University of Malawi
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The Rate of Return on Education in Malawi

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The Rate of Return on Education in Malawi*

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Abstract: This study estimates rates of returns on education from wage employment using both the basic and extended Mincerian earnings functions from the national household survey data collected in 2004/05. The results show that, on average, an additional year of schooling increases life time earnings by 10 percent. Returns from various levels of education increase as the levels of education increase from 5 percent from primary level to 65 percent from university education. It is also interesting to note that female workers tend to have higher rates of return on education than male workers, particularly at higher levels of education. The very high level of rates of return at higher levels of education suggest the need to expand higher education infrastructure while at the same time ensuring efficiency of education delivery at various levels.

1.   Introduction

Malawi remains one of the poorest countries in the world with about 54 per cent of its population living below the poverty line. Most of the population derives its livelihood from the agriculture sector which employs about 80 per cent of the workforce and accounts for 39 per cent of gross domestic product (GDP). Most of the socio-economic and human development indicators illustrate the depth and intractability of poverty. For example, the levels of malnutrition remain high, with 43.2 per cent of under-five children stunted and 22 per cent underweight in 2004 (NSO, 2005). The infant mortality

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rate and morbidity remain high with 104 deaths per 1,000 live births in 2004/05 and 984 deaths per 100,000 births in 2004, respectively (NSO, 2006). There is also high prevalence of HIV and AIDS, estimated at 14 per cent. In addition, illiteracy remains a major challenge despite recent investments in education in Malawi. According to NSO (2007), about 66 per cent of the population were literate. There is however, gender imbalance in literacy rates with 77 per cent of the male population being literate compared to 56 per cent of the female population. About 70 per cent of Malawians aged 15 years and above have never acquired any educational qualification.

Since Independence in 1964, the social sectors of health and education have received increased budgetary allocations particularly in the first fifteen years of Independence. The education budget accounted for about 15 percent of recurrent expenditure on average between 1969 and 1980, though during the reform period (1981 – 1995) the share of education in recurrent expenditure fell to 10 per cent per year. More recently, the education sector budget has been around 14 percent of the national budget (GoM, 2006 and 2007). In addition, development expenditure in the education sector has almost doubled. In 1994, the Government introduced universal free primary school education and more liberal policy on private schools that has resulted in increases in school enrolment at various levels of the education system. However, the inputs into the education system have not coped with the increasing number of Malawians enrolling at various schools resulting in deteriorating quality of education. The education system has also experienced high repetition and drop-out rates in the region of 17 per cent and 16 per cent, respectively.

The economy has also performed poorly, with very low and erratic growth rates in between 1980 and 2004. The poor economic performance has implied limited creation of employment and wage opportunities for Malawians graduating from the education system. Previous studies in Malawi provide evidence that the rate of return on education (RORE) for primary, secondary and higher education in 1982, were 15.7, 16.8 and 46.6 per cent, respectively (Psacharopoulos and Patrinos, 2002). Chirwa and Zgovu (2002) using a small sample survey from four districts in Malawi find that the average rate of return on education (based on number of years of schooling) was 6 per cent in 2000.

The formal labour market absorbs a smaller proportion of the labour force in Malawi. As a result most Malawians are engaged in self-employment activities or in paid employment in the informal sector. The existing figures of the total number of people employed in the formal sector are out of date, and report the status as far back as 1995. In 1980 only 359,825 people out of a labour force of 2.8 million

were employed in the formal sector with the private sector accounting for about 80 percent. Similarly in 1990, the formal sector only employed about 11.6 percent of the total labour force. In 1995, the formal labour market had 564,000 employees with more than 50% employed in the agricultural sector.

Table 1 shows the composition and growth of formal sector employment in the formal sector between 1971 and 1995. The agriculture sector dominates the composition of formal sector employment, accounting for 40.6 percent during the 1970s and 48.6 percent during the 1980s and early 1980s. The financial and business services sector also shows a significant increase in the share of formal employment. The increase in the share of formal employment in manufacturing sector, electricity and water, transport and communications has been modest. Nonetheless, we observe significant declines in the share of formal employment in four of the nine sectors.

Table 1 Composition and Growth of Formal Employment, 1971-1995

Sector	Composition (%)		Growth Rate (%)	
	1971 - 1979	1980 - 1995	1971 - 1979	1980 - 1995
Agriculture, Forestry & Fishing	40.61	48.63	16.05	3.72
Mining and Quarrying	0.29	0.11	0.21	8.86
Manufacturing	11.87	12.79	7.50	5.69
Building and Construction	9.22	7.53	8.91	2.39
Electricity and Water	1.11	1.14	6.75	4.78
Transport & Communication	5.09	5.33	9.48	3.32
Wholesale, Retail & Hotels	8.05	6.17	6.89	0.46
Financial & Business Services	1.38	3.31	27.75	6.70
Community & Personnel Services	22.36	14.98	0.82	3.29
All Industries	100.00	100.00	9.45	2.96
Private Sector [a]	73.43	78.91	11.54	2.88
Public Sector [a]	26.57	21.09	3.68	3.69

Notes: [a] This covers the period 1971 - 1990, data for 1991 to 1995 is not available.
Source: Computed from RBM (Various) **Financial and Economic Review**.

In terms of average growth rates, formal employment increased at 9.45 percent per annum between 1971 and 1979 resulting in a net employment generation of 179,990 jobs. However, the rate at which the formal sector generated employment opportunities significantly declined to 2.96 percent per annum during the 1980-95 period. The data also shows that most sectors, except mining and quarrying, experienced a decline in the growth rate. While employment in the agriculture sector grew at an average rate of 16.1 percent per annum

during the 1971-79 period, growth significantly slowed to 3.7 percent per annum in the 1980-95 period. The growth rate of formal employment also significantly fell in the financial and business services sector from 27.8 percent per annum to 6.7 percent per annum. Private sector employment experience decline in the growth rate from 11.54 percent per annum during the 1971-79 period to 2.88 percent per annum between 1980 and 1990, while growth in formal employment in the public sector remained stable at 3.7 percent per annum. The rate at which the formal sector has created jobs has been significantly slow between 1980 and 1995 compared with that in the period 1971 -79.

Given the limited employment opportunities and the large number of Malawians completing education at various levels, the question is whether it pays to invest in years of schooling. This paper addresses this issue by estimating rates of return on education in primary, secondary and tertiary levels in Malawi using national household survey data. In addition, we also address the question of whether there are gender differences in the rate of return on education in Malawi. We organise the paper as follows. Section 2 reviews the nature of labour markets and outlines the framework for estimating returns to education and the empirical results that have been obtained elsewhere. Section 3 describes the household data sets used in estimating returns to education in Malawi. Section 4 presents the empirical results on the return on education. Section 5 provides concluding remarks.

2.   Rate of Return on Education: Literature Review

2.1   Theoretical and Analytical Framework

The human capital theory has been the main drive on the empirical work on the rate of return on education. The main thesis in the human capital theory is that education by enhancing worker's skills leads to high productivity and consequently higher earnings (Mincer, 1974; Becker, 1975). This is based on the assumption that employers operate in competitive environments and therefore do not pay excessive wages. However, in many developing countries like Malawi markets are imperfectly competitive and the nature of contracts and type of employment may determine the relationship between human capital variables and earnings. It is widely acknowledged in the development literature that three basic types of labour markets exist in developing countries, namely: rural, urban informal and urban formal (modern sector) with different characteristics such as seasonality and uncertainty of demand, nature of contracts and

structure of wages and earnings (Byres et al., 1999; Ray, 1998; and Hess and Ross, 1997; Pal, 1996 and 1997; Adams, 1991).

Many studies on return on education in developing countries ignore the fact that different types of employment in the rural and informal sectors may have different implications on the role of education on the level of earnings. Vijverberg (1995) observes that some types of employment such as self-employment may not be tied to credentials or pay scales and education may have a little role in explaining the level of earnings. Bennell (1996) notes that many studies in developing countries rely on earnings data from wage employment in the formal sector and ignore incomes in the rural and informal sectors in which returns to education are likely to be low. Glewwe (1996) also observes that wage structure in the private sector may reflect more the impact of education on worker productivity than the wage structure in government wage employment. A similar argument can be advanced with respect to casual employment in developing countries, which may be devoid of credentials or pay scales.

There are also concerns in developing countries that the labour market is dominated by the private sector with the private sector accounting for a smaller proportion of the formal wage market (Bennell, 1996). It is recognized that earnings in the public sector are not based on the competitive environment and are more determined by government policies and capping on public sector remunerations. The dominance of the public sector understates the rate of return on education. It is therefore important for studies in developing countries to take into account the relative importance of the public and private sectors in the labour market. One solution has been to estimate rates of return on education based on employment in the private sector.

Another feature of rural labour markets in developing countries is the wage differentials between regular employment and casual employment. Studies of the rural labour markets find that wage rates in casual employment are much higher than the prevailing rates in regular or permanent employment. For instance, Pal (1996, 1997) finds that the regular daily wage is substantially lower than the casual daily work even after adjusting for the probability of unemployment in the latter and explains the difference as the premium for employment insurance in regular employment.

The standard methodology for estimating returns to education is derived from the human capital theory through the use of what have become known as Mincerian earnings functions (Psacharopoulos, 1994; Willis, 1986). Thus, private rates of return on additional years of schooling can be estimated from earnings from employment data on individuals with different levels of education. This assumes that

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employees are paid according to their marginal product that increases with accumulation of more human capital. The standard Mincerian wage function is expressed as follows:

$$Ln(W_j) = \alpha_0 + \alpha_1 S_j + \beta_1 EXP_j + \beta_2 EXP_j^2 + \sum_{k=3}^{n} \beta_k Z_j + \varepsilon_j \quad (1)$$

where for individual j, W is the observed wage rate, S is the number of years of formal schooling, EXP is the experience, Z is a vector of control variables and ε_j is the error term accounting unobservable factors affecting the wages. The coefficient α_1 is interpreted as the private rate of return to schooling. If the empirical α_1 is multiplied by 100, we get the percentage return to one additional year of schooling.

Several estimation procedures have been suggested to address problems such as self-selection and endogeneity associated with the basic Mincerian earnings functions.[1] First, since the standard model assumes that returns to education are flat regardless of the level of education, the basic model has been extended by using the categorical variables for education with respect to different levels of education completed by an individual, hence extended earnings function method. The specification of the model becomes:

$$Ln(W_j) = \alpha_0 + \sum_{i=1}^{n} \alpha_i ED_{ij} + \beta_1 EXP_j + \beta_2 EXP_j^2 + \sum_{k=3}^{n} \beta_k Z_j + \varepsilon_j \quad (2)$$

where the variables are defined as in (1) and ED is dummy variable representing service level i of the education system. The rate of return to education for each category, assuming that growth is linear, is computed as:[2]

$$RORE_i = \frac{\exp(\alpha_i) - 1}{y_i} \quad (3)$$

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[1] See among others Card (1994), Blackburn and Neumark (1995), Glewwe (1996), Alderman et al. (1996), Johnson and Stafford (1996), Altonji and Dunn (1996), Bennell (1996), Brunello and Miniaci (1999), Uusitalo (1999), Magoula and Psacharopoulos (1999), Appleton et al. (1999) and Siphambe (2000).

[2] Kahyarara and Teal (2008) assumes exponential growth of earnings between different categories and the rate of return on education is computed as $RORE_i = \exp(\alpha_i / y_i) - 1$.

where $RORE_i$ is the return on education of education category i and y is the number of years of foregone earnings for that level. Alternatively, the rate of return on education for level i has been computed relative to the immediate lower education level h, as:

$$RORE_{ih} = \frac{\exp(\alpha_i - \alpha_h) - 1}{y_i - y_h} \qquad (4)$$

Secondly, earnings functions may suffer from selectivity bias and the Heckman (1979) two-step procedure has been used to adjust estimates for selectivity bias. This selection bias emerges from self-selection or non-random nature of being in wage employment or into different sectors. However, in developing countries where unemployment is high, being in wage employment may not be a matter of choice but a result of market rigidities. Hence, such selectivity biases may not be significant. For example, Chirwa and Zgovu (2002) and Zhang et al (2005) find little differences in rates of return on education between those controlled for selectivity and those not controlled for selectivity. Thirdly, instrumental variables for education using mostly family or parents' background have been used to address the problem of endogeneity of employee's education. Fourth, the earnings equations have also included variables that capture cognitive skills, ability and quality of education. Addressing some of these biases require more information than is currently in surveys that were not designed to address issues of return on education. For example, more information is required on family background, ability and quality of education that has to match the individuals in the analysis. Such data that can be matched with the individual workers do not exist in Malawi.

2.2 Existing Empirical Studies

There is a large body of evidence on the rate of return on education both in developed and developing countries. Comparative studies of returns on education between different groups of countries done in the 1990s based on basic Mincerian earnings functions point to the fact that returns to schooling are higher in low income countries (11 percent) relative to high income countries (7 percent) (Psacharopoulos, 1994). Psacharopoulos and Patrinos (2002) observed the highest returns to schooling for Latin America, the Caribbean region and for the Sub-Saharan Africa region. Recent estimates of rates of return to education are broadly consistent with

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earlier estimates. Evidence from selected developed countries suggests that returns to schooling are just under 5 percent for men and just under 6 percent for women (Trostel et al., 2002). Similarly, recent estimates from African countries are also consistent with earlier findings, where returns are higher in secondary and higher education (Okuwa, 2004; Siphambe, 2000; Psacharopoulos & Patrinos, 2002; Lassibille and Tan, 2005; Kahyarara and Teal, 2008).

3.   Model Specification and Data

3.1   Model Specification

Our empirical analysis uses the extended Mincerian earnings functions in equation (2), and specified as follows:

$$Ln(W_j) = \alpha_0 + \alpha_1 PRIM_j + \alpha_2 JSEC_j + \alpha_3 SSEC_j + \alpha_4 GRAD_j + \alpha_5 TECH_j$$

$$+ \beta_1 EXP_j + \beta_2 EXP_j^2 + \sum_{i=1}^{6} \beta_i OC_{ji} + \theta_1 URBN_j + \theta_2 PUB_j + \varepsilon_j \qquad (5)$$

where for individual j, $Ln(W)$ is the natural logarithm of the monthly wage and ε is the stochastic disturbance term. In order to estimate returns to education at various levels, model (5) uses categorical variables for completed levels of education as $PRIM$ is a dummy representing completion of primary education, $JSEC$ is a dummy variable representing completion of junior secondary education, $SSEC$ is a dummy variable representing completion of senior secondary education, $GRAD$ is a dummy representing completion of graduate studies, $TECH$ is dummy variable representing   completion of technical education and other professional qualification. The base category comprises employees with no education and that have not completed primary education.

We also include EXP as the number of years of experience in the labour market. Since number of years of experience is rarely captured in household surveys, we follow the standard method of estimating years of potential experience (Kahyarara and Teal, 2008; Appleton et al., 1999). The number of years of experience in the labour market is computed as age less years of schooling less pre-school age. We assume that those completing primary, junior secondary, senior secondary school, university and technical education to enter the labour market at the ages of 15, 17, 19, 23 and 21 years old, respectively. This assumes that once people complete their education, they immediately enter the labour market.

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Since wages will vary according to the occupational categories, we control for occupational categories, OC. We identify seven occupational categories and construct six dummy variables representing professional/technical, administrative/management, clerical, sales, services and agricultural. All other occupational categories (production and related workers, transport equipment operators, and labourers) are a base category in the estimation. Other control variables include the location dummy, $URBN$, capturing whether the job place is urban, PUB representing the public sector and we also include dummy variables to capture gender and regional dummies (south, centre and north). In order to assess the equity issues, our estimation strategy will be to estimate a general model (5) and separately estimate earnings functions for male workers and female workers, and for private sector workers.

3.2   Data

The study uses data from the national household survey - the Second Integrated Household Survey (IHS-2). The households in IHS-2 were sampled randomly using two stage stratification procedure, in which enumeration areas were selected randomly in the first stage and 20 households were randomly selected in each selected enumeration area based on a household list in the second stage (NSO, 2005).

The analysis is based on a sample of those aged 15 years or above who are engaged in salaried employment. This means that the private rates of return on education that we estimate are only for salaried or wage employment both in the formal and informal sectors. Although, a high proportion of Malawians are self-employed and subsistence farmers, the analysis does not estimate returns to self employment and farming. In addition, use of IHS data has the shortcomings that we are not able to correct for the biases that are known in the literature such as family background, ability and the quality of education. The questionnaire used in the IHS did not address these issues.

4.   Empirical Results

4.1 Descriptive Statistics

Table 2 presents descriptive statistics of the variables in the econometric models. The natural logarithm of monthly wages is MK7.77 or MK2362.63 per month. The education variables reveal that about 32% of employees had no education or did not complete

primary education in 2004. It is also evident that the average years of schooling in Malawi are just 7 years which is one year short of completion of primary school. This is consistent with national figures which show that most people in Malawi do not have an education qualification (NSO, 2007). The proportion of graduate employees in 2004/05 is only 2%.

With respect to occupation of employees, a large proportion of employees in 2004/05 were in the service sector (21%) while 13% were in professional or technical work. About 10% were engaged in agricultural and related works including farm managers, farm labourers and fishermen. Only 19% of employees were engaged in the manufacturing sector. The public sector (government and parastatals) accounts for 28% of the employees 78% of employees were male workers.

Table 2 Descriptive Statistics of Variables in the Model

Variables	Mean	Std. Dev.
Natural logarithm of monthly wages	7.7675	0.9224
Years of experience	19.1982	12.3241
Years of experience squared	520.413	619.467
Education levels		
Primary school	0.3095	0.4624
Junior secondary school	0.0943	0.2923
Senior secondary school	0.2166	0.4120
Technical education	0.0192	0.1373
University	0.0367	0.1881
Years of schooling	6.9605	4.6202
Occupation dummies		
Professional and technical	0.1316	0.3381
Administrative and managerial	0.0102	0.1003
Clerical and related work	0.0652	0.2470
Sales	0.0457	0.2090
Services	0.2107	0.4078
Agricultural and animal husbandry	0.1059	0.3078
Other dummies		
Manufacturing	0.1867	0.3897
Public sector	0.2759	0.4470
Male worker	0.7792	0.4143
Urban	0.2807	0.4494
Southern region	0.5075	0.5000
Northern region	0.1121	0.3156
Number of observations	3541	

4.2   Econometric Analysis

4.2.1   Mincerian Earnings Functions

Our empirical analysis uses the standard and extended Mincerian earnings functions with control variables which are estimated using Ordinary Least Squares method. The earnings functions were estimated using STATA version 10. In terms of sub-samples, we estimate the models using all the data for employees, by gender of employees, by region and residence. The most common econometric problem associated with analysis of cross-section data is heterosckedasticity. We therefore report results that have been corrected for heteroskedasticity using White heteroskedastic-consistent standard errors. We report results for the full-sample model and the gender-based analysis. Models based on regions and residence are presented in Tables in Annex 1.

Table 4 presents results of the extended (Model 1) and standard earnings (Model 2) functions without control variables. The models explain between 49% and 51% of variations in earnings functions. Most of the variables are statistically significant at the conventional significance levels. The education variables have the expected positive sign and are statistically significant at the 1% level. The performance of control variables in the models is also satisfactory. In terms of occupation categories, there are variations across the models. The coefficient of the agricultural and animal husbandry occupation is negative and statistically significant at the 10% level, implying that agricultural workers earned less (8.1%) than the base category. Interestingly, the employees in the agricultural sector continued to earn relatively less than the 'other occupation' categories. Employees in the service occupations also significantly earned 6.9% less than the base category. Employees in the manufacturing sector earned less (12.5%) that all other sectors (base category) in 1998. On average manufacturing sector employees earned 19% more than those employed in other sectors of the economy.

Table 3 Mincerian Functions with controls (full sample)

Variables	Model 1		Model 2	
	coeff.	t-ratio	coeff.	t-ratio
Years of experience	0.0510[a]	15.23	0.0464[a]	13.60
Years of experience squared	-0.0007[a]	-11.82	-0.0006[a]	-9.71
Education levels				
Primary school	0.3409[a]	11.73	-	-
Junior Secondary school	0.6614[a]	14.37	-	-
Senior secondary school	1.0458[a]	24.00	-	-
Technical education	1.4161[a]	18.74	-	-
University	2.4474[a]	18.34	-	-
Years of schooling	-	-	0.1012[a]	25.53
Occupation dummies				
Professional and technical	0.2160[a]	4.38	0.3403[a]	7.01
Administrative and managerial	0.8857[a]	6.74	1.2820[a]	9.37
Clerical and related work	0.2438[a]	4.13	0.2993[a]	4.93
Sales	-0.0137	-0.24	-0.0185	-0.31
Services	-0.0715[b]	-2.39	-0.0971[a]	-3.21
Agricultural & animal husbandry	-0.2105[a]	-5.34	-0.1609[a]	-3.92
Other dummies				
Manufacturing	0.1756[a]	5.84	0.1723[a]	5.57
Public sector	-0.1681[a]	-5.72	-0.1555[a]	-5.16
Male worker	0.1742[a]	6.51	0.1316[a]	4.74
Urban	0.4178[a]	14.94	0.4258[a]	14.85
Southern region	0.0057	0.23	0.0048	0.19
Northern region	-0.0298	-0.74	-0.1063[a]	-2.64
Constant	6.4288[a]	132.06	6.2566[a]	121.66
R-squared	0.5085		0.4861	
F-statistic	165.76		196.59	
Prob > F	0.000		0.000	
N	3541		3541	

Notes: Standard errors are heteroskedastic-consistent. Superscripts *a*, *b* and *c* denotes statistically significant at 1%, 5% and 10% level, respectively.

    With respect to private and public sector workers, the evidence shows that earnings were statistically lower in the public sector in 1998, with the private sector employees earning 15.5% more than public sector employees. In terms of gender of the employer, the coefficient of the gender of employee is statistically significant and shows that, other things being equal, male employees get premium wages over female employees in the range of 13%-17%. We also find evidence that earnings are higher in the urban areas by about 42%. This may reflect the relative high cost of living in the urban areas and inflation based increases may account for these differences. The regional dummies have mixed performance with the Southern region being statistically no different from the Central region. On the contrary, the earnings are consistently lower for employees in the Northern region compared to the Central region. The coefficient of

the Northern region dummy is statistically significant at the 1% level only in model 2.

We also estimated the Mincerian wage functions by gender of workers and results are presented in Table 4. The results show that all the education dummies in both models are statistically significant at the 1 percent level. However, we observe higher differential effects of education on female earnings compared with male earnings. Another interesting observation is that the occupational categories do not play a major role in female workers earnings compared to earnings of male workers. We also find significant positive relationship between earnings and working in the manufacturing sector and when the job is in urban areas and a negative relationship between earnings and working in the public sector regardless of the gender of worker.

Table 4 Extended Mincerian Functions by Gender

	Males		Females	
Variables	coeff.	t-ratio	coeff.	t-ratio
Years of experience	0.0511[a]	13.43	0.0518[a]	7.11
Years of experience squared	-0.0007[a]	-10.27	-0.0008[a]	-6.22
Education levels				
Primary school	0.3480[a]	10.75	0.2447[a]	3.69
Junior secondary school	0.6301[a]	12.28	0.7864[a]	7.24
Senior secondary school	1.0057[a]	21.27	1.2009[a]	10.37
Technical education	1.3507[a]	15.22	1.6001[a]	10.19
University	2.3847[a]	15.44	2.6889[a]	9.74
Occupation dummies				
Professional and technical	0.2097[a]	3.80	0.1351	1.09
Administrative and managerial	0.8883[a]	5.82	0.7625[a]	3.18
Clerical and related work	0.1624[a]	2.31	0.2273[c]	1.74
Sales	-0.0367	-0.60	0.0568	0.35
Services	-0.0860[b]	-2.59	-0.1092	-1.38
Agricultural and animal husbandry	-0.2398[a]	-5.29	-0.1101	-1.41
Other dummies				
Manufacturing	0.1645[a]	4.98	0.1974[a]	2.79
Public sector	-0.1407[a]	-4.05	-0.2122[a]	-3.73
Urban	0.4049[a]	13.06	0.4692[a]	6.85
Southern region	0.0152	0.53	-0.0037	-0.07
Northern region	-0.0269	-0.59	-0.0406	-0.45
Constant	6.6134[a]	118.53	6.4315[a]	64.35
R-squared	0.4679		0.6204	
F-statistic	108.98		92.91	
Prob > F	0.000		0.000	
N	2759		782	

Notes: Standard errors are heteroskedastic-consistent. Superscripts *a*, *b* and *c* denotes statistically significant at 1%, 5% and 10% level, respectively.

We also estimated earnings functions for each region and for urban and rural areas to determine whether the effects of education vary across categories (Appendix Tables A1 and A2). The coefficients of education dummies are statistically significant at the 1 percent level, except with respect to technical education in the Central region. The results based on the regions show that the Southern and Central regions tend to have higher and fairly similar coefficients for the education level dummies. Both these regions have the main commercial cities in Malawi and potential high employment opportunities may be giving rise to high marginal effects of education on wage earnings. Similarly, differences exist between the marginal effects of education and wage earnings in the urban and rural areas, with mixed outcomes. For instance, the marginal effects of primary and secondary school are slightly larger in the rural areas than in the urban areas, while tertiary education is more beneficial in the urban areas – where job opportunities for such qualifications are more likely than in the rural areas.

4.2.2   Estimated Private Rates of Return on Education

Table 5 presents a summary of rates of return on education based on various forms of Mincerian earnings functions.[3] It is also noted here, similar to other studies, education category based RORE are much higher than RORE based on years of schooling, as the latter tends to be influenced by lower levels of education that dominate the sample. Using the years of schooling (Model B), we find evidence that one additional year of schooling increases life time earnings by 10% on average, by 9.7% among male workers and 11.4% among female workers. The average rate of return is almost double the rate estimated by Chirwa and Zgovu (2002) which was based on a much smaller sample. However, the rates of return on number of years of schooling in Table 5 are consistent with Psacharopoulos (1994) finding that the average rates of returns to education for sub-Saharan Africa are around 13 percent.

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[3] Comparing with results that did not include control variables, (available from the authors upon request), the RORE are much lower when the earnings functions include control variables. According to Psacharopoulos and Patrinos (2002), the inclusion of occupation and control variables has the effect of 'stealing' the effects of returns on education. Such reductions in the estimated rates of returns have been observed in other studies (see Zhang et al., 2005). Nonetheless, accounting for occupation and sector-specific attributes is important in limiting model mis-specification errors.

Table 5 Mincerian Rates of Return on Education (%)

Model	Level of Education	All	Male	Female
Model A	Primary Education	5.08	5.20	3.46
	Junior Secondary	9.37	8.78	11.95
	Senior Secondary	15.38	14.45	19.36
	Technical Education	22.29	20.43	28.24
	University	65.99	61.60	85.72
Model B	Years of Schooling	10.12	9.73	11.35

Notes: Model A: Extended Mincerian functions with control variables
Model B: Extended Mincerian functions with control variables

Using Model (A), the RORE increases with increase in level of education with the lower returns obtained for primary education. This is observed irrespective of gender, indicating a convex relationship between education and earnings. Our results confirm the finding by Schultz (2004) that the RORE increases with level of schooling in Sub-Saharan Africa. Similar results were obtained in Cameroon by Ewoudou and Vencatachellum (2006), Rwanda by Lassibille and Tan (2005), and Bennell (1996) for Sub-Saharan Africa. However, the results are contrary to the literature that suggests RORE are positive but fall with level of education, hence concave RORE (see Psacharopoulos, 1994; Psacharopoulos and Patrinos, 2002).

The estimated rates of return on education particularly for higher levels of education are relatively high compared to estimates in previous studies. The rate to primary education was 5.1%, the rate of return in senior secondary education is 15.4% and rate of return to university education is 66%. Lassibille and Tan (2005) note that the exceptionally high profitability of higher education is not uncommon in low income countries where it is argued that the modern sector is usually small and wages at the high end tends to be 'sticky' in that imbalances in the supply and demand for highly educated workers are accommodated more often through quantity than through price adjustment. Another possible explanation for the high rates of return to higher education is that over the years the education system in Malawi has expanded at lower levels while the number that goes into University is relatively small. Hence, the high rates of return on education may just reflect the short supply of relatively skilled workers.

The other result that is consistent with the international literature is that on average female workers tend to have much higher returns on education than male workers particularly at

secondary and above levels of education as graphically shown in Figure 1 (Psacharopoulos and Patrinos, 2002; Zhang et al., 2005). This study also confirms such evidence. For example, the estimated average rates of return on education from the extended earnings functions are 14% for male workers and 19% for female workers at senior secondary school level. This suggests that there is a scarcity premium on female workers – very few women attain higher levels of education and this constrain labour supply in the market. Similar findings were obtained in Pakistan and China that women have significantly higher economic incentives to invest in education than men (Aslam, 2007; Zhang et al, 2005). Zhang et al. (2005) find that returns to female education are on average 60% higher than returns to male education. The high premiums and better returns to education for female workers in Malawi is consistent with the finding that female education is more effective in generating profitability and employment growth among micro, small and medium enterprises in Malawi (Chirwa, 2008).

Figure 1 Rates of Return on Education in 2004/05
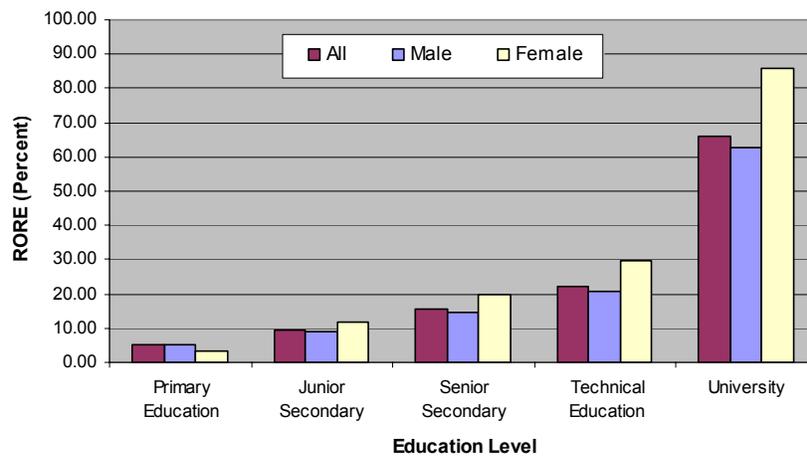
The returns to primary and secondary education that we find in this study are much lower, and university returns are much higher than those reported by Psacharopoulos and Patrinos (2002). However, the methodologies used are different and the estimated returns are not directly comparable. The stability of RORE in primary to secondary education in Malawi is not surprising due to the relative emphasis primary education has received over time relative to tertiary education. The universal primary school education policy implemented in 1994, ignored the need to expand

both secondary and tertiary levels of education in terms of infrastructure and other education system inputs. This has implied that in spite of expansion due to private sector education system, the proportion of students that progress to upper levels of the education system is marginal. Until recently, the only institution of higher learning in Malawi was the University of Malawi that was graduating less than 1,000 students per year. This situation has created a situation of over-supply of the work force with primary and secondary education and under-supply of graduates. In addition, given technological advances, jobs have become skill demanding and this may have lead to high demand for graduates in the market.

Figure 2 shows the rate of return on education by region. Generally, the rates of return on education are higher in the Southern region and lowest in the Northern region. However, the rates of return on education are similar across regions at lower levels of education and substantial differences emerge at technical and university levels. For instance, the RORE from technical education are 23.7%, 14.5% and 21.4% for the southern, Northern and Central regions, respectively. The highest differences in RORE emerge at university level ranging from 21.1% in the North, 68.2% in the South and 70.5% in the Central region. These regional differences may reflect differences in employment opportunities. The Central and Southern region has three major urban centres (Lilongwe, Blantyre and Zomba), with relatively better employment opportunities than the urban centre in the Northern area – Mzuzu.

Figure 2 Rates of Return on Education by Region in 2004/05
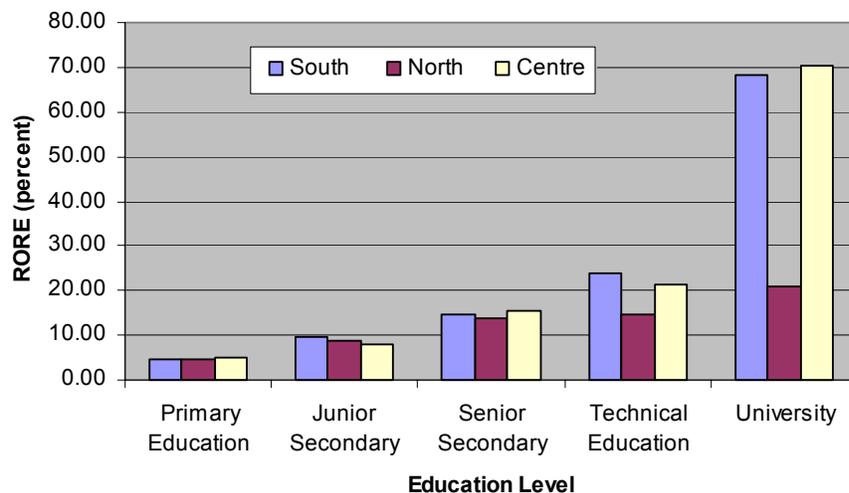
The urban-rural differences in RORE are presented in Figure 3. It is evident that little differences exist in RORE at lower levels of education but substantial differences emerge. There are similar rates of return at primary level (4.8% in urban and 4.9% in rural) and in senior secondary education (14.9% in urban and 15.3% in rural areas). Large differences exist at tertiary level which reflects the fact that highly skilled employment opportunities may be predominant in the urban areas and also tend to be well paying. The RORE at technical education level are 29.1% and 18% in urban and rural areas, respectively. There are also higher RORE if graduates work in the urban areas (67.2%) than working in the rural areas (49.4%).

Figure 3 Return on Education by Residence in 2004/05
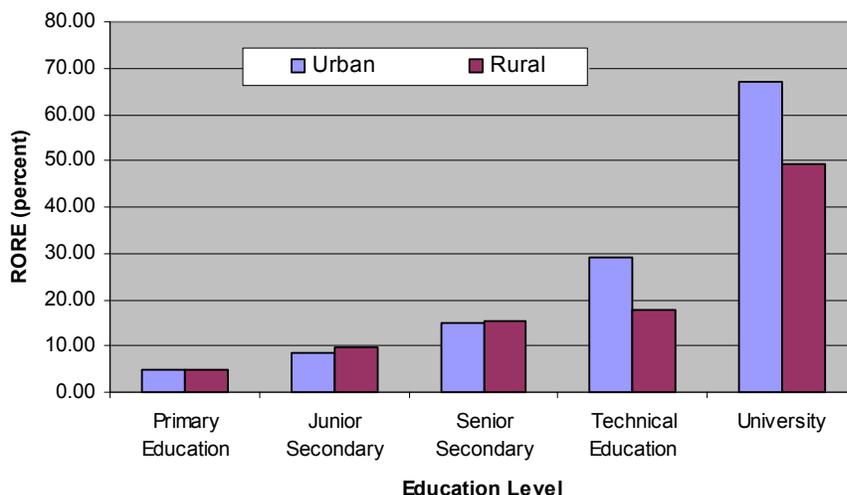
5.   Conclusions and Policy Recommendations

This study set out to estimate private rates of return on education in Malawi for different education levels. The study has used data from national representative surveys carried out in 1998 and 2004/05. Using different specifications of Mincerian earnings functions we find evidence of increases in rates of return on education particularly at higher levels of education in Malawi. The findings obtained in this study carry several policy implications for the development of education policy in Malawi. First, the positive and high RORE emphasize that education is a good investment and this supports increased public expenditure to education sector. Education does not only increase an individual's earning potential, but also produces a

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"ripple effect" throughout the economy through a series of positive externalities including increases in employee productivity.

However, the low returns to primary education imply that primary graduates do not obtain well-paying jobs in the labour market. With free primary education in Malawi, there has been an increase in supply of primary graduates and declining quality of primary education which might have depressed wages. The number of employees with primary education constitutes 29 percent and 31 percent for the periods 1998 and 2004/5 in the sample. The low returns to primary education also suggest that primary education remains a 'public' good that will continue to be subsidized by the government. In so far as wage employment is concerned it pays less just to complete primary education, which is contrary to the policy on education that is heavily biased towards eradicating illiteracy rather than development of high education skills. The potential for free primary education, without complementary investments in secondary and tertiary education, in eradicating poverty is likely to be marginal.

Contrary, to the widely held view by governments and some donors that university education is a luxury in developing countries, the high returns suggests that expanding access to higher levels of education may have deeper poverty reduction effects compared to merely making the citizens know how to write or read. In addition, given the high rate of return on tertiary education there is scope for reducing subsidization towards the operation of tertiary institutions, as the RORE are more than the cost of finance. The reduction in subsidization can reduce the high recurrent expenditure (the per capita costs) in tertiary education that exists in education systems in many developing countries. The fact that returns to education are highest for higher education imply that those who are able to reach those levels are likely to recuperate their investment. In which case, public subsidization of higher education would not be necessary to motivate students to pursue further studies. The major problem is the high competition for university space due to long periods of neglect in the expansion of university facilities. The opening up of new universities in recent years is likely to reduce this pressure, although at the moment the increased number of university places continues to be out-numbered by the demand for places that has resulted from rapid expansion of primary and secondary education.

Schultz (2004) argues that if private returns to schooling increase with higher education, then poorer families who educate their children up to only primary education will face lower returns while richer families who educate children up to higher education will reap higher returns. Consequently, the poor are motivated to educate their children less and may also send only the more able

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children to school for whom returns are higher. Education and earnings differentials may widen both across families and within families as a result.

The high RORE to higher education also imply that reducing government subsidies to university students would free scarce resources. However, such saved resources should not be used for primary and secondary education but to expand university facilities. One can also argue that the evidence of high returns to higher levels of education could justify increased funding on the basis of allocative efficiency. More importantly, government may need to review its investment policy on education by expanding infrastructure and other inputs in tertiary education and addressing the inefficiencies that prevail at different levels of the education, while allowing reduction in subsidization in operation and management.

Nonetheless, the rationale for primary school funding may not be diluted if one is to consider non-market returns and right based perspective, but a holistic approach is needed to make tertiary education more accessible. This holistic approach should look at relative expansion at different levels and the efficiency of delivering education services. More importantly, there is need to understand the political economy of education institutions in Malawi. Most tertiary level institutions were established as parastatals which were largely seen as instruments of employment generation in the post-Independence era given the thinness of the private sector. As a result there has been a tendency in most parastatals to over-employ non-essential staff and difficulties in labour restructuring when it became necessary. This tends to increase the cost of operating tertiary education and introduce inefficiencies in higher education. Labour restructuring in parastatals has been slow and inefficiencies continue to prevail.

The patterns of RORE for men and women also have implications for the shaping of educational policy. Although, few women enter the labour market, those with skills tend to earn more than their male counterparts. The results suggest that expanding the provision of education enrolment to cover more women is not only equitable but also economically efficient. This proposition is based on the evidence that the rate of return to women's education is roughly higher than that for men. This implies that there should be intensified calls increased girl-child investments in education not only at primary school level but also at higher levels where returns are most attractive.

The estimates of the RORE in this study provide some useful pointers to education policy in Malawi. Nonetheless, there are several limitations that have to be taken into account. First, the returns that have been estimated are only for wage or salary

employment and exclude self-employment activities such as agriculture and small business operations. It may turn out that lower levels of education yield much higher returns to self-employment than to paid employment. This provides an area of further research in Malawi. Second, the data used in this study was designed to estimate welfare and did not have some of the variables used in the literature to account for school quality using indicators such as student-teacher ratio and pass rate or learning achievements by students, ability and parent's education background. In order to address these biases, there is need to conduct specific labour market surveys or in the next integrated household survey the questionnaire should incorporate questions that will capture parents' education, ability and the quality of education. Third, the study has only focused on private rates of return to education. However, in Malawi the education system is heavily subsidized by the government, and social rates of return are likely to be lower than the private rates of return and such gaps are likely to widen with higher levels of education.

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Appendix Tables

Table A1. Mincerian Functions with controls by region

Variables	South		North		Centre	
	coeff.	t-ratio	coeff.	t-ratio	coeff.	t-ratio
Years of experience	0.0533[a]	11.59	0.0685[a]	6.85	0.0432[a]	7.66
Years of experience squared	-0.0008[a]	-9.28	-0.001[a]	-5.13	-0.0006[a]	-5.76
Education levels						
Primary school	0.3188[a]	8.24	0.3061[a]	2.64	0.3471[a]	7.38
Junior secondary school	0.6822[a]	10.74	0.6396[a]	4.76	0.5960[a]	7.40
Senior secondary school	1.0182[a]	17.77	0.9696[a]	6.32	1.0566[a]	14.25
Technical education	1.4628[a]	13.82	1.1074[a]	5.10	1.3851	10.51
University	2.4770[a]	13.09	1.4755[a]	2.62	2.5082[a]	13.18
Occupation dummies						
Professional and technical	0.2936[a]	4.46	0.2256[c]	1.86	0.1266	1.42
Administrative and managerial	0.9866[a]	5.07	1.6996[a]	6.68	0.6107[a]	3.18
Clerical and related work	0.2322[a]	2.99	0.4658[a]	2.84	0.1749	1.65
Sales	0.0158	0.21	-0.1352	-0.92	0.0160	0.14
Services	-0.0786[b]	-2.00	-0.1137	-1.34	-0.0652	-1.16
Agricultural and animal husb.	-0.3326[a]	-4.95	0.4950[a]	2.78	-0.1932[a]	-3.82
Other dummies						
Manufacturing	0.188[a]	5.34	0.1639	1.63	0.1383[c]	1.89
Public sector	-0.193[a]	-4.97	-0.2125[a]	-2.97	-0.1081[b]	-2.01
Male	0.2003[a]	5.83	0.2129[a]	3.11	0.4783[a]	9.11
Urban	0.4379[a]	11.29	0.1317[c]	1.66	0.1594[a]	3.50
Constant	6.3917[a]	103.55	6.3724[a]	42.11	6.5165[a]	82.86
R-squared	0.5348		0.4036		0.5201	
F-statistic	108.62		38.43		72.07	
Prob > F	0.000		0.000		0.000	
N	1797		397		1347	

Notes: Standard errors are heteroskedastic-consistent. Superscripts *a*, *b*
and *c* denotes statistically significant at 1%, 5% and 10% level,
respectively.

Table A2. Mincerian Functions with controls by residence

Variables	Urban		Rural	
	coeff.	*t-ratio*	*coeff.*	*t-ratio*
Years of experience	0.0448[a]	6.04	0.0527[a]	14.15
Years of experience squared	-0.0006[a]	-3.88	-0.0008[a]	-11.42
Education levels				
Primary school	0.3269[a]	4.66	0.3287[a]	10.12
Junior secondary school	0.6095[a]	6.73	0.6738[a]	12.08
Senior secondary school	1.0261[a]	12.07	1.0425[a]	18.94
Technical education	1.6245[a]	11.12	1.2577[a]	13.97
University	2.4640[a]	14.43	2.1861[a]	8.57
Occupation dummies				
Professional and technical	0.1354	1.49	0.2366[a]	3.79
Administrative and managerial	0.7137[a]	4.44	1.0781[a]	5.65
Clerical and related work	0.1697[c]	1.82	0.1971[a]	2.57
Sales	-0.1716[b]	-2.00	0.1041	1.26
Services	-0.2035[a]	-3.50	-0.0256	-0.70
Agricultural and animal husbandry	-0.0157	-0.05	-0.1945[a]	-4.88
Other dummies				
Manufacturing	0.0315	0.48	0.2196[a]	6.34
Public sector	-0.1223[c]	-1.91	-0.1716[a]	-5.30
Male	0.0864	1.51	0.2071[a]	6.88
South	-0.0018	-0.04	-0.0003	-0.01
Centre	-0.2308[a]	-3.17	0.0596	1.22
Constant	7.0774[a]	55.52	6.3751[a]	118.88
R-squared	0.5002		0.3856	
F-statistic	48.25		96.94	
Prob > F	0.000		0.000	
N	994		2547	

Notes: Standard errors are heteroskedastic-consistent. Superscripts *a*, *b* and *c* denotes statistically significant at 1%, 5% and 10% level, respectively.

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