

EDUCATIONAL INVESTMENT AND ECONOMIC PRODUCTIVITY: EVIDENCE FROM MALAWI*

S. HEYNEMAN

The World Bank, 1818 H Street NW, Washington DC 20433, USA

Abstract — Tracer study data on the destination and earnings of a sample of nearly 1000 secondary school graduates are used to estimate the returns to investment in the Malawi Certificate of Education. Even when adjustment is made for the possibility of unemployment among graduates, the social rate of return is estimated to be in the order of 20% and the private rate 50%. These results are used to explain the strong private demand for entry into secondary education and to support the case for further expansion of such schools in Malawi.

INTRODUCTION

At the time of self-rule 1963 the Malawian Government was one of the most impoverished anywhere. Malawi borrowed the necessary capital to develop its agricultural base, its road system and its educational infrastructure. The latter was relatively controversial. It was not uncommon to hear objections raised within the development assistance agencies that education was more consumption than investment; and were one able to compute its benefits one would likely find high levels of unemployment and negative returns. Nevertheless between 1963 and 1978 secondary school enrollment in Malawi expanded by a factor of twelve. The results, which appear below, apply to the latter years (1976-78), and are derived from a longitudinal survey of school leavers and their earnings. The rate of return to individuals who invested in secondary education was found to be 50%; and the return to society 21%.

Data were collected at three points in time: (i) in 1976 when students were sitting for their Junior Certificate (2 year) and Malawi Certificate of Education (4 year) examinations, (ii) one year later (1977), and (iii) two years later (1978). Thus, longitudinal employment information exists on those who completed two

and four years of secondary school, one and two years after entering the labour market.¹ The sample of 928 students in 16 schools represented 26% of all the secondary schools in the country.

LABOUR MARKET ACTIVITY

Very significant differences exist in the proportion of those who find themselves unemployed two years after leaving school (Tables 1 and 2). Of those working, approximately half (48%) found employment in the civil service and another 16% with a 'statutory' body (Table 3). That the remaining 36% found employment in the private sector is significant in a country of Malawi's level of economic development where the public sector is the predominant and sometimes the sole employer. More exact information on employment activity can be found in Tables 4 and 5. Of the 207 males who left the education system in 1976 and who were traced in the labour force two years later, 176 were employed and 31 were either unemployed or not looking for work. Earnings are displayed in Table 6.

RATE OF RETURN TO INVESTMENT IN SECONDARY EDUCATION

There are basically four categories of costs to be considered: foregone earnings, tuition and fees, operating costs, and capital costs:

*These data were collected under the auspices of the Ministries of Education and Labour. They were utilized as background to a World Bank Basic Economic Report on Malawi, but the views and interpretations expressed here are solely those of the author.

	<i>Private</i>	<i>Social</i>	Tuition in a government secondary school in 1978 prices was approximately K26/year and boarding approximately K40/year. ² Boarding fees are not in their entirety a legitimate private cost — since students would have expenses whether or not in school and it is not clear whether boarding and lodging costs are higher than what they would spend elsewhere. To be
(a) Earnings foregone	X	X	
(b) Tuition and fees	X		
(c) Operating costs [including (b)]		X	
(d) Capital costs		X	

Table 1. The activities of secondary school leavers 1976-1978

	Studying (%)	Unemployed (%)	Employed ^a (%)	Other ^b (%)
Preliminary phase (1976)	100.0	—	—	—
Year 1 (1977)	51.8	12.6	20.8	14.4
Year 2 (1978)	49.8	6.0	22.7	21.7

N = 928.

^a Includes both those who are salaried and those who are self-employed.

^b Includes those not in the labor force and those who did not respond.

Table 2. Activities of secondary school students two years after their 1976 JCE and MCE examinations, by exam success and sex

	Still in school or training (%)	Working ^a (%)	Unemployed (%)	Other ^b (%)	Total (%)	(<i>N</i>)
Female fail JCE	34.2	15.8	15.8	34.2	100	(38)
Male fail JCE	28.0	28.0	16.0	28.0	100	(25)
Female pass JCE	74.0	—	4.0	22.0	100	(100)
Male pass JCE	76.0	7.0	4.0	12.7	100	(237)
Female fail MCE	30.2	18.9	18.9	32.0	100	(53)
Male fail MCE	18.1	42.9	11.3	27.8	100	(133)
Female pass MCE	35.9	26.6	7.8	29.7	100	(64)
Male pass MCE	44.6	34.9	0.7	20.1	100	(278)

^a Includes both those who are salaried and those who are self-employed.

^b Includes those (few) who are not interested in employment as well as those who did not respond.

Table 3. Type of employer two years after leaving secondary school (1978)

Civil service (%)	Statutory body (%)	Private enterprise (%)	Total (%)	(<i>N</i>)
48	16	36	100	(211)

Table 4. Distribution of occupational categories two years after leaving secondary school

	%
Professional and technical workers	7.0
Clerical and related workers	67.0
Sales workers	7.0
Service workers	5.0
Farmers, fishermen and foresters	8.0
Production workers, transportation workers, equipment operators and labourers	6.0

N = 211.

Table 5. Sector of employment two years after leaving secondary school

	%
Agriculture, forestry, fisheries	21
Transportation and communications	14
Manufacturing	5
Electricity, water, gas	1
Construction	6
Trade	16
Banks, insurance and real estate	10
Public administration and defense	15
Services	12
Total	100

N = 211.

conservative boarding costs will be considered as being 23% higher; and K10/year will be added to be cost of tuition. Thus, tuition and fee costs to the individual in 1978 prices were K36/year. Earnings foregone are not as easy to establish. Male earnings in 1978, two years after secondary school, averaged K28.5/month for those who were working. But after the chance of unemployment is taken into account the earnings of the average JC leaver were reduced K17.1/month. Since risk of unemployment is a reality for those who leave secondary school, particularly after only two years, this latter figure will be used as the opportunity cost for choosing to continue in years 3 and 4. Thus the opportunity cost of earnings foregone is K17.1/month (K205/year).

Capital costs are usually borne by governments; but in Malawi a significant portion is financed by agencies other than government — by religious organizations or more recently, by grants or loans from bilateral donors or multilateral banks. The level of capital which was necessary to create a 'student place' in 1978 in the secondary schools where most of those students were educated was approximately K3046.³

Operating costs are often borne by governments; in Malawi a significant portion — 20% in government-assisted boarding schools — is derived from private fees. The level of operating cost in Malawi is affected by the supply of — and willingness to utilize — external teaching staff.⁴ The annual operating cost for a boarding secondary school student in 1975 was K214, or less. This figure includes the private cost to the student. When calculating

Table 6. Earnings of those in the labour force two years after leaving secondary school (1978)^a

Examination	Mean earnings of those working (K/month) (N)	Number of unemployed and not seeking employment (N)	Unemployment adjusted mean earnings (K/month) ^b
JCE	28.5 (21)	14	17.1
MCE	44.8 (155)	17	40.3

^a Refers to males only.

^b Assumes that the productivity of those not in employment is zero.

the returns we will adjust this 1975 figure by a 9% year inflation rate. Thus for 1978 we will consider the recurrent cost to be K278/student.

Productivity

Productivity data are derived from a survey of self-reported earnings one and two years after leaving full time schooling.⁵ But are earnings a fair measure of productivity? There has been much discussion of this, both generally and about Malawi in particular. First, in economies where a large portion of the salaried labour force is employed in the public sector, some feel that differences in earnings reflect an inherited wage structure and do not represent a difference in productivity. In part this is conjecture. It does not explain why education appears to be a good predictor of advancement in earnings after employment has been obtained; and it runs counter to recent evidence on the productivity of the civil service, including data from centrally planned economies (Phelps-Brown, 1977).⁶ Second, in Malawi: public sector salaries are not entirely a function of colonial inheritance.⁷ Not only are they adjusted periodically, but more importantly, the adjustments have kept in line with the private sector and in line with the supply of educated talent. Adjustments have differentiated between classes of employees. At the time of the last adjustment in 1978, salaries of the unskilled levels were raised by 50%; salaries at the middle (clerical) levels by 32%; and salaries at the technical, professional and special skill level (e.g. nurses) were raised between 32% and 96%. This corresponded to the relative supply of talent at those levels in the economy and the government's ability to attract them from the private sector.

Since the data emanate from a secondary school longitudinal study rather than the usual cross-sectional survey, it is not possible to compare the full range of educational investment options — primary, secondary, post-secondary, vocational and others.⁸ Annual productivity (AP) for an investment in years 3 and 4 of secondary schools can be calculated in the following manner:

$$AP = 12 \text{ months} \times \text{alpha coefficient} \times (\text{MCE} - \text{JCE});$$

where MCE = the monthly earnings of those who have had four years of secondary education;

JCE = the monthly earnings of those who have had two years of secondary education;

alpha coefficient = that portion of the earning differential due to schooling and not to ascriptive characteristics — parental economic status, IQ and the like. The size of this coefficient (usually 0.60–0.80 for industrial countries) will be a matter of some discussion.

Use of the alpha coefficient in low-income countries

To an observer of earnings functions in industrialized societies it is evident that factors other than education have a substantial influence. But the rationale for choosing to characterize earnings differentials as only 60% or 80% due to schooling is not clear. Even if this were an accurate estimate for the United Kingdom, Western Europe and North America, then it would be a significant underestimate for Malawi and many other developing countries. Sex and socio-economic status appear to have only a fraction of the predictive power on earnings in Malawi that they have in a high income country, and therefore the size of the alpha coefficient in Malawi should be larger than the norm elsewhere (Heyneman, 1980; Heyneman and Currie, 1979).⁹ In Malawi we will adopt an alpha coefficient equal to 90%, though in fact 90% may be an underestimate for this particular sample. The effect will be to deflate the difference between the two earnings streams (MCE and JCE) from K278/year to K250/year.

Given the absence of full age earning profiles of the sample, a short cut formula has been used for calculating the returns to investment in education (Psacharopoulos, 1973, p.27), as follows:

*Social rate of return*¹⁰

$$r_s = \frac{\text{alpha coefficient (constant annual earnings differential, before tax)}}{2 \text{ years (opportunity cost + recurrent cost + annual capital cost)}}$$

$$r_s = \frac{0.90 (483.6 - 205.2)}{2 (205 + 278 + 102)} = 21\%.$$

Private rate of return

$$r_p = \frac{\text{alpha coefficient discount (constant annual earning differential, after tax)}}{2 \text{ years (opportunity cost + tuition and fees)}}$$

$$r_p = \frac{0.90 (279 - 9.25)}{2 (205 + 36)} = 50\%.$$

These calculations are based upon an assumption that the rate of unemployment will remain constant over a working lifetime. In fact, however, unemployment tends to be concentrated among the young and to decline thereafter. Since this sample is drawn from those who have been in the labour market for only two years it may be that the rate of lifetime unemployment is overestimated. Another alternative is to assume an unemployment rate of approximately zero.¹¹ By making one unemployment assumption and then another what is generated is a low and a high estimate for the rate of return to upper secondary education. This range appears in Table 7.

DISCUSSION

Investments in secondary education in Eastern Africa have a reputation for generating higher economic returns than in any other region in the world (Psacharopoulos, 1972). But the data by and large are more than a decade old (Smyth and Bennett, 1967; Thias and Carnoy, 1969), and since in the interim secondary school enrollments have doubled, tripled or, in the case of Malawi, quadrupled, the question is whether estimates would be as high in the 1980s as they were in the 1960s. These data suggest that estimates made a decade ago for Kenya (23%) and Uganda (29%) are not inconsistent with the results from Malawi.¹² Although much growth has occurred

in secondary education since the 1960s, it appears that the demand for and productivity of the graduates is still significantly in excess of the social costs of producing graduates. These returns essentially reinforce what we know

about the scarcity of human capital from cross-sectional manpower surveys, and simple common sense.

The fact that the unemployed rate is so low — 0.7% for males who pass their MCE examinations — illustrates the degree of scarcity of what, in industrialized countries, is both universal and mandatory basic education. Malawi is only now beginning to develop an educational system of sufficient size and quality so that its labor force, in terms of skills, would be internationally competitive. Despite significant expansion, today the same proportion of the population attends secondary school as attends doctoral programs in North America. Ten years ago this comparison might have seemed out of place. But today there is an awareness that skill levels required for agricultural and commercial efficiency in Europe, North America and elsewhere are similar to those required — but cannot yet be afforded — in Malawi. Today adults with two years secondary school are asked to make technical decisions as medical or agricultural assistants that would be restricted to individuals with university education in more wealthy countries. The difference is not one of 'manpower requirements'. The complexities of medicine and agriculture do not vary from one country to the next. Junior Certificate level preparation (two years of secondary school) is allowed as the prerequisite for entering professional training programs in Malawi because individuals with

Table 7. Rate of return to investment in upper secondary education (4 years vs 2 years)

Unemployment assumption ^a	Social (%)	Private (%)
As observed among recent graduates	21	50
None	14	31

^a Assumes that the difference in earnings between four and two years is constant over a working lifetime; alpha coefficient = 0.90; no corrections for differences in mortality, if any; figures are adjusted for unemployment in the case of opportunity costs; in the top row the rate of unemployment is assumed to be constant over the working life and in the lower row it is assumed to drop to zero. Rates of returns cannot be calculated for females because no female who passed the JCE in 1976 chose to enter the labor market.

higher levels of basic education are simply too scarce. This scarcity has a cost. In the case of agriculture and commerce the cost can be measured in terms of economic efficiency; in medicine the cost is even more serious.

One additional side-effect is the cost incurred by specialized training institutions which are required to teach basic mathematics, science and language skills which should have been learned in the prerequisite general education. It is four times as expensive to teach calculus, biology and English at the post-secondary Mikolongwe or Colby Colleges as it is at a Malawian secondary school; and nine times as expensive at the Polytechnic college as at a secondary school. Yet these highly specialized post-secondary training institutions have to allocate as much as 40% of their time and resource to remedial work.

Exactly how expansion will affect the future social rate of return is not well known. Despite rapid past expansion, however, Malawi still has one of the world's lowest secondary school enrolment ratios (3% of the age group). There is, therefore, little reason to suspect that continuing the same increase in enrolment that prevailed between 1963 and 1978 (10% per year) would significantly reduce the rate of return. In sum, the necessary steps should be taken by both external and internal funding agencies to maintain the level of secondary school expansion as long as the rate of return to the investment remains as attractive as it currently appears.

NOTES

1. Is two years in the labour market too short to identify a stable earning stream? All techniques seem to have drawbacks. Using cross-sectional information from differing age groups requires the assumption that neither rates of economic growth nor the quality of schooling had changed over time. This latter assumption is particularly shaky in developing countries. Tracing a cohort of school leavers solves these difficulties but it raises others. The ideal, but most costly solution is to have longitudinal information on the same individuals over their working lifetime; barring this we will have to be satisfied with less than ideal information.

2. The unit of currency in Malawi is the Kwacha. In 1978 the rate of exchange was approximately K0.83/US\$1. In 1975 the prices for tuition were K20 and K30 for day and boarding schools respectively.

3. The capital cost for creating a student place in a secondary school in 1979 was approximately US\$4000 depending upon the size of the institution and its proximity to transportation and other factors. The rate of inflation was approximately 9% between 1978 and 1979; the US\$4000 figure has been deflated by that rate to arrive at the 1978 estimate \$3670. Since the exchange rate in 1978 was approximately K0.83/US\$1, K3046 will be used at the 1978 capital cost/student place. Since capital and recurrent costs have been calculated in 1978 prices, they are consistent in time with the benefits and no further adjustments for inflation are necessary. School buildings are assumed to have a lifetime of 30 years and therefore the annual capital cost per student in 1978 is simply estimated to be K102.

4. Secondary school teachers, trained locally, cost less than expatriates; but among expatriates there is a substantial difference. If the cost of a local teacher is considered to be 1.0, a Peace Corps Volunteer would cost 1.03; a Volunteer Service Overseas (UK) teacher would cost 1.49; a Canadian University Service Overseas (CUSO) teacher would cost 1.73; and a professional expatriate teacher on a fixed term contract 2.29.

5. Earnings are not equivalent to salaries because the former include income from all types of sources: trading, farming, small and part-time business, etc.

6. The point here is that public sector earnings are complex. Incentives differ between one country and the next, over time, between ministries, and among levels. There are myriad differences from one public sector to the next, and it would be less than fair were one to assume that earnings in any public sector were, by definition, lower than an individual's productivity.

7. The commonly heard argument is that wage structures are inherited and therefore deficient. This assumes either that the pre-Independence wage structure did not reflect differences in marginal value or that when Africanization occurred somehow there were markedly fewer distinctions in African skills, i.e. that something was lost in the transition.

8. In this sample the non-response rate is small (22%). A bias in results could be suspected if characteristics commonly associated with lower earnings were more prevalent among non-respondents than for the rest of the sample; but this does not appear to be the case. Non-respondents had a higher level of parental education than the rest of the sample (8.9 vs 8.3 on a 30-point scale). Exactly the same portion of non-respondents were female, attended boarding schools, and passed their examinations.

9. The lack of power of social status to predict earnings is not necessarily attributable to the social selectivity of secondary school enrolments, at least to the extent that those enrolments are determined by performance on entrance examinations. In low income countries improvised students frequently do as well on examinations as rich students; and this anomaly is not necessarily attributable to the structural determinants of who gets a chance to sit for those examinations (Heyneman and Loxley, 1983).

10. The taxation differential for each earning stream amounted to approximately 3% of the income — K5.75/year and K15.0/year. Thus K9.25 is taken as the taxation differential in the calculation of private returns.

11. Since unemployment is more closely associated with being a JCE leaver, in this case 'correcting' for unemployment lowers the rates of return.

12. Earlier returns were calculated on the basis of 4 (or even 6) years of secondary school vs 0 years of secondary school. The returns for Malawi are 4 vs 2 years of secondary school. If data were available for 4 years vs 0 years the returns would be higher.

REFERENCES

- Heyneman, S. P. and Currie, J. K. (1979) *Schooling, Academic Performance and Occupational Attainment in a Non-Industrialized Society*. University Press of America, Washington DC.
- Heyneman, S. P. (1980) *The Evaluation of Human Capital In Malawi*. Staff Working Paper No. 420. Washington DC.
- Heyneman, S. P. and Loxley, W. (1983) The impact of primary school quality on academic achievement across 29 high and low income countries. *American Journal of Sociology* **88**, 1162-1194.
- Ministry of Labour (1977) Tracer survey of school-leavers and students: report on the preliminary phase. Lilongwe, Malawi, mimeographed.
- Phelps-Brown, H. (1977) *The Inequality of Pay*. Oxford University Press, London.
- Psacharopoulos, G. (1972) Rates of returns to investment in education around the world. *Comparative Education Review* **16**, 54-67.
- Psacharopoulos, G. (1973) *Returns to Education: an International Comparison*. Elsevier, Amsterdam.
- Psacharopoulos, G. (1979) On the weak versus the strong version of the screening hypothesis. *Economic Letters* **4**, 181-185.
- Smyth, J. and Bennett, N. (1976) Rates of return on investment in education: a tool for short-term educational planning illustrated with Uganda data. In *The World Year Book of Education*. Evans Brothers, London.
- Thias, H. H. and Carnoy, M. (1972) *Cost-Benefit Analysis in Education: Case Study of Kenya*. International Bank for Reconstruction and Development, Occasional paper No. 14. Washington DC.