy, 2000). There is some evidence

that married daughters are less likely to remit cash income to their parents and thus, education for girls may not be seen as important (World Bank, 1995). Accordingly it has been questioned whether investment in education of females in Uganda is profitable compared to investment in males education and whether parents are acting rationally in their investment decisions.

Findings on gender impact on the returns to educational investment across countries are mixed. On one hand, some researchers have found no significant gender differences in the rate of return to educational investments and, on the other hand other researchers have found significant differences in the rate of returns. Researchers who have found significant differences between men and women educational investment returns argue that men have more schooling and experience and tend to earn more than women do. It is also argued that differences in the rate of returns is a reflection of gender discrimination in pay and occupations. These mixed findings seem to suggest that the impact of gender on earnings may depend on the social, cultural and economic characteristics of a given country.

Statement of the Research Problem

It is a well known fact that on average women in many countries earn less than men. However, less is known about gender differences in earnings in the Ugandan case. No information existed on gender differences in educational investment returns at higher levels of education, and on how policy could effectively influence the labour market.

This study investigated the determinants of returns on educational investment for both men and women at higher education levels in Uganda. This gives an insight into the factors, such as, educational attainment, experience and gender that determine relative returns on educational investment at higher levels of education for both women and men in Uganda.

Objectives of the Study

The overall objective of this study is to investigate the returns on investment at higher educational levels for women and men in Uganda.

The specific objectives included;

- a) Determining the relative returns on investment, for both women and men at higher levels of education.
- b) Investigating the role of gender in the determination of educational investment returns.
- c) Investigating other factors such as educational attainment and experience that may influence educational investment returns.

Literature Review

Few studies have attempted to address gender differences in the rate of return to educational investment and the results are mixed. Teillet and Waldorf (1983) found no evidence of sex discrimination. Finding no significant difference in earnings based on gender, they concluded that there was no consumer discrimination for street vendors. Burki and Ubaidallah (1992) found that women were employed in lower earnings sub-sectors of the informal sector where their earnings averaged nearly 25 percent less than males in the same sub-sector. Cartaya (1994) pointed out that the demand for female labour was highest for the production of goods and services that could be produced at home, and market work was an extension of the activities they performed as wives and mothers. These domestic tasks were said to be underestimated. Gindling (1991), working in San Jose, Costa Rica, found a significant positive relationship between earnings and both education and experience, with no significant gender differences.

A few previous studies comparing male and female earnings in Africa do not uniformly show a

female disadvantage in pay after controlling for background factors. The results of Milne and Neitzert(1994) for Kenya and Vijverberg (1993) for Côte d'voire suggest, an earnings disadvantage to women in wage and self-employment. On the other hand, Glewwe (1990) does not find evidence of wage discrimination against women in Ghana but rather puts a premium to being female in the public sector in some model specifications.

Similarly, Amitage. and Sabot(1987), using data on the private and public wage sectors in Tanzania and Kenya found evidence of a wage premium to men only in the public sector in Tanzania. The lack of consistent finding of bias against women in pay suggests those economic conditions, labour market conditions, and social cultural factors that affect wage determination differ among countries. However, the results may also differ because the methodological approaches in these studies vary widely, perhaps most importantly with respect to the presence or absence of controls to sampling selectivity.

In a study in India, Duraisamy(2000) showed that, the returns to an additional year of women's education is higher than that to men at the middle, and higher levels, particularly so at secondary level where gains to women's education is more than twice that to men's. Men receive 6.4,15.7 and 8.9 percent returns on middle, secondary and higher secondary levels compared to 10.3, 33.7 and 11.8 percent returns to women.

Decomposition of the earnings differentials however indicate that in every sector of the labour market, men earn more than women even when other factors are controlled, reflecting either gender discrimination in pay or differences in the occupations that men and women tend to enter into. In addition, because they have more schooling and experience men tend to earn more than women do. In sum, with respect to earnings, women appear to fair less well than men do (Smith, 1995).

Although these earlier studies made important contributions to the literature on investment in education, these estimates were general and cannot be useful to us to disintegrate gender differences in returns to investment in education in Uganda. Furthermore, the above studies have utilised equation specifications that have been extended on a number of occasions, by the addition of different controls, sectors of activity, region of location, firm size and age, among others. These extensions have made it considerably more difficult to compare different results.

Methodology

Data Collection and Analysis

The cross sectional data used in this study was collected from Mpigi district. The District Personnel Officer availed to the researcher data on workers in the whole district. The information on workers that was available was on the wages/salaries per month, age, experience, post, and education level. The researcher sampled randomly ten females and ten males at different levels of higher education, that is, at diploma and degree levels making a sample size of 40 workers. The researcher did not divide his population into cohorts, because he assumed that the different cohorts will have gone through schooling of the same quality. The main draw backs to this data set lie in the lack of household information. Financial limitations made him unable to collect this information from the scattered sample.

The study employed quantitative methods of analysis to describe the impact of gender, education and experience on educational investment returns. Descriptive statistics such as mean were used. Inferences and conclusions were drawn from the findings in terms of estimates and statistical test results.

The Model

Returns to different levels of education may be estimated using two approaches, namely, the elaborate method and earnings function (Psacharopoulos, 1994). The elaborate method requires information on the cost of education which is rarely available and hence the earnings function method is the one that is widely used. Under the earnings function framework, the salary of the worker is assumed to depend on the level of schooling and on job training proxied by job experience. This earnings function does not take into consideration factors such as; social connections, personal characteristic, etc. which may account for differences in returns to investment in education. However, this model has been tested and found to be capable of giving reasonable estimates of the returns to investment in education (Dougherty, 1991). In addition, a more selective rates of return estimate review focusing on the causality debate between schooling and earnings by Card(2001) reaffirms Griliche's (1970) conclusion that the effect of ability and related factors does not exceed ten percent of the estimated schooling coefficient.

Mincer (1974) has provided a great service and convenience in estimating returns to education by means of semi-log earnings function, first done in Becker and Chiswick (1967). However, for the sake of convenience, many researchers use the raw coefficients of the extended (dummy-form) function to report returns to education, where there are wage effects (Psacharopoulos, 2002). Despite Beckers(1964) warning, many researchers feel obliged to throw in the regression whatever independent variables they seem to have in the data set. In effect, this procedure leads to stealing part of the effect of education on earnings (Psacharopoulos, 2002).

The semi-logarithmic earnings function also known as Mincerian earnings function is the commonly accepted functional form for the earnings function (Mincer, 1974). This study adopted this semi-logarithm earnings function. Drawing on moderately weak assumptions, Mincer (1974) proves that running the following specification;

$$\ln W_i = \beta_0 + \beta_1 educ + \beta_2 exp + \beta_3 exp^2 + u \dots \dots \dots \text{with}$$

crosssectional data, β_1 will represent the rate of return to education.

Where $\ln W_i$ = The natural log of wage variable of an individual i ,

$Educ$ = Education attainment level,

Exp = Experience,

Exp^2 = Experience squared, and,

U = Error term with expected value of zero.

$\beta_0, \beta_2, \beta_3$ are rates of return to different variables.

The dependent variable in the wage function is the natural logarithm of either, hourly, weekly, monthly or yearly income of an individual. In this case the researcher used the natural logarithm of the monthly wage rate of an individual. The effect of the level of education attainment can be measured in several different ways. First, a dummy variable can be used to reflect completion of each level; the estimated coefficient then reflects the marginal contribution of each level of earnings. Alternatively, a variable can be employed to reflect the maximum level of attainment; the estimated coefficients then reflect the total contribution of all levels completed. Finally, since each of these education levels represent differing numbers of years of study, the alternative is to convert the education levels of attainment to total years; the coefficient then reflects the average contribution to earnings of a year of education. This study adopts the latter measurement approach. The education or schooling level variable used in this study was the total years of

schooling. The levels of education considered are diploma (fifteen years) and university education (sixteen to eighteen years).

The returns to experience were captured by a continuous variable for years of potential experience. Potential labour market experience is equal to age minus years of schooling minus five years. A squared term of experience is included to capture the non linearity in the experience earnings profile.

Estimation Issues

The returns to education based on estimates of the wage equation one is subject to various sources of bias and the recent literature provides alternative estimation strategies to tackle such issues (Harmon, 1995; Ashenfelter, et al, 1999).

Findings and Discussions.

Empirical Results

This study provides estimates of educational investment returns for workers employed by Mpigi district, by gender, experience and educational attainment. The estimates of the earnings function show that the effects of all educational levels and potential experience on the wages are significant at five per cent level. The adjusted R squared which shows the fitness of the model was above 60 per cent in almost all equations estimated suggesting that over 60 per cent of variation in wages is explained by the education level other than other factors.

The estimates of the wage equation confirm the conventional wisdom, that is, the coefficients of the educational level are positive and also statistically significant at one per cent in all equations. Results indicate that the rate of return on educational investment per year for diploma and degree holders is 29.9 per cent for females and 50.7 per cent for males (see Table One below).

Table 1: Estimates of Returns to Education Investments(Diploma & Degree holders) Dependent Variable: Natural Logarithm of Monthly wages; Sample :20

Variable	Coefficients		Significance	
	Females	Males	Females	Males
Constant	7.21 (1.173)	4.685 (.688)	.000	.000
Education	.299 (.076)	.507 (.041)	.001	.000
Experience	.0064 (.053)	-.0089 (.038)	.249	.031
Experience squared	-.002 (.002)	.000032 (.001)	.273	.01
R Squared	.617	.89		

Notes: Figures in the brackets are the t-statistics

The findings show significant gender differences at diploma and degree levels. The rate of return per year, for instance, for females with degrees was 25 per cent compared to 52.1 per cent for males (see table Two below). A close scrutiny of the data shows no evidence of wage discrimination in pay, instead the data shows that most females specialise in arts and social sciences based professions compared to males who specialise in science based professions where

earnings averaged seventeen per cent more than other professions (see table Three). Out of the degree holders who have the same qualification levels, males tend to major in science-based courses and females major mostly in art-based courses.

Table 2: Estimates of Returns to Education Investments(Degree Holders)
Dependent Variable: Natural Logarithm of Monthly Wages; Sample: 10

Variable	Coefficients		Significance	
	Females	Males	Females	Males
Constant	7.551 (3.803)	3.984 (5.084)	.009	.002
Education	.250 (2.17)	.521 (10.47)	.073	.000
Experience	.186 (1.653)	-.0022 (-.503)	.089	.633
Experience squared	-.0007 (-1.47)	.00012 (.910)	.017	.398
R Squared	.586	.935		

Notes: Figures in the brackets are the t-statistics

At tertiary level, males tend on average to earn more, although this is also marked by more years of experience. Similarly, at the degree level, males tend to earn more than females despite the lower average years of experience. This may be a result of differences in fields of specialisation and further studies by males compared to females.

Table 3: Average Wage, Experience , Schooling Years and Income Ratio

Education Level	Wage		Experience		Schooling Years		Male/Female Income Ratio
	Male	Female	Male	Female	Male	Female	
Diploma	179,867	152,896	18.4	16.7	15	15	1.18
Degree	441,594	376,260	14.2	14.7	17.3	16.8	1.17

Thus, the choice of different fields of specialisation at the college and university lead to different opportunities and rewards. Females and males could be having different preferences for occupations and prepare differently for college and university education.

This variance in the earnings between females and males with diplomas and degrees may affect women incentives to pursue college and university education. In general, a large variance in earnings constitutes high risk and would be a deterrent to invest in the higher education of females. The results confirmed the expected diminishing returns to experience.

Conclusions and Policy Recommendations

Findings obtained in this study indicate that the overall rate of return to educational investment to women is lower compared to men. There is substantial gender difference in the rate of return to educational investment at higher levels of education. It was established that women tend to specialise in professions that are less paying compared to men. Studies show that the traditional

division of labour in the homes is more demanding on girls than boys. Girls also tend to suffer from natural physiological and psychological changes that render their academic performance relatively poor (Kasente, 1983). This may explain why they prefer arts to science based courses.

There is need to close this gender gap at higher levels of education. This can be done by increasing the enrolment of females to courses where the returns are high. Admission to these highly rewarded courses can be on the basis of quota system. There is also need to provide career guidance more especially at secondary level on course choice. Yet another approach would be to use an incentive approach where for instance most of government scholarships being provided should go to females who want to pursue courses that are highly rewarding. In addition, entry points can be lowered for females who want to pursue these highly rewarded courses. These are some of the suggestions that should be subjected to more discussion and refinement. These recommendations may help in narrowing the gender gap in earnings at higher levels of education.

References

- Appleton S., Collier, P., & Horsnell, P. (1990). "Gender, education and employment in Côte d'Ivoire" *Social dimensions of adjustments*. Working Paper No. 8 (World Bank, Washington, D.C).
- Armitage, J. and R. Sabot (1987). "Socio economic background and the returns to education in two low income countries". *Econometrica* 54,(213).
- Ashenfelter, H. and O. Break (1999). *Schooling, Intelligence, and Income in America: Cracks in the Bell Curve*. National Bureau of Economic Research, Working Paper 6902, January.
- Becker, G.S.(1964). *Human capital: a theoretical and empirical analysis*. New York: National Bureau of Economic Research.
- Becker, G. S. and B. Chiswick (1966), "Education and distribution of earnings." *American Economic Review* 56:356-369.
- Burki, A. and Abbas Q. (1991). "Earnings functions in Pakistan's urban informal sector": A case study. *The Pakistan Development Review* 30(4), 695-706.
- Burki A.A and Ubaidullah, A. (1992), "Earnings, training and employment in Gujranwalas urban informal sector: evaluation or involution"? *Pakistan Economic and Social Reviews* 30(1), 49 66.
- Cartaya, V (1994). Informality and poverty: causal relationship or coincidence? *In Contrapuntal: The Informal Sector Debate in Latin America*, C.A Rakowski (Ed). pp. 223-249. Albany, NY: State University of New York press.
- Card, D. (2001), "Estimating the returns to schooling: progress on some persistent econometric problems." *Econometrica* 69(5):1127-1160
- Dougherty, C. and E. Jimenez (1991). "The specification of earnings functions: tests and implications," *Economics education review*, 10(2), 85-98.
- Duraisamy, P. (2000). "Changes in Returns to Education in India 1983-84." *Economic Growth Center*, Yale University, Centre Discussion Paper No. 815.
- Glewwe, P. (1990). "Schooling, skills and the returns to education: an economic exploration using data from Ghana" *Living standards measurement* Working paper No. 76 (World Bank, Washington, D.C).
- _____ (1996), "The relevance of standard estimates of rates of return to schooling for education policy: a critical assessment". *Journal of development economics* 51, 267-290
- Glick, P. (1999). *Pattern of employment and earnings in Madagascar*. Cornell University, Food and Nutritional Policy Program, Working Paper No. 92.
- Gindling, T.H (1991). "Labour market segmentation and the determination of wages in

the public, private formal, and informal sectors in San Jose Costa Rica". *Economic development and cultural change* 39(3) 584-605

Griliches, Z.(1970), "Notes on the role of education in production functions and growth accounting," In W.L. Hansen, (Ed), *Education, Income and Human Capital*. New York: National Bureau of Economic Research.

Harmon, C. & I. Walker(1995). "Estimates of the economic returns to schooling for the United Kingdom," *The American economic review*, 85(5):1278-86.

Knight, J. & Sabot, R. (1991). "Labour market discrimination in a poor urban labour markets, an Unfair Advantage". In Birdall, N. & Sabot R. (Eds). *Labour market discrimination in developing countries*, Washington D.C: World Bank.

Milne, W & M Neltzart (1994). "Kenya, in labour market in an era of adjustment", vol.2 Horton, R., Kanbur, D.& Mazumdar (Eds) Washington D.C: World Bank.

Mincer, J. (1974). "*Schooling, experience and earning*"; New York: National Bureau of Economic Research.

Mincer, J.(1993). "Education and unemployment", In Mincer, J. (Ed) *Studies in human capital*, (pp.212-38), Cambridge, UK: Edward Edgar Publishing

Murphy, K. & F. Welch(1992)"The structure of wages." *Quarterly journal of economics* 107,285-326.

Pascharopoulous, G. (1985), "Returns to education: a further international update and implications." *Journal of human resources* 20(4), 583-604.

Pascharopoulous (1994). "Returns to investment in education: a global update", *World development* 22(9):1325-45.

Pascharopoulous & H. Patrinos (2002), "Returns to investment in education: a further update", World Bank Policy research Working Paper 2881, September.

Pascharopoulous & R. Maltson (1998), "Estimating the returns to education. a sensitivity analysis of methods and sample size,". *Journal of educational development and administration* 12(3),271-287.

Teilhert-Waldorf & W. Waldorf (1983). "Earnings of self employed as an informal sector: The Case of Bangkok", *Economic development and cultural change* 31, (.3), 585-607.

Rosen,S.(1974). "Fiedonic prices and implicit markets: product differentiation in pure competition," *Journal of political economy*.

Shultz,T.(1961) "Investment in human capital", *American Economic Review* 51,(1),1-17

Smith, A.(1776). *The wealth of nations*. Reprint, Chicago: University of Chicago Press,.

VijverBerg, W. (1993)."Educational investments and returns for women and men in Côte d'voire," *Journal of human resources* 28,933-74

World Bank (1995). *Uganda growing out of poverty*. Washington, D.C: Country Studies Publications.

Mr. Aggrey Niringiye, is a Lecturer of Economics in the Department of Economic Policy and Planning at Makerere University. His research interests include Poverty, Population and Trade issues. He has also been working in the field of Decentralisation and determinants of corruption. Please address correspondence to : Department of Economic Policy and Planning at Makerere University, P.O. Box 7062, Kampala, Uganda. (se-mail: aniringiye@fema.mak.ac.ug)