University of Malawi
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DEPARTMENT OF ECONOMICS

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The Impact of Education on Self-Employment, Farm Activities and Household Incomes in Malawi

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The Impact of Education on Self-Employment, Farm Activities and Household Incomes in Malawi *

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Abstract: This study estimates rates of returns on education from self-employment activities (maize production, tobacco farming and business enterprises) and on overall household income. The results reveal that for different levels the returns to education are lowest with respect to maize production (1.3 – 7.3%), followed by tobacco earnings (3.5 - 25%) and highest with respect to business enterprises (4 – 71%). The returns from overall household income per capita range from 1.4% in primary education to 27% in university education. In all cases the return from primary education are very low, suggesting that primary education may be necessary but not sufficient for poverty reduction. The simulation of impacts of education on household income has revealed that targeting the poor households to complete higher education almost eliminates poverty, although major changes in poverty occur with ensuring that at least one member of the household complete junior secondary school.

1. Introduction

The human capital theory has been widely used to estimate rates of return on education from wage employment. This poses a lot of challenges in developing countries where a large proportion of the labour force is outside the labour market. This has led to the extension of the traditional model of returns to education in wage employment to assessment of the benefits of education for those individuals that are self-employed in agricultural and non-farm economic activities. There have been a number of studies that have

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estimated the rate of return on education from self employment (see Garcia-Mainar and Montuenga-Gomez, 2005; Vijverberg, 1995; Soon, 1987; Fredland and Little, 1981). Some of the studies have compared rates of return from self-employment and the returns from wage employment. The results have been mixed. For instance, Garcia-Mainar and Montuenga-Gomez (2005) find that wage earners in Spain had better returns on education than self-employed individuals, but the differences in Portugal were negligible. The results of a study carried out by Fredland and Little (1981) reveal that the differences in returns to wage earnings and self-employment are sensitive to specification. Soon (1987) finds that employees and self-employed have different rates of return on education, with the former generating better returns than the latter. Similarly, Nielsen and Westergard-Nielsen (2001) find evidence of higher returns for the employed compared with the self-employed. Lueng (2006) also find little differences in rates of return from wage employment and self-employment. Other studies have focussed on the role of education in farming and non-farm incomes (Yang, 1997; Appleton and Balihuta, 1996). Lockheed et al. (1980) and Phillips (1994) review some of the studies that have looked at the link between education and farmer productivity.

The case of Malawi is no different from that of other developing countries in which the labour market participation rate is quite low. Chirwa and Matita (2009) note, in the case of Malawi, that the formal labour market absorbs a smaller proportion of the labour force. Most Malawians are engaged in self-employment activities or in paid employment in the informal sector. The formal labour market is estimated to employ about 12 percent of the total labour force with more than 50% employed in the agricultural sector. Thus, while investments have been made in the education system, particularly in primary and secondary education, the economy has not been able to absorb the labour force that has completed education at various levels.

Although there exist estimates of the rates of return on education in Malawi (Chirwa and Matita, 2009; Chirwa and Zgovu, 2002; Psacharopoulos and Patrinos, 2002), there are no estimates of rates of return on education from self-employment activities, and a few studies analyse the role of education in poverty in Malawi (Mukherjee and Benson, 2003; GOM and World Bank, 2006). For instance, Mukherjee and Benson (2003) simulate the impact of increasing the number of adults attaining secondary level of education and find that investing in females has more pay-off on poverty than investing in male adults. Undoubtedly, self-employment either on farm or non-farm activities pre-occupies most Malawians. Farming, mostly subsistence farming, is the dominant

form of self-employment. According to NSO (2005), about 82% persons employed in 2005 were self-employed (75.4% as farmers and 6.5% as self-employed in non-farm activities).

This paper complements the study on returns to education from wage earnings (Chirwa and Matita, 2009) and addresses the issue of education pay-offs from self-employment and overall income in Malawi using national household survey data. The paper has the following objectives: a) to analyse the impact of education on maize output and tobacco earnings; b) to estimate rates of return on education from household business enterprises; c) to assess the impact of education on household income and poverty and simulate the contribution of investments in education on poverty reduction. We therefore estimate four models of rates of return on education based on the following outputs from self-employment activities: maize production, tobacco earnings, business earnings and household incomes. We organise the paper as follows. Section 2 outlines the methodology for estimating returns to education and the empirical specification of models. Section 3 presents the empirical results on the return on education. Section 4 provides concluding remarks.

2. Methodology and Model Specification

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). The human capital theory has been extended to explain variations in earnings from business activities and other self-employment activities. Following other studies on rates of return from self-employment, we use the extended Mincerian functions to estimate education returns from earning. The specification of the models becomes:

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

where for individual or household j, and earnings type T, Y is the observed earnings level from activity T, ED is dummy variable representing service level i of the education system, 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 vector of control variables varies according to the earnings function that is estimated.

The earnings are measured at individual level or at household level. The rates of return on education from business activities are estimated at individual level and we analyse the impact of investing in the education of the business owner. Models based on tobacco farming, maize output and household income are estimated at household level using the education status of any household member with the highest education level; hence maximum education within the household.[1] We also estimate the models based on the standard Mincerian functions in which ED is replaced with S – the number of years of schooling. The rate of return to education from self-employment for each education category, assuming that growth is linear, is computed as:[2]

$$RORE_i = \frac{\exp(\alpha_i) - 1}{y_i} \tag{2}$$

where $RORE$ is the return on education of education category i and y is the number of years of foregone earnings for that level.

2.2 Model Specification

On the basis of the general model of returns to education in (1) we specify four different models to assess impact of education on maize output, tobacco farming earnings, business incomes and overall household incomes.

[1] We also estimated models using the education level of the household head, but our preference is to report results based on the highest education level completed by any member of the households. This choice also facilitates the simulation of the poverty impact of investing in education.

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

2.2.1 Education and Maize Production

The first model explores the role of education in agricultural productivity. There is a vast body of literature particularly in developed countries that support the hypothesis that education enhances agricultural productivity (see Lockheed et al. (1980) and Phillips, 1994 for review). Appleton and Balihuta (1996) review studies in Africa and find that only in a minority of the studies is there a positive and significant relationship between education and productivity. Generally, it is argued that education affects agricultural productivity through cognitive and non-cognitive skills by enhancing farmers' physical productivity, the efficiency of making allocative decisions and superior farm management techniques (Yang, 1997; Appleton and Balihuta, 1996). Empirically, the relationship between education and productivity has been studies using Cobb-Douglas production function that includes schooling variables. However, due to data limitations in the computation of other inputs, our Cobb-Douglas specification does not include capital and quantities of fertilizer and seed inputs. We specify the following model of maize production:

$$\begin{aligned} Ln(MO_j) &= \alpha_0 + \alpha_1 PRIM_j + \alpha_2 JSEC_j + \alpha_3 SSEC_j + \alpha_4 GRAD_j + \alpha_5 TECH_j \\ &+ \beta_1 EXP_j + \beta_2 EXP_j^2 + \theta_1 URBAN_j + \theta_2 CENTRE_j + \theta_3 SOUTH_j \\ &+ \phi_1 Ln(LAB) + \phi_2 Ln(LAN) + \sum_{i=3}^{4} \phi_i MV_{ji} + \phi_5 FERT + \sum_{i=4}^{n} \phi_i Z_{ji} + \varepsilon_j \end{aligned} \quad (3)$$

where for individual or household j, $Ln(MO)$ is the natural logarithm of maize production, $PRIM$ is a dummy for completion of senior primary school, $JSEC$ is the dummy for completion of junior secondary school, $SSEC$ is the dummy for completion of senior secondary school, $GRAD$ is a dummy for graduate farmers, $TECH$ is a dummy for completion of technical college, EXP are years of experience in farming, $URBAN$ is a dummy variable for urban, $CENTRE$ and $SOUTH$ are regional dummies, $Ln(LAB)$ is the natural logarithm of labour proxied by household size, $Ln(LAN)$ is the natural logarithm of land devoted to maize production in hectares, MV is a vector of maize varieties, $FERT$ is a dummy capturing application of fertilizers and Z is a vector of control variables which affects maize and ε is the stochastic disturbance term.

Maize production is calculated as total maize produced by the household from different plots regardless of the type of maize.[3] Maize is mainly a subsistence crop and incentives to productivity that are enhanced by the competitive output markets are generally weak. It is estimated that only about 15-20 % of the total maize produced is marketed, and the rest is used by households for own consumption.

In order to estimate returns to education at various levels, model (3) uses categorical variables for completed levels of education as $PRIM$, $JSEC$, $SSEC$, $GRAD$ and $TECH$. The base category comprises farmers with no education and that have not completed primary education. We hypothesize that education of the household head is positively associated with maize production. Other studies such as Appleton and Balihuta (1996) find evidence of the external effects of education, such that it is not the education of household members that matters in enhancing agricultural productivity but also the average education of farmers in the community. We also include EXP as the number of years of experience in the maize model and self-employment models below. 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 start participating in self-employment activities at the ages of 15, 17, 19, 23 and 21 years old, respectively. This assumes that once people complete their education, they immediately participate in farming and self-employment activities.

The empirical model also controls for several other variables that affect maize productivity. First, we introduce two dummies of maize varieties (MV): open pollinated varieties (composite) and hybrid seeds, with local maize variety as a base category. It has been shown that under appropriate management conditions, yields per hectare are higher for hybrid seeds than for composite seeds whose productivity is much higher than local maize seeds. The application of fertilizer is also important in enhancing productivity of maize regardless of the variety. The dummy variable, $FERT$, representing

[3] The crop production module data in the IHS2 is most problematic and produces unrealistic yields due to imperfect measurement of quantities due to different units of measure used by different households. These units are not standardized across households. We eliminated observations that had yields which were less than 100 kilograms per hectare and those that had yields of more than 6,000 kilograms per hectare.

the application of fertilizer on the maize plot is expected to be positively related to maize production.

Other control variables include dummy for participation in non-farm business activities, participation in formal wage and *ganyu* labour, receipt of remittances and households' tenure in the village. The model also include dummy variables that capture some fixed effects such as the location dummy, $URBAN$, capturing whether the area of residence and regional dummies $CENTRE$ and $SOUTH$ with $NORTH$ being the base category. The participation of farmers in non-farm business activities and formal labour captures resource augmenting effects on farming activities. However, participation in *ganyu* labour may lead to lower maize productivity due to the fact that the supply of *ganyu* labour which occur mainly in the farming season compete with own labour demand on agricultural activities. Household heads that have always lived in the village although they do not tend to create absentee farm managers, may lack the exposure that could motivate or inspire them to be innovative and take more risky decision. Hence, they may be risk averse and this may negatively affect their investments in productivity enhancing activities.

2.2.2 Education and Tobacco Earnings

We also investigate the impact of education on earnings from a cash crop – tobacco. Since the liberalisation of burley tobacco in the early 1990s, the number of smallholder farmers engaged in tobacco production has increased. GOM (2004) notes that about 18.9 percent of smallholder farmers participate in burley tobacco cultivation. Estate production of burley tobacco has declined since the 1990s due partly to declining profitability of estate agriculture. According to GOM and World Bank (2006), smallholder farmers accounted for 80 percent of total tobacco production in the late 1990s. World Bank (2003) also notes that productivity in burley tobacco has declined over time, from 1,150 kilograms per hectare in 1990 to 973 kilograms per hectare in 2001. The returns to earnings from tobacco are estimated from the following Mincerian type function:

$$\begin{aligned} Ln(TI_j) &= \alpha_0 + \alpha_1 PRIM_j + \alpha_2 JSEC_j + \alpha_3 SSEC_j + \alpha_4 GRAD_j + \alpha_5 TECH_j \\ &+ \beta_1 EXP_j + \beta_2 EXP_j^2 + \theta_1 URBAN_j + \theta_2 CENTRE_j + \theta_3 SOUTH_j \\ &+ \phi_1 BUP_j + \phi_2 CLUB_j + \phi_3 CEXP_j + \sum_{i=4}^{n} \phi_i Z_{ji} + \varepsilon_j \end{aligned} \quad (4)$$

where for individual or household j, $Ln(TI)$ is the natural logarithm of income from tobacco sales; the schooling, experience, urbanisation and regional dummies are defined as in equation (3); BUP is a dummy capturing participation in business enterprise; $CLUB$ is a dummy variable representing membership of a farmer club; $CEXP$ is number of years of experience in club membership; Z is a vector of other control variables including labour market participation – formal wage labour and *ganyu* labour and remittances, and ε is the stochastic disturbance term.

The earnings from tobacco (TI) are reported annual profits from tobacco production estimated as sales net of total costs in Malawi Kwacha. We include the following additional control variables: dummies for participation in business activities, participation in the formal wage and *ganyu* labour market, whether household received remittances, current membership to farmer's club, and years of experience in club membership. The variables related to farmer club membership capture the effects of social capital on tobacco profitability. The club system in tobacco minimizes transaction costs arising from transport costs to tobacco auction markets through links of clubs to farmer organizations such as the Tobacco Association of Malawi (TAMA) and the National Smallholder Farmers' Association of Malawi (NASFAM). Both TAMA and NASFAM provide transport services to farmers which are cheaper due to their ability to negotiate better prices with transporters (GOM and World Bank, 2006). We also control for fixed effects of regional dummies and urbanisation.

2.2.3 Education and Business Income

Following other studies (Leung, 2006; Vijverberg, 1995), in order to investigate the role of education in self-employment, the returns to earnings from business enterprises are estimated from the following Mincerian type function:

$$\begin{aligned} Ln(BI_j) &= \alpha_0 + \alpha_1 PRIM_j + \alpha_2 JSEC_j + \alpha_3 SSEC_j + \alpha_4 GRAD_j + \alpha_5 TECH_j \\ &+ \beta_1 EXP_j + \beta_2 EXP_j^2 + \theta_1 URBAN_j + \theta_2 CENTRE_j + \theta_3 SOUTH_j \\ &+ \phi_1 AGEB_j + \sum_{i=2}^{8} \phi_i IC_{ji} + \phi_9 MALE_j + \phi_{10} FCB_j + \varepsilon_j \end{aligned} \quad (5)$$

where for individual or household j, $Ln(BI)$ is the natural logarithm of income business enterprise; the schooling, experience, urbanisation and regional dummies are defined as in equation (3);

$AGEB$ is the age in years of the business enterprise; IC is a vector of seven industry dummies; $MALE$ is the dummy if the owner of the business is male; FCB is a dummy equal to 1 if the main customers are final consumers, and ε is the stochastic disturbance term.

The dependent variable, earnings from business (BI) is defined as monthly profits that were calculated as sales in the past 30 days of the interview less total costs of sales. The extra control variables in the model include: dummy for sex of the business owner, age of the business enterprise, dummy for main customers and eight industrial sector dummies (agriculture, forestry and fishing; mining and quarrying; manufacturing; construction; wholesale and retail; transport; communication business and financial services, and other social services (as control group)). Chirwa (2008) also notes that institutional buyers, as opposed to final consumers, provide a more reliable market and more contractual binding orders; these aspects may be used as a platform for growth and enterprise profitability. We expect enterprises whose main customers are final consumers to earn less profits than those that rely on institutional buyers (other firms, corporations and government institutions). Owing to data limitations, this model does not control for access to capital, entrepreneurial skills and innate ability as self-starter entrepreneurs.

2.2.4 Education and Household Income

Several studies have analysed the role of education on total income or as a determinant of poverty (such as Jolliffe, 2002; Mukherjee and Benson, 2003). We adapt the specification by Jolliffe (2002) by focusing on the maximum education within the household and specify the following model:

$$\begin{aligned} Ln(HI_j) = {} & \alpha_0 + \alpha_1 PRIM_{Mj} + \alpha_2 JSEC_{Mj} + \alpha_3 SSEC_{Mj} + \alpha_4 GRAD_{Mj} + \alpha_5 TECH_{Mj} \\ & + \beta_1 EXP_j + \beta_2 EXP_j^2 + \theta_1 URBAN_j + \theta_2 CENTRE_j + \theta_3 SOUTH_j \\ & + \phi_1 MALEH_j + \phi_2 HHALV_j + \phi_3 HHSIZE_j + \sum_{i=4}^{n} \phi_i Z_{ji} + \varepsilon_j \end{aligned} \qquad (6)$$

where for individual or household j, $Ln(HI)$ is the natural logarithm of household income, $PRIM$ is a dummy for completion of senior primary school, $JSEC$ is the dummy for completion of junior secondary school, $SSEC$ is the dummy for completion of senior secondary school, $GRAD$ is a dummy for graduate farmers, $TECH$ is

a dummy for completion of technical college. The subscript m on schooling levels denotes the maximum education completed within the household. The experience, urbanisation and regional dummies are defined as in equation (3); $MALEH$ is a dummy representing male-headed households; $HHALV$ is the dummy equal to 1 if the household head has always lived in the village; $HHSIZE$ is the household size; Z is a vector of variables capturing the participation in various economic activities including tobacco farming, business enterprise, labour market and receipt of remittances and ε is the stochastic disturbance term.

The dependent variable, income, is measured as the natural logarithm of expenditure per capita. We use the household per capita expenditure that was used to derive the poverty levels in 2005 (GOM and World Bank, 2006). Jolliffe (2002) notes that education affects households' income in three different ways. First, there is the weak link paradigm that posits that minimum education within the household is that matters. Second, there is the allocative effect in which maximum education helps in the allocation of household resources into various economic activities. Third, is the productivity effect, in which average education (capturing the average skills of household members) is critical in improving the productivity of household members in various economic activities. In this model, we explore the allocative effect of education by using the maximum education within the household.

In addition to experience, regional dummies and urbanisation, we further control for sex of household head, household size, household tenure in the village, participation in tobacco production, participation in business enterprise operations and labour markets and dummy representing whether a household is a recipient of remittances. In existing poverty studies in Malawi, household size is negatively associated with low income per capita, reflecting the negative effects of the dependency burden (Mukherjee and Benson, 2003; GOM and World Bank, 2006). In addition, these studies in Malawi have also shown that welfare is positively associated with participation in tobacco farming and in wage employment market.

2.4 Simulations of Impact of Education on Poverty

We also conduct simulations based on the rates of return on education on overall household incomes. We use *ex ante* simulation by assuming unit changes in education levels for poor households. The aim of the simulation exercise is to determine the extent to which investments in education, *ceteris paribus*, can contribute to improvements in national income and poverty reduction. The

simulation is based on the estimated model in equation (6) and use the predicted expenditure and poverty levels as a base for the simulation exercise. The actual per capita expenditure levels are taken as initial conditions. In the simulation, we improve the education level of poor households (or all households that have less than that level) based on the predicted model by one level and assess the changes in per capita expenditure and changes in poverty rates. In some cases, we simulate using changes in two independent variables. For instance, we simulate the case of households that have improved education level while at the same time allowing for employment opportunities such that all poor households entered wage employment and stop participating in *ganyu* employment.

2.5 Data

The study uses data from 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 self-employment. Self-employment is categorized into farming activities (food crops and cash crops) and business enterprises. We also use data on expenditure per capita as a proxy of income generated from various sources including farming, enterprises and remittances. The analysis is based on a usable sample of 11,387 households of which 8,964 households are engaged in maize farming and 1,685 households in tobacco farming. The data also generated a usable sample of 3,508 business enterprises. In all cases, outlier observations were drop from the analysis by concentration on observations between the 5^{th} and 95^{th} percentile. However, in the maize model, we dropped observations whose yield were less than 200 kilograms per hectare and more than 6,000 kilograms per hectare. In addition, it is difficult to measure the amount of labour, capital and other inputs used on maize from the data set. For instance, the questionnaire only captures the quantity of seeds purchased and ignores farmer's recycled seeds such as local seeds.

3. Empirical Results

3.1 Descriptive Statistics

Table 1 presents the means of the variables used in the models. With respect to maize production, the average production is 257.7 kilograms. The average yields are 595 kilograms per hectare which is far much below the potential of 3,000 – 4,500 kilograms per hectare. It is well known that one of the problems with agriculture in Malawi is low productivity among smallholder farmers. Most of the maize farmers have low education, with 43 percent with senior primary education and 32 percent with no education or junior primary education. In terms of technology, the data reveals that 48% of the farmers used improved maize seeds (composites and hybrids) compared to 52% that used local maize variety. About 60% of farmers at least used fertilizers in their maize farming. It is also shown that households engage in multiple economic activities, with 31% operating a business enterprise, 26% in formal wage employment and 52% having household members that participate in the *ganyu* labour market and 78% of households also receive remittances.

With respect to tobacco farming, households that participate in tobacco production on average earn about MK9,642 per agricultural season from tobacco sales. About 50% of households have a member who completed senior primary school level of education. Tobacco farming households also have members that participate in other economic activities including business enterprise (23.9%), wage labour market (19%) and *ganyu* labour market (49%).

The average earnings (profits) from business enterprises are MK1,095 per month per enterprise. The sample has 37% and 8% business owners who completed primary and secondary education, respectively. However, the representation of graduates and technical education holders is minimal, 0.34% and 0.31%, respectively. The statistics also show that business ownership is dominated by men (60%) and about 91% of business products and services are sold to final consumers. With regard to the type of business, wholesale and retail business dominate (51.2%), followed by manufacturing related income generating activities recording 26.3% of the sample of business enterprises.

Table 1 Means of Variables in the Models

Variable	Maize Output	Tobacco Earnings	Enterprise Earnings	Expenditure per Capita
Natural logarithm of maize output	5.5519	-	-	-
Natural logarithm of tobacco earnings	-	9.174	-	-
Natural logarithm of enterprise earnings	-	-	6.9979	-
Natural logarithm of expenditure per capita	-	-		9.8403
Years of experience	30.394	27.256	22.238	29.398
Years of experience squared	1229.16	993.00	663.61	1181.085
Household size	-	5.367	-	4.5999
Natural logarithm of labour	1.4256	-	-	-
Natural logarithm of land	-0.5740	-	-	-
Age of household head	-	40.55	-	-
Age of business enterprise	-	-	3.6172	-
Years of experience in club membership	-	1.221	-	-
Education levels				
Primary school	0.431	0.499	0.3694	0.4148
Junior secondary school	0.107	0.142	0.0775	0.1112
Senior secondary school	0.127	0.130	0.0787	0.1446
Technical education	0.012	0.008	0.0031	0.0138
University	0.004	0.002	0.0034	0.0067
Years of schooling	6.368	6.975	4.9809	6.5553
Industry dummies				
Agriculture, forestry and fishing	-	-	0.0707	-
Mining and quarrying	-	-	0.0014	-
Manufacturing	-	-	0.2634	-
Construction	-	-	0.0031	-
Wholesale and retail	-	-	0.5120	-
Transport and communication	-	-	0.0125	-
Business and financial services	-	-	0.0040	-
Other dummies				
Male household head	0.774	0.902	-	0.7731
Male business owner	-	-	0.6023	-
Household head always lived in village	0.442	0.449	-	0.4220
Composite maize	0.040	-	-	-
Hybrid maize	0.471	-	-	-
Fertilizer application	0.606	-	-	-
Participation in tobacco farming	-	-	-	0.1429
Participation business enterprise	0.310	0.239	-	0.3126
Participation in formal wage labour	0.262	0.191	-	0.2958
Participation in *ganyu* labour	0.521	0.490	-	0.4820
Recipient of remittances	0.781	0.721	-	0.7582
Farmer club membership	-	0.205		-
Final consumer buyers	-	-	0.9102	-
Urban	0.065	0.021	0.1636	0.1267
Central region	0.392	0.659	0.3603	0.3838
Southern region	0.475	0.185	0.4994	0.4660
Number of observations	8,964	1,685	3,508	11,387

With respect to household expenditure (income) per capita, households have an average of 5 individuals with an average income per capita of MK18,776. The male-headed dominated sample has 41.5% household heads with primary education representing an average of 7 years of schooling. This is followed by 14.5% representation of those who completed secondary education. In addition, the statistics show that approximately 14.3% of the sample cultivated tobacco, while 31.3% operated business enterprises. The composition of households that engaged in *ganyu* labour is 48.2% which is relatively higher than those in wage employment (29.6% of the sample). Majority of the households, 75.8%, reported to have received remittances in the last twelve months of the study. Thus, remittances are important sources of household income among sample households.

3.2 Econometric Analysis

3.2.1 Mincerian Earnings Functions

Our empirical analysis uses the standard and extended Mincerian earnings functions which are estimated using Ordinary Least Square method. The earnings functions were estimated using STATA version 10.

3.2.1.1 Education and Maize Production

Table 2 presents results of the extended Mincerian functions for maize output. The explanatory power of the models is about 27%. In all the models, the estimated F-statistics indicate that the model coefficients are jointly significantly different from zero. With respect to the role of education, the different education categories are statistically significant at the 1% level. On average households with members that completed primary education and secondary education produce 10.4% and 51.5% more maize above the base category (less than senior primary education), respectively. The results also indicate that male-headed households produce 16.7% more maize than female-headed households.

The model also controls for use of various farming technologies. First, we find that in the cultivation of different maize varieties farmers that used composite maize seeds produced 14.1% more maize while those that used hybrid seeds produced 5.8% more maize compared to farmers that used local maize seeds. Secondly,

households that applied fertilizer produced 35.6% more maize than those that did not utilize fertilizer.

The control variables for participation in wage employment and operation of business enterprises were found to be insignificant in influencing maize production. On the contrary, participation in *ganyu* employment reduces maize production by 18.4% relative to the base category. This may suggest that *ganyu* activities that are typically on farming activities compete with household's own labour requirements for own farming activities. We also obtain evidence of the important role remittances play in maize cultivation, due partly to augmenting the resource envelop for productivity enhancing technologies and labour requirements. Households that received remittances produced 1.3% more maize than produced by to those that did not receive any remittances.

Table 2 Extended Mincerian Functions on Maize Output

	Model 1		Model 2	
Variables	*coeff.*	*t-ratio*	*coeff.*	*t-ratio*
Years of experience	0.0119[a]	5.79	0.0120[a]	5.83
Years experience squared	-0.0002[a]	-6.26	-0.0002[a]	-6.09
Education levels				
Primary school	0.0985[a]	4.56	-	-
Junior secondary school	0.1754[a]	5.40	-	-
Senior secondary school	0.4156[a]	12.36	-	-
Technical education	0.7767[a]	5.01	-	-
University	0.7783[a]	8.65	-	-
Years of schooling	-	-	0.0391[a]	13.15
Control variables				
Male household head	0.1544[a]	7.18	0.1458[a]	6.76
Natural logarithm of labour	0.0422[b]	2.20	0.0221	1.14
Natural logarithm of land	0.4886[a]	27.09	0.4884[a]	27.12
Household head always lived in village	0.0510[a]	2.85	0.0478[b]	2.67
Composite maize	0.1318[a]	2.67	0.1431[b]	2.89
Hybrid maize	0.0562[a]	3.02	0.0602[a]	3.23
Application of fertilizer	0.3047[a]	17.15	0.3068[a]	17.28
Operates business enterprise	-0.0309	-1.63	-0.0356[c]	-1.87
Participates in wage labour	-0.0456[b]	-2.12	-0.0281	-1.31
Participates in *ganyu* labour	-0.2033[a]	-11.15	-0.2113[a]	-11.57
Received remittances	0.0131	0.59	0.0129	0.58
Urban	0.2631[a]	7.70	0.2817[a]	8.22
Centre	0.0021	0.07	0.0291	0.94
South	-0.0614[b]	-2.07	-0.0295	-0.99
Constant	5.2610[a]	85.75	5.1380[a]	81.58
R-squared	0.2773		0.2728	
F-statistic	131.14		159.11	
Prob > F	0.000		0.000	
N	8,964		8,964	

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

3.2.1.2 Education and Tobacco Earnings

Table 3 presents results of the relationship between tobacco earnings and education. The models explain 20% of the variation and the F-statistics rejects the hypothesis that all coefficients are equal to zero. The results show that education variables are positively associated with higher earnings from tobacco farming. All the coefficients of education are statistically significant from zero at least at the 5% level. The marginal benefits of education to tobacco farming increase with the level of education completed by the farmer. For instance, tobacco farmers who completed senior primary school earn 24.5% and those that completed senior secondary school earn 53.4% more than tobacco farmers that have no education or just completed junior primary school level.

Table 3 Extended Mincerian Functions on Tobacco Earnings

	Model 1		Model 2	
Variables	*coeff.*	*t-ratio*	*coeff.*	*t-ratio*
Years of experience	-0.0067	-0.44	-0.0094	-0.62
Years of experience squared	0.0000	0.44	0.0000	0.35
Education levels				
Primary school	0.2445[a]	2.68	-	-
Junior secondary school	0.3244[b]	2.54	-	-
Senior secondary school	0.5337[a]	3.99	-	-
Technical education	1.4969[a]	5.16	-	-
University	1.6020[b]	2.32	-	-
Years of schooling	-	-	0.0563[a]	4.27
Control variables				
Male household head	0.3234[a]	2.95	0.3154a	2.91
Age household head	-0.0022	-0.15	0.0016	0.11
Household size	0.0775[a]	4.89	0.0747[a]	4.62
Household head always lived in village	-0.0771	-1.26	-0.0785	-1.29
Operate business enterprise	-0.1038	-1.49	-0.1095	-1.58
Participate in wage labour	-0.1236	-1.53	-0.0776	-0.98
Participate in ganyu labour	-0.4777[a]	-7.86	-0.4820[a]	-7.94
Received remittances	-0.0150	-0.23	-0.0071	-0.11
Farmer club experience	0.0242	1.61	0.0278[c]	1.86
Club membership during season	0.3764[a]	3.91	0.3415[a]	3.58
Urban	-0.2051	-0.99	-0.1727	-0.79
Centre	-0.4926[a]	-5.88	-0.4792[a]	-5.72
South	-0.7563[a]	-7.25	-0.7384[a]	-7.08
Constant	9.1290[a]	32.11	8.9189[a]	32.68
R-squared	0.2008		0.1970	
F-statistic	24.39		28.61	
Prob > F	0.000		0.000	
N	1,682		1,682	

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

With respect to control variables, we find headship of the household, household size, participation in *ganyu* labour, club membership during the season and regional dummies to be statistically significant at the 1 percent level. Male-headed households tend to earn 32.3% more than female-headed households and larger households also tend to earn more. The latter may be due to availability of household own labour which is a cheaper labour source than hired labour. Similar to the case of maize production, participation in *ganyu* labour does seem to compete with labour requirements on own tobacco farm. Membership to a farmer club enhances the earnings from tobacco farming such that club members tend to earn 37.6% more than those farmers that were not members of a farmer club. This supports the positive effects of social capital on agricultural based livelihood systems.

3.2.1.3 Education and Enterprise Earnings

Table 4 shows estimated results on enterprise earnings and the models explain 25% of the variation. The effect of education variables on natural logarithm of business profits are highly significant and have the expected positive signs. All the coefficients of education variables are statistically significant at the 1 percent level. The percentage increase in log of business profits increases with increase in level of education supporting the human capital theory. For instance, we find that entrepreneurs who completed primary and secondary education obtain 28% and 90%, respectively, higher profits than the base category.

With respect to control variables, main customers of the business, gender of the business owner, age of business, businesses in the agricultural industry, construction industry, transport and communications, and those operating in the urban areas tend to be significantly associated with earnings from enterprises. The evidence points to the fact that final destination of products and services matters in enterprise performance. We find that businesses that sell products or services to the final consumers earn 41% less profits than the base category of institutional buyers such as other businesses and government. Thus, the bulk purchase by institutional buyers tends to facilitate high business turnover and re-investments. Gender also has a bearing on profits from business. Businesses owned by male individuals earn 73% more than those run by female owners. The coefficients results for the type of business indicate that all the industry-specific businesses earn positive profits above the base category (social services) except for the category for manufacturing related income generating activities.

Table 4 Extended Mincerian Functions on Enterprise Earnings

	Model 1		Model 2	
Variables	*coeff.*	*t-ratio*	*coeff.*	*t-ratio*
Years of experience	0.0437[a]	6.69	0.0414[a]	6.41
Years of experience squared	-0.0008[a]	-6.68	-0.0007[a]	-6.01
Education levels				
Primary school	0.2759[a]	5.47	-	-
Junior secondary school	0.6464[a]	7.62	-	-
Senior secondary school	0.9050[a]	10.01	-	-
Technical education	1.3491[a]	3.41	-	-
University	2.5185[a]	6.10	-	-
Years of schooling	-	-	0.0828[a]	12.23
Control variables				
Consumers are main customers	-0.4099[a]	-5.48	-0.4085[a]	-5.46
Male business owner	0.7284[a]	17.31	0.6902[a]	16.23
Age of business enterprise	0.0307[a]	7.84	0.0303[a]	7.71
Agriculture, forestry & fishing	0.4261[a]	4.50	0.4322[a]	4.60
Mining and quarrying	0.2943	1.03	0.3709	1.42
Manufacturing	-0.1047	-1.40	-0.1104	-1.48
Construction	1.1535[a]	5.59	1.1552[a]	5.17
Wholesale and retail	0.0239	0.34	0.0061	0.09
Transport and communication	0.7982[a]	3.53	0.8123[a]	3.76
Business and financial services	0.2705	0.78	0.4638	1.17
Urban	0.7754[a]	13.25	0.7974[a]	13.66
Centre	-0.0452	-0.68	0.0221	0.33
South	-0.2211[a]	-3.52	-0.1605[a]	-2.57
Constant	6.0888[a]	42.47	5.8810[a]	40.24
R-squared	0.2545		0.2520	
F-statistic	66.38		80.42	
Prob > F	0.000		0.000	
N	3,508		3,508	

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

Business enterprises in urban areas earn 78% more than those in rural areas, reflecting the relative high effective demand for various products in urban areas given the high levels of income. It may be argued that business turnover is much higher in urban areas and businesses tend to generate returns more frequently than in the rural areas. Chirwa (2008) finds similar evidence of high profitability from micro and small enterprises in urban areas compared to rural areas. Operating an enterprise in the Southern and Central regions is found to yield less business profits than those in the Northern region. In addition, we find higher profits for older enterprises.

3.2.1.4 Education and Household Income

Table 5 presents estimated results of the link between household income and the highest completed levels of education of any household member. The model explains 44.5% of the variability in the log per capita expenditure. The overall model is highly significant at 1% based on the estimated F-statistic. The education level completed by any household member significantly contributes to household income (household expenditure) per capita. The estimated coefficients which are significant at 1% are consistently positive, highlighting or confirming the expectation that education attainment enhances welfare. The expenditure per capita for the households is 10.2% and 29.6% higher for primary and junior secondary education levels respectively, than that of the base category of no education or lower primary education. The estimates for tertiary education are much higher than those for basic education; however, only a few graduates were captured by the survey.

All the control variables used in the model are statistically significant at the 1 percent level. The positive sign for gender of household head reflects that being male, the per capita consumption expenditure is 10.6% higher than being female-headed household. We find a negative and statistically significant effect of household size on per capita consumption expenditure. This is consistent with earlier findings of a negative relationship in the poverty literature (see for instance Lipton and Ravallion 1995; Lanjouw and Ravallion 1995; Mukherjee and Benson, 2003; GOM and World Bank, 2006). This implies that the level of household per capita expenditure declines by approximately13.95% a unit change in the household size, reflecting the negative effects of the dependency burden.

Table 5 Extended Mincerian Earnings Functions for Total Income

	Model 1		Model 2	
Variables	*coeff.*	*t-ratio*	*coeff.*	*t-ratio*
Years of experience	0.0043[a]	3.72	0.0038[a]	3.19
Years of experience squared	-0.0001[a]	-4.50	-0.0001[a]	-3.40
Education levels				
Primary school	0.1023[a]	8.90	-	-
Junior secondary school	0.2955[a]	16.58	-	-
Senior secondary school	0.5042[a]	27.89	-	-
Technical education	1.1719[a]	22.23	-	-
University	1.6747[a]	21.58	-	-
Years of schooling	-	-	0.0547[a]	31.63
Control variables				
Male household head	0.1058[a]	8.87	0.0857[a]	7.02
Household size	-0.1395[a]	-47.58	-0.1442[a]	-46.87
Household head always lived in village	-0.0284[a]	-2.90	-0.0351[a]	-3.53
Grew tobacco	0.1185[a]	8.17	0.1076[a]	7.29
Operate business enterprise	0.1376[a]	13.25	0.1224[a]	11.49
Participate in wage labour	0.0675[a]	6.04	0.0967[a]	8.48
Participate in *ganyu* labour	-0.1609[a]	-16.33	-0.1747[a]	-17.29
Received remittances	0.0524[a]	4.54	0.0547[a]	4.61
Urban	0.2686[a]	15.25	0.306[a]	16.37
Centre	0.1947[a]	12.68	0.2388[a]	15.22
South	-0.0666[a]	-4.37	-0.0229	-1.48
Constant	10.0713[a]	350.02	9.8851[a]	316.40
R-squared	0.4445		0.4110	
F-statistic	368.52		404.92	
Prob > F	0.000		0.000	
N	11,387		11,387	

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

Households whose head have always lived in the village tend to have lower welfare than those that have lived in other places. This group accounts for 42% of the sample households used in the model. Although, this may be good for farming activities, the lack of exposure to different environments with different economic opportunities tends to perpetuate their poverty status. The performance of this variable may reflect two things. First, it is possible that the lack of exposure retards the household's innovativeness in identifying high earning income generating opportunities while the ones with exposure tend to be more innovative and invest in risky activities. Second, it may reflect the fact that households that might have lived elsewhere had accumulated wealth before they settled in an area that is conditioned by poor economic opportunities. Such accumulated wealth provided a springboard for productive economic activities. These may include households that were in the labour market in

different parts of the world and are living in the village to spend their retirement time.

On average households that cultivate tobacco and operate business enterprises experience 11.9% and 13.8% higher per capita expenditure levels, respectively. These results are consistent with the findings in Mukherjee and Benson (2003) and GOM and World Bank (2006). Participation in wage employment enhances per capita income. In contrast, *ganyu* labourers experience 16.1% less per capita expenditure, and this is broadly consistent with the results found in the maize output and tobacco earnings models. This negative effect reflects the substitution effect of *ganyu* labour and family labour requirements for income generating activities. Households that receive remittances tend to have 5.2% higher incomes than non-recipient households. We also find that residents in the South spend 6.7% less per capita expenditure relative to the base category – Northern region, confirming the finding that poverty is much higher in the Southern region than in the other regions in Malawi.

3.2.2 Estimated Rates of Return on Education

Table 6 presents a summary of rates of return on education based on Mincerian earnings functions for different self-employment activities. The returns to education are lowest with respect to maize production and highest with respect to business enterprises. There is also a striking difference on the role of education in a food staple (maize) and a commercial or cash crop (tobacco). Education tends to have a much larger marginal effect on tobacco earnings than its effect on maize production. It may be the case that the subsistence nature of maize in Malawi (of which only 15-20% is estimated to be marketed) provides less incentives for improvements in productivity. The differences in rates of return on education from self-employment activities are graphically presented in Figure 1.

Table 6 Rates of Return on Education from Self-Employment (%)

Model	Level of Education	Natural logarithm of Maize Output	Tobacco Earnings	Enterprise Earnings	Expenditure per Capita
Model 1	Primary Education	1.29	3.46	3.97	1.35
	Junior Secondary	1.92	3.83	9.09	3.44
	Senior Secondary	4.29	5.88	12.27	5.46
	Technical Education	8.41	24.77	20.39	15.92
	University	7.34	24.77	71.31	27.11
Model 2	Years of Schooling	3.91	5.63	8.28	5.47

Notes: Model 1: Extended Mincerian functions with control variables
Model 2: Basic Mincerian functions with control variables

With respect to maize productivity, the evidence shows that significant gains in maize production may emerge by investing more in senior secondary education levels. Completing senior primary education leads to only 1.3% increase in maize production and the difference with completing junior secondary school levels is marginal. However, the returns to education from maize production more than double to 4.3% for senior secondary school from 1.9% with respect to completing junior secondary school. The results suggests that the heavy emphasis that has been placed on the need for farmers to read and write (mere literacy) through the promotion of adult education, may not generate substantial gains in agricultural productivity. Thus, farming does require more education – particularly in light of the technological aspects and business-like farming management techniques that present day farming requires.

Similarly, in tobacco farming, the returns on education are higher from senior secondary school level, with returns on primary education and junior secondary education being marginally different. It is noted that in terms of tobacco farming, returns on education are more than four times higher if the household has a member that completed technical education or university education than the household that has a member that completed senior secondary education. Interesting also is the fact that there is no difference between rates of return on education from tobacco earning for households that have members with technical and university education.

Figure 1 Rates of Return on Education from Self Employment Activities (Education Levels)

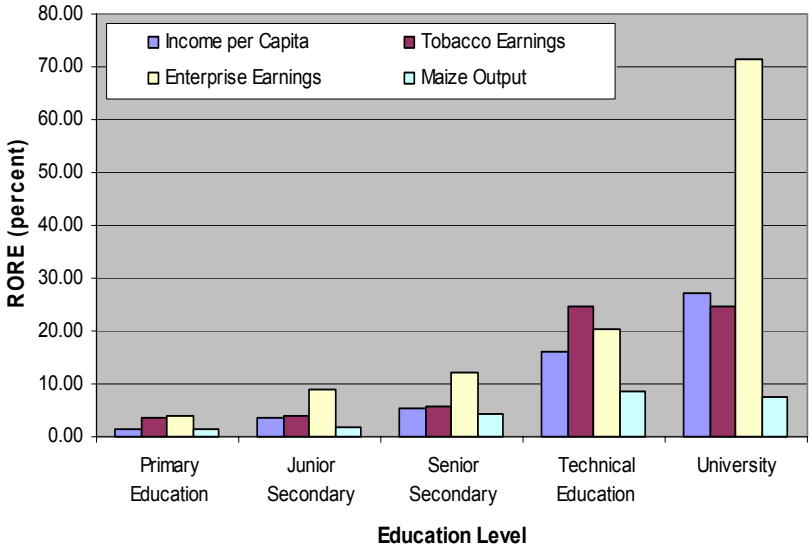


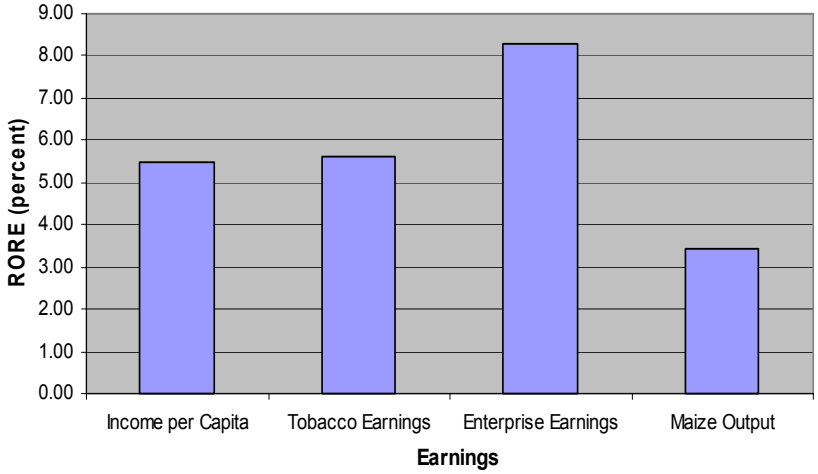
Table 4 and Figure 1 also show that the highest returns from self-employment emerge from business enterprises. Compared to other self-employment activities, at each level of education, there are higher returns from enterprise earnings than from other activities such as maize farming and tobacco farming. Completion of senior primary school generates 4% additional earnings per year of education spent in that level, while by investing 2 more years of education to complete junior secondary education more than doubles the returns from self-employment in business activities. The other big jump in earnings from business enterprise is evident between technical education and university education. If the owner of the business completed technical education, the returns on education are on average 20.4% compared to 71.3% returns if the owner completed university education. The positive effects of higher levels of education on enterprise performance may reflect the high managerial skills embodied in tertiary education.

In terms of overall impact of education on incomes and poverty, the evidence points to the fact that substantial returns are evident with respect to technical and university education. The results show that expenditure per capita increases by 5.5% per year of forgone earnings in senior secondary education to 15.9% per year of foregone earnings in technical education and 27.1% per year in forgone income in university education. The results imply that investing in

higher education may have the highest poverty reducing potential than expansion of primary education that has been receiving a lot of emphasis and investments in Malawi. The case for the need to expand tertiary education is consistent with the high rates of return on education evident from wage employment and off-farm business activities.

Figure 2 shows the comparative rates of return on education from self-employment that result in one year of schooling. Consistent with the results from the extended Mincerian functions, using the years of schooling reveals that higher rates of return are obtained in enterprise operations than in farming activities. An additional year of schooling leads to a 3.2% increase in maize production and a 5.6% increase in earnings from tobacco farming. On the other hand, an additional year of schooling leads to 8.3% increase in enterprise earnings. Overall, a marginal year of schooling increases household income per capita by 5.5%.

Figure 2 Rates of Return on Education from Self Employment Activities (Years of Schooling)



The results from Chirwa and Matita (2009) on rates of return on education from wage employment and these results of self-employment and income are consistent. Both returns on education from wage employment and self-employment, and income tend to be higher with the level of education completed by a household member. The results therefore, provide justification for increased investments in higher education. Tertiary education not only proves vital for the labour market, but it also turns out that it is of immense benefit to

entrepreneurship and other self-employment activities such as commercial farming.

3.3 Poverty Impact Simulations

Table 5 presents results of simulation of various scenarios of education attainment on income and poverty reduction. We simulate based on the estimated model (Model 1 in Table 5). We particularly focus on the impact of investment on education among poor households. It must be noted, however, that these simulations are static and mainly consider what would happen if we change the education levels in the households, other factors being held constant. We nonetheless, demonstrate the importance of the participation in the labour market by poor households. Table 5 has initial conditions – these are the average expenditures and poverty levels from the data set.[4] Our simulations make reference to base conditions – these are predictions based on Model 1. Our model predicts much lower poverty levels, particularly the proportion of households that are ultra-poor. We use the base conditions as a basis for comparing the impact of changes in the education status of poor households or all households. Thus, the poor and ultra-poor households are those as predicted using the model and remain the basis for comparing mean income per capita for each scenario. The simulated results are also summarized in Figure 3.

First, we assume that all poor households have a member who completes at least senior primary school level. This simulation is consistent with the universal primary school policy and assuming that every child in the household at least completes primary school. Overall, such investments would lead to only 1.5% increase in average per capita income, but the income per capita for poor households would increase by 4.1% while those of the ultra-poor will increase by 3.3%.[5] These increases will lead to 10.8% and 14.8% reduction in the proportion of poor and ultra-poor households, respectively.

[4] The poverty levels reported here are different from national figures of 52.4% poor and 22.3% ultra-poor (NSO, 2005) because we are using unweighted data while NSO used weighted data.

[5] The change in overall income per capita in this case only occurs among poor households and the effect is much lower than when all households (poor or non-poor) are included in the change in education level.

Table 7 Simulating Impact of Education on Poverty (%)

	Variable	All	Poor	Ultra Poor
Initial Conditions	Poverty line (MK)	-	16,165.00	10,029.00
	Expenditure/capita (MK)	18,775.79	10,512.55	7,575.08
	Poverty rate (%)	-	44.13	16.84
Base Conditions (Predicted)	Expenditure/capita (MK)	18,775.79	12,193.08	8,010.00
	Poverty rate (%)	-	36.48	6.22
Simulation Scenario		**Changes from the Base Conditions (%)**		
All poor households with at least a member with completed primary education (PSLC)	Expenditure/capita	1.51	4.10	3.29
	Poverty rate	-	-10.75	-14.79
All poor households with at least a member with completed junior secondary education (JCE)	Expenditure/capita	7.96	23.25	21.87
	Poverty rate	-	-45.34	-61.41
All poor households with at least a member with completed junior secondary education (JCE) with entry into wage labour market	Expenditure/capita	14.54	45.01	45.40
	Poverty rate		-70.78	-77.49
All households with at least a member with completed senior secondary education (MSCE)	Expenditure/capita	41.37	50.30	48.52
	Poverty rate	-	-74.48	-79.74
All households with at least a member with completed technical education	Expenditure/capita	171.90	193.05	189.58
	Poverty rate	-	-97.81	-99.36
All poor households with at least a member with university education	Expenditure/capita	77.89	384.52	378.78
	Poverty rate	-	-99.75	-99.36

Notes: Simulation based on Model 1 in Table 5

The second scenario is where we upgrade the education levels of all poor households to having a member that has at least completed junior secondary school. This would be equivalent to a policy of universal junior secondary education. Here, we notice a significant increase of 7.8% in overall income per capita, and 23.3% increase in the incomes of the poor households and 21.9% increase in the incomes of the ultra-poor households. Consequently, the proportion of poor and ultra-poor households falls by 45.3% and 61.4%, respectively. This scenario implies that it would be possible to halve poverty if investments can be made in junior secondary school by broadening access to junior secondary school which targets poor households. We extend this scenario by allowing the individuals from poor households with at least junior secondary school to enter into

the labour market (not to participate in *ganyu* labour).[6] This almost doubles the average income per capita to 14.5% for all households, and also doubles the expenditure per capita among poor and ultra-poor households to 45% and 45.4%, respectively. There is an additional 25% and 16% reduction in households that would be poor and ultra-poor with new expenditure levels, respectively.

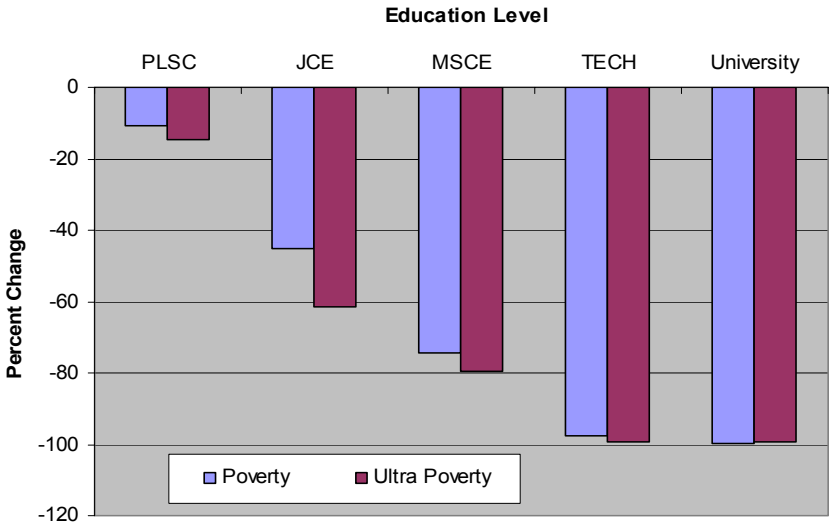
The third scenario that is simulated is when all households have a member with at least completion of senior secondary school education (MSCE). This would be equivalent to a policy that offers universal secondary education in Malawi. Overall, household per capita income increases by 41.4%.[7] The income per capita for poor households increases by 50.3% while the income per capita for ultra-poor also increases by 48.5%. In terms of poverty, the proportion of poor households would fall by 74.5% and that of ultra-poor would fall by 79.7%.

Figure 3 shows the impact of raising the level of education of at least one member of the household on changes in poverty. It is apparent that substantial differences emerge between completion of primary education and completion of junior primary education. The implication is that if poor households were to be targeted and supported, moving a step beyond universal primary education to ensuring that members complete junior secondary school, can substantially enhance household income earning potential through the allocative effect of education.

[6] It is well known that it is poor households that typically participate in *ganyu* labour in Malawi.

[7] When all households are included in the change in education status, the overall average change in income is due to the change in income of both the non-poor and poor households.

Figure 3 Simulated Impacts of Education on Poverty



Improvements in both technical education and university education lead to substantial gains in per capita income and poverty reduction. If all poor households were to educate at least one member to university level, poverty would largely be eliminated. This is possibly the least feasible scenario, but it just demonstrates the importance of higher education in livelihoods. The high increase in the proportion of households with university education will have implication on the labour market, with consequences of increasing labour supply and reducing the returns on education. However, as noted above higher education is not only important in the labour market, but it also generates high returns from business enterprises and the oversupply in the labour market may in the long-run be moderated by entrepreneurial development – as more graduates opt to operate their own businesses with potential to generate additional employment opportunities.

4. Conclusions and Policy Recommendations

This study set out to assess the impact of education on self-employment activities and overall household income and poverty levels. Most of the income among Malawians comes from non-wage income earning activities such as farming and operation of business enterprises. The returns on education based on the labour market only, therefore tend to ignore the contribution of education and what

education earns in self-employment activities. The study uses national household survey data to estimate extended Mincerian earnings functions for different self-employment activities (maize output, tobacco farming, and business enterprise) and household incomes.

We find returns to self-employment activities to be positively related to levels of education completed by members of the household. While differences in rate of returns are minor with respect to maize output, we find substantial differences in rate of returns between secondary education levels and tertiary education. In particular, these differences are decisive with respect to earnings from business enterprises. Again, using household per capita expenditure as a measure of household income, we find substantial differences in rates of return on education between secondary and tertiary levels. The results suggest that investments in higher education are likely to have substantial long-run effects on income distribution and poverty.

Using the household income model, the simulation of impacts of education has revealed that targeting the poor households to complete higher education almost eliminates poverty. Completion of primary school education, marginally contributes to reduction in poverty, raising questions about the potency of a free primary education policy in making a meaningful dent in poverty reduction efforts from a point of investments in human capital. More importantly, substantial improvements in household income and reductions in poverty start to emerge with investments in junior secondary school level. If it were possible to target the poor households so that at least a member of such household is supported to complete junior secondary school, the Millennium Development Goal of reducing poverty by 2015 could be a realistic target through investment in education. Improving the education level of poor households to junior certificate, and the possibility of improvement in job opportunities would reduce the level of poverty by more than 65 percent.

As in the case of rates of return on education for wage earners (Chirwa and Matita, 2009), the results on self-employment and household income point to the potency of tertiary education as human capital investment for ending poverty in Malawi. The rates of return to education in tertiary education in Malawi still remain high suggesting that there remain huge opportunities of investments with positive benefits to the nation. This calls for a shift in the current education policy that concentrates on primary education in favour of a policy that aims at reducing a tight pyramid situation of the education structure. Hence, there is need for increased investments in post-secondary education so that the many people that graduate

from secondary levels attain higher levels of education. More specifically, a policy shift towards universal access to junior secondary education can positively contribute to the goal of halving poverty in the long-run. Nonetheless, this will require massive investments in secondary school infrastructure and other inputs necessary for quality education.

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