Overview of Educational Expansion, Productivity and Inequality: A Comparative Analysis of the East African Natural Experiment

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December 1986

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OVERVIEW OF EDUCATIONAL EXPANSION, PRODUCTIVITY AND INEQUALITY: A COMPARATIVE ANALYSIS OF THE EAST AFRICAN NATURAL EXPERIMENT

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An overview is provided of a research project comparing the restrictive policy for secondary education in Tanzania with the more expansionist policy in Kenya. This "natural experiment" is exploited, by means of specially designed urban labor market surveys, to examine the relationship between secondary education or its expansion and, in turn, labor productivity, the structure and inequality of pay, and educational access and intergenerational mobility. The two policy regimes are evaluated and more general policy implications are drawn out.
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EXECUTIVE SUMMARY

EDUCATIONAL EXPANSION, PRODUCTIVITY AND INEQUALITY IN EAST AFRICA.

by J.B. Knight and R.H. Sabot

Kenya and Tanzania, contiguous countries at roughly the same level of economic development, have pursued educational policies that are similar in various respects: both are close to their objective of universal primary education and both have fewer than one per cent of the relevant age group in tertiary education. They differ sharply, however, in their policies for secondary education. The secondary enrollment ratio in 1980 was 25 percent in Kenya but only 4 percent in Tanzania. Which has been economically more beneficial - the Kenyan policy since independence of rapidly expanding secondary enrollment in government schools and permitting community schools to mushroom, or the Tanzanian policy of restraining the growth of public and private secondary enrollment for financial and manpower planning reasons?

This research project, funded by the research side of the World Bank, explores the 'natural experiment' by means of specially designed urban labor market surveys, providing rigorously comparable microeconomic data sets for Kenya and Tanzania in 1980. Information was collected on the income, on the employment history and the educational history of workers, on their cognitive skill and reasoning ability (using specially designed tests), and on the education of their parents and children.

In East Africa, as in other developing countries, pay is strongly positively correlated with years of schooling: the earnings premium for
secondary education is large in both Kenya and Tanzania. The conventional method of estimating social rates of return to education simply assumes that the higher pay reflects the productivity of education. It is plausible, however, that the higher pay may be due to the higher natural ability that the educated on average possess or to payments for education irrespective of its contribution to productivity. The information on cognitive skills and reasoning ability permits a test of the 'human capital' theory against these rival 'screening' and 'credentialism' theories. It provides strong support for the human capital interpretation of the education-wage relationship in both Kenya and Tanzania. Analysis of the test scores suggests that the quality of education is also higher in Kenya. The difference between the two countries in the quality and quantity of secondary education accounts for a high proportion of their difference in the mean earnings and productivity of labor. The opportunity cost of constraining the quality and quantity of secondary education in Tanzania has been substantial.

The expansion of secondary enrollment is shown to be an effective means of compressing the widely dispersed wage structure that both governments inherited. This comes about mainly through the 'filtering-down' of educated entrants to the labor market into less skilled jobs. The containment of secondary enrollment in Tanzania has necessitated a public sector pay policy to curb the scarcity rents that would otherwise accrue to the educated. This explains why the social rate of return to secondary education, although estimated to be high in both countries, appears to be no higher in Tanzania, despite its shortage, than in Kenya. Thus one policy intervention - in the market for education - begets another - in the market for labor. The increase in the proportion of workers with secondary education initially widens the inequality of pay among individuals but the
'compression effect' on wage structure is shown to outweigh this 'composition effect'.

Now that universal primary education has been effectively achieved in both countries, even the children of the poor and uneducated, who were once excluded, receive a basic education. Both governments have shown their concern for equality of opportunity to enter secondary education: they heavily subsidize government secondary schools and ration the scarce places on the basis of meritocratic criteria. One reason for the Tanzanian restrictions on private enrollment is the view that those who can afford to pay should not be at an advantage.

Despite these policies, family background confers powerful advantages in academic competition, in East Africa as in other countries. This means that it is primarily the children of the poor and uneducated who are excluded by the quantitative restrictions imposed by the Tanzanian government. Here is another example of a government intervention having unforeseen side-effects and producing an outcome the opposite of what was intended. An educated elite is in the process of perpetuating itself in Tanzania. The greater expansion of the secondary system in Kenya has resulted in far less inequality of access at that level. Yet relative intergenerational mobility is not greater in Kenya: social differentiation occurs on exit from the secondary and on entry to the tertiary level of education, and this continues to order the labor market by family background.

The private rate of return on secondary education is far higher in government than in private community schools in Kenya. These high private returns, the willingness of parents to pay for secondary education, and the favorable family background of most government school pupils constitute a
good case for reducing subsidies by increasing school fees in government schools, while simultaneously introducing a need-based scholarship scheme. The same policy can be recommended for Tanzania, particularly as budgetary constraints have shared the blame for the slow expansion of the government secondary system.

The general conclusion is that the Kenyan policy regime is to be preferred both according to efficiency criteria and, ironically, according to the distributional criteria on which the Tanzanian government places much weight. Indeed, in the 1980s there has been a revision of Tanzanian policy in an expansionist direction, partly because political pressure for secondary expansion has increased as the number of primary-completers has grown. The analysis does not provide clear guidance as to the future rate of expansion of the Kenyan secondary system. That would require a study of the value of secondary education to self-employed farmers.
1. INTRODUCTION

This report, prepared as a background paper for the Africa Education Strategy Study, is based on the results of a large research project, funded by the World Bank, which has been conducted by the authors. A number of research papers have been written, some of which have been published, and a book with almost the same title as this overview is in the final stages of preparation. The references below are generally to the papers, all of which are available on request, rather than to the book.

The report is arranged as follows. Section 2 reviews the issues that will be addressed. Section 3 discusses the research design. Section 4 examines the relationship between educational expansion and labor productivity. Section 5 switches to the effect of educational expansion on the structure and dispersion of pay. Section 6 looks at inequality of educational opportunities and the effect on this of educational expansion. Section 7 is concerned with various methodological and policy issues in the cost-benefit analysis of education. Section 8 draws conclusions for policy.
2. THE ISSUES

This report is concerned with the educational expansion that normally occurs as an economy develops. The objective is to analyse the various consequences of educational expansion both for productivity and for inequality, that is for the growth of income and its distribution.

The positive correlation, observed across countries at one time and in countries over time, between educational enrolment ratios and output per head does not establish causation. How much is education an investment good that increases labor productivity and contributes to economic growth, and how much is it a consumer good increasingly demanded as incomes rise? The answer is important for government policies towards public and private spending on education. On average in developing countries government spends some 3 per cent of GNP on education, and it has generally been government policy to increase this proportion. This can be seen in Table 1, which also shows the rise in enrolment ratios over two decades. These trends are often to be explained in terms of government response to rent-seeking pressures for subsidised education, but the case for subsidies is normally expressed in terms of the social returns to education being greater than the private returns or the private demand being constrained by capital market imperfections. The issue of subsidies is now more pressing than it was two or three decades ago when subsidy programs were small or were being introduced. With slower economic growth and tighter budgetary constraints in the 1980s, spending on education faces greater competition from other claims.
### Table 1

**Educational Expansion in Developing Countries**

<table>
<thead>
<tr>
<th>Category of countries:</th>
<th>Low-income</th>
<th>Middle-income</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>all</td>
<td>excluding China and India</td>
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<tr>
<td>Number of countries:</td>
<td>34 32</td>
<td>60 39 104</td>
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</thead>
<tbody>
<tr>
<td>Central government expenditure per capita (1975 dollars)</td>
<td>3 3</td>
<td>20 15 25</td>
<td>6 3</td>
<td>27 16 42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central government expenditure (percentage of GNP)</td>
<td>3.0 1.1</td>
<td>2.9 3.4 2.6</td>
<td></td>
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<td></td>
<td>80 37</td>
<td>75 66 88</td>
<td>93 70</td>
<td>100 98 104</td>
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2.1 Labor Productivity

What support is there for the propositions that education raises productivity and that more resources should be diverted to education? The empirical evidence comes from accounting exercises and rate of return studies. Crude output accounting exercises have suggested that more than half of the difference in income per head between high- and low-income countries is due to differences in endowments of human capital (for instance, Krueger, 1968). A survey of rate of return estimates in 44 countries has found that social rates of return to education are generally competitive with returns to investment in physical capital (Psacharopoulos, 1981).

Such estimates, using the standard methodology, need not be good guides for public resource allocation. At the heart of the problem is the standard use of wage differences between educational levels as a measure of the effect of human capital acquired in school on the productivity of workers. The rate of return to education is high because the wage premium earned by more educated workers is large. An alternative to the human capital hypothesis posits that the premium on education measures the effect of native ability or motivation on the productivity of workers, an effect that schools pick out but do not augment. Another hypothesis posits that the structure of wages by education is institutionally determined and that the more educated earn more on account of their higher credentials. The implication of these criticisms is that, whereas the private return may be high, estimates of the social return on investment in education and the contribution of education to growth are biased upwards. In this research project we examine these issues using new data and new methods.
2.2 Income Distribution

There is another justification for the subsidisation of education by government. It is that educational expansion, by making human capital more abundant, will reduce inequality in the distribution of pay. Perhaps three-quarters of the inequality of income in industrialised countries can be explained by the inequality of earnings from employment (Blinder, 1974, Phelps Brown, 1977). In developing countries the contribution of the inequality of pay to total inequality is smaller, but the inequality of pay is greater and, with the growth of wage employment, its contribution to total inequality is increasing.

Simple two-sector models have been widely used to explain the well-known tendency for the inequality of income first to increase and later to decrease as economic development occurs (Kuznets, 1955, Robinson, 1976). The transfer of workers from a large low-income sector to a small high-income sector is likely to increase inequality, which declines only when the proportion of workers in the high-income sector reaches a minimum size. This notion can be applied also to the wage labor market, comprising educated and uneducated workers. The expansion of the educated group increases the proportion of educated workers, and this 'composition effect' is likely initially to increase inequality. However, educational expansion can be expected to produce a countervailing 'compression effect'. The tendency for educational expansion to compress the educational structure of pay has been perceived to operate powerfully over the decades in industrialised countries (Phelps Brown, 1977, pp. 81-9), and it has been singled out as an important policy tool for narrowing pay differentials (Lydall, 1968, pp. 254-66). In many developing countries the supply of educated workers is growing faster in relation to wage employment.
opportunities than has been the case in the industrialised countries. This suggests that the compression effect could outweigh the composition effect.

The compression effect relies on the operation of market forces. Whether labor markets in developing countries can adjust the educational structure of pay to large and rapid increases in the supply of educated workers is a matter of concern. The public sector accounts for a much larger share of wage employment in most developing economies than in the industrialised market economies. It is common to find more than half of all wage-earners working for the government and parastatal bodies. The dominance of the public sector, particularly in the market of educated labor, means that it need not act as a price-taker: public sector wages are often influenced by bureaucratic or political considerations, the former associated with internal labor markets and the latter with distributional, fiscal and employment goals. Thus the educational structure of pay in the public sector may be unresponsive to market forces, and rapid educational expansion may fail to compress wages, perhaps instead increasing unemployment among the educated. In this research project we examine the effect of educational expansion on the inequality of pay, distinguishing composition and compression effects and the influence of market and non-market forces.

2.3 Intergenerational Inequality

Educational policy is also relevant to another dimension of inequality, i.e. the distribution of income among families from one generation to the next. A further justification for subsidising education is the belief that the ability to pay school fees should not determine the distribution of school places. Because parents who are well-educated and
have high incomes are better able to afford school fees or to finance them from savings or borrowing, educational access in an unsubsidised system tends to be biased in favor of their children. Thus socioeconomic status may be perpetuated from one generation to the next. Many studies have found differential educational attainment by socioeconomic background (see, for instance, OECD (1971) and Coleman et al (1966) for developed countries and Behrman and Wolfe (1982) and Birdsall (1982) for less developed countries).

Equality of educational opportunity can be justified on the grounds of equity, being commonly regarded as the hallmark of a just society. It can also be justified on the grounds of efficiency, if more able workers can use their schooling more productively. However, a combination of subsidies and meritocratic selection criteria may not be sufficient to ensure equality of educational opportunity. Higher quality of preparatory schooling, better training in the home, or other advantages may enable children from families of high socioeconomic status disproportionately to satisfy meritocratic selection criteria. In that case, inequality in educational access will persist and those best able to meet the costs of their children's schooling will benefit disproportionately from the subsidies.

There is another way in which the subsidisation of education can promote equality in the distribution of school places. Subsidisation increases demand and, if this can be effectively translated into pressures for greater public provision, generates educational expansion. If most of the children from high socioeconomic backgrounds gain access when the system is small, an expansion of the system may disproportionately increase the access of children from less privileged backgrounds. And yet it may do little to increase intergenerational mobility, measured in a relative sense. Children from privileged backgrounds can protect their status by taking
their education a stage further or, among workers of the same educational attainment, those with superior socioeconomic backgrounds may continue to be more successful in the labor market. This pattern could result from discrimination or from differences in productivity which again stem from better quality of schooling or training in the home. Our data permit us to explore the effects of educational expansion on the intergenerational dimension of inequality, which has been little studied by economists.
3. RESEARCH DESIGN

3.1 The Natural Experiment

Experiment in the natural sciences involves varying particular causal factors in a controlled way while holding other exogenous factors constant, and studying the effects. The best equivalent experiment that can be done in the social sciences is to seek out and compare situations in which the combinations of relevant factors vary whereas other conditions remain roughly the same. Where the causal factor of interest is economy-wide, as in the case of the relative abundance of human capital, the situations to be compared should represent either different periods or different countries. For instance, a comparison might be made of a country before and after a rapid expansion of education, or of two countries with different relative stocks of educated labor. In either case the economies to be compared should be as similar as possible in all other relevant respects.

A study of this kind would represent a 'natural experiment', as opposed to the controlled experiment of the physical sciences, in the sense that the researcher cannot control what goes on: the situations being observed are the outcomes of interactions among economic agents including government. It would be an experiment, as opposed to a conventional econometric analysis, in the sense that there are too few observations to isolate the influence of each variable by statistical means. Economists frequently use natural experiments as a method of argument, but usually in an informal way. Among the more systematic cross-country studies are Chenery and Syrquin (1975) on patterns of development and Little, Scitovsky and Scott (1970) on industrialisation policies. However, the methodology is
rarely developed with the precision that we have attempted in this research project.

Kenya and Tanzania provide a 'natural experiment' in secondary education. The two countries are similar in size, colonial heritage, resource endowment, structure of production and employment, and level of development. Nor do technical conditions or physical capital intensity differ much for their urban wage economies. Both achieved their independence in the early 1960s, inheriting administratively similar but very undeveloped educational systems and negligible stocks of indigenous educated manpower. Today, however, they differ markedly in one dimension of the supply of educated manpower: secondary schooling. Primary education in both countries is nearly universal; tertiary enrolments remain at less than 1 percent of the relevant age group. But in Kenya, with a slightly smaller total population, the secondary-school (Forms I-IV) enrolment ratio was 25 per cent (410,000 pupils) in 1980, and in Tanzania it was 4 per cent (67,000 pupils). In a graph of the relationship between the secondary-school enrolment ratio and national income per head, Kenya is roughly at the level predicted for its income per head whereas Tanzania is well below the line (Figure 1).

(i) Policies on Secondary Education

This difference in secondary enrolments is due largely to differences in public policy on secondary education rather than to differences in private demand. In both countries the government has satisfied only a small part of the demand for places at government secondary-schools. Places are accordingly rationed on meritocratic criteria, principally performance in the nationwide primary school-leaving examination. The rationing is partly due to budgetary constraints:
government secondary schools are highly subsidized in both countries. In addition, the governments of Kenya and Tanzania have paid heed to early manpower planning exercises which suggested that the private demand for government school places, inflated as it is by the subsidies, is a poor guide to the socially optimal supply of secondary school-leavers. East African manpower planners have repeatedly warned of the dangers of too rapid an expansion of the secondary school system: workers overeducated for their jobs, unemployment of the educated, and wasted scarce resources.

In Kenya secondary enrolment increased by 17 percent per annum, from a mere 30,000 in 1963, the year of independence, to 410,000 in 1980, the year of our survey. Enrolment in 1980 was divided between 'maintained and assisted', i.e. government, schools (43 percent), assisted 'harambee', i.e. self-help, schools (20 percent) and unassisted harambee and private schools (37 percent). The proportion of funding from public sources ranged from 53 per cent in the government schools, to 18 per cent in the assisted harambee schools, to zero in the rest; the overall weighted share of public funding being 25 percent (Wolff, 1984, Table 6). Government attempted to restrict the growth of enrolment in government secondary schools, particularly after 1974: it expressed both budgetary concern and fears about the 'school-leaver problem' (Government of Kenya, 1974, pp.404-5). However, harambee and private schools responded to the demand for secondary schooling by Kenyan children unable to get into government schools but able to pay the higher fees; enrolment in these schools grew rapidly. Moreover, the burgeoning harambee movement had implications for the government sector. In response to political pressures, government took over some harambee schools and partly subsidised some others.

From 1963, when the number was a mere 17,000, secondary school
enrolment in Tanzania grew by 8 percent per annum to a total of 67,000 in 1980 (Cooksey and Ishumi, 1986, Table 2.4). In that year 58 percent of secondary school pupils were in government schools: there were few community schools in Tanzania corresponding to the harambee system in Kenya. Public finance represented 86 percent of the total cost of attending government secondary school and there was no subsidy in private schools (Wolff, 1984, Table 6). The share of government finance overall was therefore 50 percent. Enrolment in the government schools increased by only 20,000 between 1963 and 1980, and stagnated entirely in the last five years of the period. This was partly because of a budgetary constraint, particularly tight after the decision was made in 1974 to move rapidly to universal primary education. Of no less importance, however, was the influence of manpower planning. The government accepted that postprimary education should not be expanded beyond the 'requirements' of the economy as gauged by existing input-output relationships. The government also constrained the growth of the private secondary system, first by precluding private schools (there was none until 1965) and then by imposing highly restrictive regulations on their establishment and operation. The government appeared to be concerned not only about the possibility of wasteful 'over-production' but also about maintaining educational standards and about the distributional implications of a system catering for those who could afford to pay for their education. Despite these constraints, the private sector responded to the demands of those unable to enter government schools and grew beyond the limits recommended by the manpower planners. However, in contrast to Kenya, the private market for secondary education in Tanzania remained in disequilibrium.

Policies on secondary education have thus diverged sharply in the
two countries, in regard both to highly subsidised government schools (Kenya providing 4.6 places for every one in Tanzania) and to private schools (Kenya permitting 8.3 times as many places). In 1980 Kenya had 6.1 times the secondary enrolment of Tanzania. By that year the diverging educational policies had generated an important difference between the two countries in the educational composition of their urban wage labor forces. This natural experiment provides an opportunity for answering some important questions. By examining the markets for labor and for education, we can estimate the effects of this divergence on income and its distribution, and evaluate the relative merits of Kenya's more responsive and expansionary secondary educational policy regime and Tanzania's more interventionist and restrictive regime.

3.2 The Surveys

(i) Survey Objectives

One cross-section cannot be used to analyze the effect of a change in factor endowments. To conduct comparative static analysis of educational expansion, at least two cross-sections are needed. Comparisons across time require observations that are some years apart, a problem which could be overcome by conducting a single survey that generated retrospective data, but such data generally suffer from biases in sample selection and from problems of respondent recall. The remaining practical course is to analyze cross-sections from two or more countries which differ in the abundance of human capital.

To exploit the possibilities arising from the natural experiment in Kenya and Tanzania, we had to generate new data. To measure the effects of the differences in the size of the secondary education systems, the data had
to be rigorously comparable if the question of how much an observed
difference in behavior was due to differences in sample design or variable
definition was not to cast doubt on the comparisons. Although various
existing sets of microeconomic data in Kenya and Tanzania could shed some
light on the issues we wished to explore, no two were rigorously comparable
and none specifically designed for the purpose. Our surveys have many
variables measuring respondent characteristics that are not available
elsewhere, either at all or in sufficiently disaggregated form, or are not
available in the same data set with other variables essential to the
analysis. We provide three examples of the uses to which our data sets can
be put.

First, our measures of respondents' reasoning ability and cognitive
skill provide the basis for estimating a simple recursive model of
educational attainment, cognitive skill, and earnings. This model allows us
to adjudicate between the human capital, screening and credentialist
interpretations of the link between educational attainment and earnings.
These measures also provide a basis for assessing, by means of output
accounting, how far the differences in labor productivity between Kenya and
Tanzania can be attributed to differences in their educational policy
regimes.

Second, our skill-based occupational classification of respondents
and other measures of the characteristics of respondents and their employers
enable us to examine the detailed structure of wages in the public and
private sectors. Simulations of these structures are then used to assess
how much of the difference between Kenya and Tanzania in the wage premium
to secondary education was due to differences in relative demand for
secondary-leavers, how much to differences in public sector pay policy, and
how much to the greater supply of secondary-leavers in Kenya.

Third, the educational history and family background of each respondent permit us to conduct a comparative cost-benefit analysis of investment in private and government secondary schools. This analysis helps us to assess the consequences, for both efficiency and equity, of government subsidies in secondary education.

(ii) Survey Design

In designing the surveys we made the basic judgement that the comparison of Kenya and Tanzania should focus on the economically active stock of graduates from secondary schools. In both countries this stock is concentrated in the urban wage sector. That is basically why we chose establishment surveys of urban wage employees. Several related factors reinforced the decision for an establishment rather than a household survey. Much of the analysis pertains to behavior at the workplace. Such data are best generated at the workplace: they are likely to be more accurate than similar data from household surveys because confirmatory information can be (and was) obtained from the employer. Moreover, secondary-leavers make up a much higher proportion of wage employees than of the urban population. The sample of an urban household survey would therefore have to be many times larger than that of an establishment survey to obtain an equally large sample of employees with secondary education. For this reason and because of the lack of readily available sampling frames and the greater geographic dispersion of respondents, a household survey would cost much more than an establishment survey.

The disadvantage of an establishment survey is its lack of comprehensiveness. Although our sample represents the urban wage labor force and the great majority of secondary-school leavers, it does not
include secondary-leavers who are out of work or the small number who work elsewhere. It was therefore not possible to analyze the effect of educational expansion on unemployment, on participation and earnings in self-employment, and on labor force participation. These issues, while of interest in East Africa, are of relatively low priority. Other sources indicate that labor force participation rates of secondary-school leavers are very high in East Africa and that their rates of unemployment and self-employment are very low.

Sample selection bias poses a potential problem for any urban wage labor survey. For instance, if the urban wage labor force, and therefore our sample, is selective of the most accomplished secondary-school leavers, estimates of the effect of secondary schooling on productivity may be biased upward. However, because such a low proportion gains access to urban wage employment, selectivity among primary-school leavers is likely to be greater than among secondary-school leavers. Since our assessment of productivity benefits is based on a comparison of the relative performance of these groups, any net bias is likely to be downward. The effect of such bias is to strengthen the conclusions that we draw.

The positive link between family background and educational attainment is at the core of our analysis of the effects of educational expansion on educational access and on intergenerational mobility. Such a relationship could be biased upward by the fact that the mean level of educational attainment in our sample of urban wage employees is higher than the educational attainment of the entire labor force. However, because the uneducated children of the uneducated are underrepresented in our sample, the estimate of that relationship is likely to be biased downward, so strengthening our argument. More generally, it turns out that the sample
selection bias inherent in our surveys does not pose serious problems of interpretation.

In sum, to be comprehensive, a household survey of the entire national—urban and rural—population would be required. Such a survey, prone to greater measurement error of key variables, would cost much more than an urban establishment survey. Given the aims of our analysis and the conditions in East Africa, the incremental benefits of the larger undertaking would have been small. The expected net returns to an urban establishment survey therefore far exceeded those to an urban or national household survey.

(iii) Survey Administration

The respondents of the Kenya and Tanzania Surveys of Wage Employment and Education were randomly selected from the wage labor forces of Nairobi and of Dar es Salaam. The surveys were confined to the capital cities because previous labor market survey work had suggested that a capital was not unrepresentative of urban areas in respect of relevant wage-employment characteristics. First, a sample of establishments stratified by size and sector was randomly drawn from a frame provided by the central statistical bureau in each country. Then, in each establishment a random sample of employees was drawn from a complete list of employees provided by the employer. The result was a representative sample of urban wage employees containing nearly 2,000 respondents in each country.

Teams of university students, trained and supervised by the authors and other researchers, administered the questionnaires and tests to the respondents in 1980. The questionnaires pertained to the demographic

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1See Sabot (1979), which compared Dar es Salaam with other towns in Tanzania.
characteristics and family background of respondents, their education and training histories, their current and previous earnings, their experience in current and previous jobs, their links with rural areas, and the education of their children. Reasoning ability was tested by using "Raven's Progressive Matrices." Widely used in developing countries, this test involves matching pictorial patterns, for which literacy and numeracy provide no advantage. The tests of literacy and numeracy were designed by the Educational Testing Service of Princeton for these surveys. The designs were based on questions in national primary-school leaving and Form IV examinations and on other guides to the content of the academic curriculum, which is much the same in Kenya and Tanzania, except that the use of Kiswahili is stressed more in Tanzania; questions were set in both English and Kiswahili for respondents to choose the language they preferred. The sum of the scores on the literacy and numeracy tests is the measure of cognitive skill.

Two other features of the sample should be noted. First, in both countries respondents are from all sectors of the urban wage economy — manufacturing, services, and commerce — but a disproportionate number are employed in manufacturing. This oversampling, which in the aggregate analysis was adjusted for by using appropriate weights, permitted detailed comparisons of the manufacturing sector subsamples of the 1980 surveys with a similar survey of wage employees in manufacturing that Sabot had conducted in Dar es Salaam in 1971. These comparisons add an intertemporal dimension to the cross-country analysis of educational expansion. Second, the questionnaires were administered to all respondents, but only a stratified subsample of respondents were given the tests of reasoning ability and cognitive skills. The subsamples for each country comprise some 200
respondents who had left formal education after precisely completing primary (Standard VII) or secondary (Form IV) school. The cost of administering the test was high, as was the risk associated with the expected benefits from this feature of the surveys. With hindsight, the added benefit of increasing the size of the subsamples would have outweighed the cost.
4. EDUCATIONAL EXPANSION AND LABOR PRODUCTIVITY

Does educational expansion yield social benefits in the form of increased production or are the benefits only private and redistributive? In this section we summarise our attempt to adjudicate among the 'screening', 'credentialist' and 'human capital' interpretations of the relation between education and earnings. We focus initially on the relationships which we found to be similar in the two countries. Focus is then shifted to the differences between them in educational policy and the effect of these differences on labor productivity.

4.1 Similarities in Relationships and Outcomes

In cost-benefit analyses of education, the relationship between wages and years of education (shown as B in Figure 2) is used to measure the social benefit of education. The assumption is that relationship B measures the effect of human capital acquired in school on labor productivity (relationship A). For B to be an accurate proxy for A, however, neither ability nor years of schooling should have an independent influence on wages (relationships C and B). Ability and years of schooling must influence earnings only indirectly, by raising the level of skills acquired in school. They must work through the educational attainment function (E) and the educational production function (D and F), which summarize in general terms the relationships between the inputs and outputs of the educational system.

The theory of "screening" predicts that the influence on productivity of ability will be large relative to the influence of skills acquired in school. Taken to its extreme, the theory posits that schools
simply identify the potentially more productive, and do not enhance the productive capacity of their students. In the figure, then, E and C are the operative links and B simply captures the effect of C. Educational attainment "signals" workers with more ability and, because ability raises productivity, is rewarded with higher earnings.

The loose amalgam of hypotheses generally known as "credentialism" is a more radical rejection of the human capital interpretation of the education-wage link. According to this view, schools provide students with a credential which is personally valuable but not productive. Educational qualifications are rewarded irrespective of their economic value. For instance, a government may determine wages and establish education-based hiring and payment criteria, or private employers may discriminate in favor of the educated because they share similar socioeconomic backgrounds. The implication is that relationship B is not a proxy for either A or C and E. It is a measure of the independent effect of the number of years of schooling on earnings.

As conventionally measured, the social benefit of education and its contribution to economic growth may be biased upwards if the screening or credentialist interpretations contain some truth. Our means of adjudicating among the hypotheses is to measure all six relationships in Figure 2, and not just relationship B. Our data sets were designed to make this possible. The econometric analysis involves the estimation of a system of equations comprising educational attainment functions (measuring E), educational production functions (measuring D and P), and expanded human-capital wage functions (measuring A, B, and C). The work has been published in Boissiere, Knight and Sabot (1985).
(1) Cognitive Skills and the Educational Structure of Wages.

The wage functions allowed us to weigh the relative direct contributions to the structure and variance of earnings of reasoning ability, years of schooling, and cognitive skills. The results show that the direct returns to reasoning ability in the labor market are small and the returns to years of schooling are moderate. But the returns to cognitive achievement are large. They are not significantly lower among manual than among nonmanual workers, and among primary- than among secondary-school leavers. Presumably this is so because accomplishment in the basic skills of literacy and numeracy increases the productivity of technicians, machinists, and forklift drivers as well as that of accountants, clerks, and secretaries.

To illustrate these results, various simulations using the estimated wage functions were conducted. One such simulation shows that differences in reasoning ability account for little of the large gap in mean wages between primary- and secondary-school leavers. The direct returns to ability in the labor market are so low that giving primary-leavers the ability levels of secondary-leavers (while leaving their cognitive skill levels unchanged) would increase their earnings by less than 7 percent in Kenya and by less than 4 percent in Tanzania. Giving primary-leavers four more years of schooling (without altering their ability or achievement) would increase their earnings, by 19 percent in Kenya and 13 percent in Tanzania. Differences between primary- and secondary-school leavers in cognitive achievement account for the largest proportion of the wage gap. Giving primary-leavers the cognitive skills of secondary-leavers (without altering their other characteristics) would increase their earnings by 25 percent in Kenya and 15 percent in Tanzania.
There is much variation in cognitive skill and in reasoning ability within the two educational groups. Among Kenyan primary-leavers, the score of the bottom 10 percent on our test of reasoning ability is 11 out of a possible 36, while that of the top 10 percent is 34. The range of cognitive skill is from 13 out of a possible 63 for the bottom 10 percent to 52 for the top 10 percent. Among Kenyan secondary-leavers the corresponding ranges are 17 to 35 on the ability test and 28 to 56 on the cognitive skill tests. In Tanzania the ranges are similarly broad. Moreover, in both countries the reasoning ability and cognitive skill distributions of the primary- and secondary-leavers overlap considerably.

A second set of simulations indicates that the predicted earnings of primary-leavers of high ability are less than the predicted earnings of less able secondary-leavers. In neither country is being among the brightest of your peers a sufficient condition for successful performance in the labor market. The results of a similar simulation, this time with cognitive skills, are quite different: in each education group high-achievers earn much more than low-achievers, and the predicted wage of primary-leavers who scored in the top third is nearly as high as that of secondary-leavers who scored in the bottom third. In both countries, it would seem, how much you learn in primary- or secondary-school has a substantial influence on your performance at work. Mere attendance at secondary school is no guarantee of higher wages: it is necessary to learn your school lessons.


A strong relationship between earnings and employment experience is an almost universal characteristic of the structure of earnings, a characteristic normally explained as the result of skill acquisition in the labor market. Kenya and Tanzania follow this rule: in both countries
earnings rise steeply with employment experience. Standardizing for other characteristics, a worker with 10 years of experience is found to earn a premium relative to labor market entrants of 57 percent in Kenya and 56 percent in Tanzania.

Our interest is in the relationship between educational attainment and the returns to employment experience. In poor and rich countries alike, it is generally found that earnings rise more rapidly with experience the higher is the level of education. Kenya and Tanzania typify this pattern. The rate of increase of earnings per year of employment experience is roughly 2 percent greater among secondary- than among primary-leavers in Kenya and 1.5 percent greater in Tanzania. This is relevant to educational policy formation because the difference in the present value of the lifetime earnings streams of primary- and secondary-leavers is conventionally taken a measure of the gross social benefits from investment in secondary schooling. In Kenya roughly 90 percent of this difference is accounted for by the higher returns to experience of secondary-leavers; in Tanzania more that 100 percent is so accounted.

Human capital theory provides an explanation for the positive interaction between educational level and the returns to experience: investments in schooling and in postschool training are complementary. The more education workers have received, the greater will be their cognitive skill. The more cognitive skill they have acquired, the greater will be the vocational skills acquired over their working lives, both because they are likely to devote more time to training and because their higher level of cognitive skills permit them to derive more from training. The greater the accumulation of vocational skills, the steeper will be the earnings-experience profile.
Screening theory also provides an explanation: there could be an association between investments in schooling and in vocational training simply because they have ability in common. There is also a credentialist explanation: the educated have higher returns to experience because they are more likely to have white-collar jobs in which earnings rise with tenure of the job, irrespective of any increases in skills and productivity. Again, how much of the private benefits of investment in secondary schooling should be included among the social benefits will depend on the choice of interpretation.

Our expanded human capital earnings functions permit a simple test of these competing explanations for the interaction between education and returns to experience (Knight and Sabot, 1985b). The human capital explanation predicts that the returns to experience will be higher for workers with higher cognitive skills, even among those with the same education. Furthermore, it implies that the higher returns to experience of secondary-leavers are due to their higher cognitive achievement. The predictions yielded by the credentialist explanation are different. Because the returns to experience are tied by institutionally determined wage structures to educational credentials, secondary-leavers have the same returns to experience irrespective of their level of cognitive skill. Since the same is held to be true of primary-leavers, the difference in cognitive skills between the two educational groups cannot be responsible for their difference in returns to experience. Our test therefore entails two questions. First, is there a positive relationship between cognitive skills and the returns to experience for workers with the same education? Second, is the difference in cognitive skills between primary- and secondary-leavers sufficient to explain their difference in returns to experience?
The results of our analysis indicate, for both primary- and secondary-leavers, that the returns to experience vary positively with cognitive skill. For example, among Kenyan secondary-leavers with ten years of experience, the return to experience is 4.7 percent a year for those whose score on our tests of cognitive skill is at the mean of the bottom third and 9.9 percent a year for those whose score is at the mean of the top third. These results also suggest that the difference between primary- and secondary-leavers in cognitive skill is responsible for their different returns to experience. We conducted simulations in which the mean cognitive skill of secondary-leavers was reduced to that of primary-leavers, and traced the effect on their returns to experience and consequently on the present value of earnings. As predicted by human capital theory, a big part of the difference in the present value of earnings between the two educational groups in East Africa is due to the influence on the returns to experience of the higher cognitive skills of secondary-leavers.

We conclude that more skills of one type beget more skills of the other. This implies that, as has conventionally been done, it is legitimate to include among the social returns to schooling that part of the returns that arises from the interaction between education and the returns to experience.

(iii) Cognitive Skills and the Variance in Earnings.

The relative importance of the effects of reasoning ability, cognitive skills, and years of schooling on the dispersion of earnings can differ from that of their effects on the wage structure. For example, though high levels of cognitive skill have a large positive impact on earnings of the individual worker, variance in cognitive skill might nevertheless contribute little to the inequality of pay if the group of
highly skilled workers is small or if its members are evenly scattered over the earnings distribution. What, then, would be the effects on the inequality of pay if, while mean earnings were held constant, the dispersion due to a particular characteristic such as cognitive skill was eliminated?

Again, simulations with our estimated wage functions allow us to answer this question. The contribution to income variance of variance in the level of reasoning ability is small in both countries. Its small effect on the structure of earnings is part of the explanation. Moreover, in neither country are the more able highly concentrated in the highest quintiles of the distribution: the average ability of the lowest income quintile is not much less than that of the highest quintile. This reflects the substantial proportion of primary-leavers of high ability who do not gain access to secondary schools, for instance because of their relatively poor quality of primary schooling or training in the home, or limited secondary places in the past.

Differences in years of schooling contribute rather more to the dispersion of wages because of their relatively large effect on individual earnings and because the proportion of secondary-leavers in each earnings quintile rises with earnings. The contribution of years of schooling is greater in Tanzania than in Kenya, despite the higher wage premium on secondary education in Kenya. The proportion of secondary-leavers rises more steeply from low- to high-earning quintiles in Tanzania. This reflects the greater scarcity of Tanzanian secondary-leavers: the proportion of secondary-leavers in relatively low-paying manufacturing occupations is far higher in Kenya.

In Kenya cognitive skill accounts for three times more variance in earnings than do ability and years of schooling combined; in Tanzania, the
ratio is two to one. Not only are cognitive skills highly rewarded but also there are few highly literate and numerate workers, be they primary- or secondary-leavers, in the low-earnings quintiles. The predominant contribution made by cognitive skills suggests that inequality of pay is based primarily on inequality of individual productivity: the efficiency cost of reducing inequality may be high.

(iv) **The Indirect Effects of Ability and Schooling on Earnings**

Between two groups of employees of different reasoning ability, the more able group has higher earnings. What accounts for the difference? There are both direct and indirect effects. The direct effect operates through the greater competence of the naturally more able, for any given schooling or cognitive skill level. In East Africa reasoning ability has a small direct influence on earnings. The indirect effect of ability operates in two ways. First, other things being equal, the more able acquire more schooling and the higher earnings that go with it. Second, for any length of schooling, the more able are better at acquiring cognitive skills: that is, at learning their lessons. Our estimates of educational attainment functions and educational production functions measure these respective mechanisms.

An analysis of the relationship between ability and earnings for different ability groups shows that the largest single reason for the higher mean wage of the more able group was that they acquired more cognitive skills at secondary-school (44 percent of the difference in Kenya and 48 percent in Tanzania). Greater access to secondary-school by the more able was an important cause of their higher earnings (accounting for 32 per cent of the higher wage in Kenya and 45 per cent in Tanzania). Most of this effect worked through human capital acquisition rather than credentialism.
Reasoning ability thus has an important influence on earnings but in these indirect ways.

It was also possible to distinguish the different effects of secondary-school attendance on earnings. The wage is raised directly by 21 percent in Kenya and 12 percent in Tanzania by secondary-school attendance on its own, i.e. by what we termed credentialism. The indirect mechanism combines the isolated effect of secondary-school attendance on cognitive skill level with the isolated effect of that higher cognitive skill on earnings. Their combination implies that human capital acquisition in secondary-school raises earnings by 25 percent in Kenya and 15 percent in Tanzania, both figures being larger than the corresponding credentialist effect. Thus the main effect of secondary school attendance on earnings is indirect, operating through the development of cognitive skills.

In sum, the returns to cognitive skills are a payment for human capital. Literate and numerate workers are more productive, and education and reasoning ability are valuable to workers mainly because they allow them to acquire skills that increase their productivity. Our analysis strongly supports the human capital interpretation of the education-wage relationship. These conclusions have generally satisfied the usual statistical tests. That they apply to both Kenya and Tanzania increases their robustness.

4.2 Differences Arising from the Natural Experiment

We have argued that the economic benefits of investment in secondary education are not just private. By increasing labor productivity, secondary education also yields social benefits. The similarity between Kenya and Tanzania in the relationship between education and labor productivity poses
another question. What are the consequences for labor productivity of the difference in the educational policy regimes of the two countries? This question can be posed in another way, familiar to those who have studied the attempts by economists to account quantitatively for the differences between countries in output per head or in rates of economic growth. To what extent does the difference between Kenya and Tanzania in human capital endowments, resulting from differences in educational policy regimes, account for the observed gap between the two countries in the productivity of wage labor? Judging by average wages, the difference between Kenya and Tanzania in productivity in the late 1960s was small, about 10 percent. By 1980 this difference had grown to roughly 50 percent, and use of an appropriate shadow price of foreign exchange would only increase this estimate.

It was in the late 1960s - following the Arusha Declaration and President Nyerere's application, in "Education for Self-Reliance", of its general principles to education - that major differences in educational policy emerged between the two countries. In Tanzania the priority accorded to the development of post-primary education gave way to the new priority of universal primary education. The difference between Kenya and Tanzania in secondary enrolment rates and in the stock of secondary-school graduates in 1980 can be traced to these changes in educational policies in Tanzania in the late 1960s.

1. Differences in the Quality of Education

"Education for Self-Reliance" involved not only a quantitative change in direction but also a qualitative change. Changes in the curriculum took place in Tanzania which were designed to change values and to teach vocational skills. Curriculum diversification diverted time from teaching general academic skills. The two countries have differed in
another respect. In Tanzania greater stress has been placed on teaching in Kiswahili at primary-school, perhaps at the cost of learning in English at secondary-school.

Our estimated production functions indicated that secondary school attendance contributes substantially to cognitive skill in both Kenya and Tanzania. They also provide an opportunity for comparing the quality of education in the two countries, as measured by cognitive 'output' per unit of schooling 'input' (Knight and Sabot, 1985a). The educational production functions show that, standardizing for the inputs, cognitive skill is higher in Kenya than in Tanzania and that it is more responsive to secondary schooling and to reasoning ability. Consider, for example, someone with the mean level of reasoning ability of the combined sample. If he attended secondary-school in Tanzania, his predicted level of cognitive achievement as measured by our tests would be 36, whereas if he attended secondary-school in Kenya, his predicted level would be 42, no less than 17 percent higher.

The foregoing results suggest that Kenyan secondary schools are indeed of higher average quality than their Tanzanian counterparts. The results do not allow us to determine, however, how much of this difference in quality is due to differences in curriculum, to greater managerial efficiency in Kenya, or to higher levels of such unmeasured inputs as the educational attainment of teachers, availability of textbooks, or provision of teaching facilities. Although educational spending per secondary student is higher in Tanzania than in Kenya, a higher percentage of that spending is on board and lodging. A markedly higher proportion of Tanzanian secondary students are enrolled in boarding school on account of the smaller secondary system in Tanzania. The possibility of achieving economies of scale
suggests a way of keeping down costs and keeping up quality as the secondary system is expanded.

We have seen that the quantity and quality of secondary education are substantially greater in Kenya than in Tanzania. We therefore expect the cognitive skill level of the average employee to be higher in Kenya. Whereas the average scores of Kenyans and Tanzanians on the reasoning test are essentially the same, we find that Kenyan employees are indeed more numerate and more literate than their Tanzanian counterparts. The combined achievement score for Tanzania, appropriately weighted according to the proportions of primary- and secondary-leavers in the Tanzanian urban labor market, is 30; whereas for Kenyans the corresponding score is 42, i.e. no less than 40 per cent higher.

(ii) Educational Policy Regimes and Labor Productivity

The results of the analysis with the expanded human capital wage functions, summarized above, show that workers who are more literate and numerate are more productive. Tanzania may thus have paid a price in terms of output foregone by restraining the growth of secondary education and reducing the quality of education for the sake of other goals. Our aim was to quantify this price and to apportion the contributions of the quantity and quality dimensions of Tanzania's policy regime. For this we used our estimated educational production functions to assess how much greater the cognitive skill of the Tanzanian labor force would be if, separately and in combination, the quantity and quality of secondary education were increased to the Kenyan level. Then we used our wage functions to assess the effect of these increases in cognitive skill on average wages (Knight and Sabot, 1985a).

We found that a simultaneous increase in quantity and quality would
increase the cognitive skills of Tanzanians by 31 percent and their earnings by 13 percent. The increases in the quality of education account for more than half the increase in the cognitive skill level of the labor force and in mean earnings. It seems that the opportunity cost to Tanzania of constraining the quantity and quality of education is substantial. Roughly 40 percent of the current difference in mean wages between the Kenyan and Tanzanian workers in our tested subsamples can be accounted for by the lower cognitive skill of the Tanzanian labor force. The divergence between Kenya and Tanzania in educational policy regimes appears to have been a major factor in their diverging mean earnings and productivity of labor over recent years.
5. EDUCATIONAL EXPANSION, GOVERNMENT POLICY AND THE STRUCTURE AND DISPERSION OF PAY

At the time of political independence in East Africa the stock of economically active citizens with post-primary education was remarkably limited. For instance, in 1962 there were only 4,700 candidates for the national secondary-school (Form IV) examination in Kenya, and 1,900 in Tanzania. With independence, citizens possessing post-primary qualifications were in extremely scarce supply. The wage premia they earned in the labor market were substantial. Wage differences associated with education were very large by international standards of comparison.

In the subsequent two decades the annual flow of secondary school graduates into the labor market grew rapidly, even in Tanzania. The annual growth of non-agricultural wage employment over those decades averaged 26,000 in Kenya and 7,000 in Tanzania, whereas there were 92,000 Form IV examination candidates in Kenya and some 18,000 in Tanzania in 1980. As the process of ousting all but the most highly qualified expatriates came rapidly to an end, so the initially very tight labor market for secondary-school graduates was progressively loosened.

5.1. Labor Markets in East Africa

In the theory of competitive markets, a reduction in the relative scarcity of a factor of production lowers its relative price. Whether secondary-school expansion will depress the premium on secondary education depends on the nature of the labor market in East Africa. Are there institutional factors at work which might prevent or retard the operation of
market forces? Our ultimate concern in this section is with the effect of secondary expansion on the structure and dispersion of pay. Our first task, however, is to understand how the labor market works in East Africa. Our focus is on two aspects: the roles of occupation and of public sector pay policy in the determination of wages.

(i) The Role of Occupation

The occupation of a worker is an intermediary between his education and his earnings. Education, primarily representing cognitive skills, is often the main determinant of occupational attainment. Because elements of human capital are occupation-specific, the occupation of a worker is an important determinant of the vocational skills that he acquires, and therefore of his earnings. These ideas are applied to the Kenya and Tanzania samples in de Beyer and Knight (1986).

The wage in one occupation may exceed that in another because it is inherent in the job that its incumbents will have superior personal characteristics - some natural, such as ability, and some acquired, such as education and vocational skills. In exploring this idea, we make use of the concept of the 'occupational production function', relating individual inputs such as ability, education and employment experience to productivity, each occupation having its own occupational production function. It was possible to classify workers into six broad skill-based occupational groups, in which the hierarchy of mean wages corresponds to our judgement about the occupational hierarchy by skill level. There is very little mobility among these occupational groups in the sample: allocation to a particular occupational group is therefore likely to be an important determinant of lifetime earnings. Estimates of occupation-specific wage functions show that there are significant differences among occupations with regard to
education and to employment experience: the returns to these human capital variables generally increase with hypothesised occupational skill level.

Given that mean wages and the functional relationship between inputs and productivity vary among occupations, workers in different occupations are likely to have different mean characteristics. We therefore estimated 'occupational attainment functions', in which the occupations attained by workers are explained in terms of their personal characteristics. In both countries the most probable occupation rises (in level of skill) with level of education: a worker's educational level is a powerful determinant of his occupation.

We could also examine the process of 'filtering-down', i.e. the movement of educated workers, or of educated entrants to the labor market, into lesser jobs as a result of an increased supply of educated labor. The probabilities of occupational attainment were found to differ from one entry cohort to another, suggesting that the burden of filtering-down falls on entrants to the labor market rather than incumbents. The time at which a worker entered wage employment is an important determinant of his occupation. Consider the most recent cohort, who entered wage employment at the time of the surveys. The probability of a new secondary-leaver in Kenya entering a semi-skilled or unskilled manual job exceeds two-fifths, but in Tanzania it is less than one-fifth and the probability of such a person entering a non-manual job exceeds three-fifths. The probabilities of occupational attainment of new primary-leavers are similar in the two countries, reflecting the similarity of government policies for primary education. The contrast arises at the secondary level, where the filtering-down of entrants has proceeded further in Kenya than in Tanzania, reflecting the far more rapid expansion of secondary education in Kenya.
Our substantive conclusion is that skill-based occupation plays an important role in the labor market in East Africa. In the better paying occupations there is a nexus of relationships between output and the inputs labor, cognitive skills, vocational skills and natural ability, such that these inputs are found in combination and yield high returns. Natural ability and access to education are important to occupational attainment and thus to vocational skill acquisition: 'unto him that hath shall be given'. In a meritocratic educational and social system providing 'equality of opportunity', positive interaction among the determinants of earnings contributes to economic efficiency. Even in a meritocratic system, however, the interaction accentuates income inequality among workers.

Our methodological conclusion is that the role of occupation ought explicitly to be taken into account in analysing the effects of educational expansion on the labor market. The premium on education may well be reduced primarily through the filtering-down of the educated into jobs which are lower-paying and in which their education is less productive.

(ii) Pay Policy

In the period immediately following independence average wages were substantially higher in the public than in the private sector of Tanzania. This was partly because of the relative skill-intensity of public services but analysis of a 1971 household survey (Lindauer and Sabot, 1983) showed that, standardizing for personal characteristics, there was a 13 per cent wage premium in the public sector. This was in accord with the early government policy of exercising wage leadership and being an exemplary employer. At the time of independence most middle and senior level civil service posts were held by expatriate Europeans, their pay being determined by labor market conditions in Europe. Localisation took place rapidly over
the next decade, but public sector wages did not fully adjust to reflect the consequential decline in employee supply price. To do away with one of the fruits of independence and to introduce a large wage disparity between Tanzanians and their expatriate counterparts would have been politically untenable. Private sector wages were more responsive to the change in labor market conditions; hence the public sector wage premium in 1971.

Equalising pay policy dates from the Arusha Declaration of 1967, which set Tanzania on a more egalitarian and socialist path. The government attempted to resolve the conflict between the claims of equity and the reward that education could command in the market, by means of its policy on pay. The policy of wage compression extended beyond government employment to other parts of the public sector including the burgeoning group of 'parastatal organizations'. In principle the egalitarian pay policy applied also to the private sector but in practice it could not be enforced. The effects of the public sector pay policy should be observable in the 1980 surveys, the public sector accounting for over 60 per cent of our sample. We refer to the public sector as the 'non-market' sector and to the private sector as the 'market' sector because it is likely to diverge less from free market conditions. We hypothesise, therefore, that in 1980 pay in the non-market sector is less dispersed, and lower for the better-paid, than in the market sector.

Government policy on wages in the period immediately after independence in Kenya resembled that in Tanzania. The economic and political factors that influenced the wage leadership shown by the Kenya government were very much the same as those in Tanzania. Since the mid-sixties the Kenya government has progressively ceased to be a wage leader and has expressed itself in favor of equalising wages.
There is reason to question whether the government policy in fact resulted in any significant departure from a market outcome for wage structure in either the public or the private sector. There was no effective control over the private sector and public corporations, and central government employment accounted for only a fifth of our sample. The government appeared in practice to adopt the 'prevailing wage rate' approach to its wage determination, possibly because market forces were achieving its distributational goal. Our hypothesis for 1980, therefore, is that government pay policy has less influence in Kenya than in Tanzania, and that pay in the Kenyan public service and public corporations differs little from pay in the private sector.

5.2 Educational Expansion and Wage Compression

The relation between educational expansion and wage structure is examined by reference not only to the 1980 samples but also to the 1980 sub-samples of manufacturing and a comparable 1971 survey of manufacturing in Tanzania. A full account is to be found in Knight and Sabot (1984). The manufacturing comparisons have the advantage that they introduce a time-series element and that the manufacturing sector is relatively free of the effects of government pay policy, so permitting analysis of the relatively unimpeded operation of market forces.

(i) The Manufacturing Sector

With regard to the supply of secondary-leavers, the three manufacturing samples can be thought of as representing three points in a time-series: Tanzania, 1971; Tanzania, 1980; Kenya, 1980. The ratio of secondary-to primary-leavers rises sharply across the three samples. By contrast, the occupational structure of the labor force is very similar in
all three. Given our skill-based occupational classification, this suggests that the composition of demand for skills has remained much the same. Thus the relative supply of secondary-leavers has increased against a background of unchanging relative demand.

Educational expansion can compress the wage premium on education in two ways. First, wages in the occupations employing secondary-school leavers may be reduced by competitive market forces. Second, the 'filtering-down' of secondary-leavers into lesser jobs may reduce their average wage in relation to that of primary-leavers. The education-occupation matrix is indeed different in the three manufacturing samples. The proportion of secondary-leavers in non-manual occupations was 76 percent in Tanzania, 1971, 68 percent in Tanzania, 1980 (most of the filtering-down between 1971 and 1980 being into junior clerical from more senior white collar jobs), and a striking 26 percent in Kenya, 1980. The corresponding proportions in unskilled and semi-skilled manual occupations were 6 percent, 11 percent and 52 percent. Primary-leavers were also filtering down but at a much slower pace. The effect of the increase in the relative supply of secondary-leavers is as expected. The standardized wage premium earned by secondary-leavers over primary-leavers falls from 80 percent in Tanzania, 1971 to 52 percent in Tanzania, 1980 and to 26 percent in Kenya, 1980.

The elasticity in the response of relative wages to relative supplies of educated labor implicit in the comparison within Tanzania is -1.48, in the 1980s comparison it is -0.31, and in the comparison between Tanzania, 1971 and Kenya, 1980 it is -0.51. Since the wage premium in Tanzania, 1980 would not entirely have escaped the depressing affect of pay policy, the first elasticity is biased upwards and the second downwards,
making the third elasticity our best estimate. A doubling in the ratio of secondary- to primary-leavers employed in manufacturing would be sufficient to halve the ratio of their pay.

(ii) The Urban Wage Sector

Considering the urban wage labor force as a whole, we find that the ratio of secondary- to primary-leavers in Kenya (where it is 1.17) is two-thirds higher than in Tanzania (0.69). Since the occupational composition of urban wage employment is very similar in the two economies, these ratios imply that filtering-down has proceeded further in Kenya. Whereas 21 percent of secondary-leavers were employed in unskilled or semi-skilled occupations in Kenya, only 5 percent were so employed in Tanzania. The difference in the occupational distribution of primary-leavers is much less marked: the corresponding figures for primary-leavers were 41 percent in Kenya and 38 percent in Tanzania. Again, we predict a smaller wage premium for secondary-leavers in Kenya. However, we find that the standardized relative wage is higher in Kenya. The elasticity in the response of relative wages to relative supplies implicit in the comparison is actually positive.

The explanation for this anomaly is to be found in the difference in government pay policy in the two countries. Whereas government has not significantly altered the market outcome in Kenya, the Tanzanian government has intervened to compress the wage structure in the predominant public sector. In our wage function analysis we isolated the effect of pay policy on the educational structure of wages using dummy variables representing sector of ownership and interacting this variable with educational attainment. It was then possible to simulate the premium on secondary education in the market sector. Eliminating the pay policy increases the
premium by a mere 6 per cent in Kenya but by 63 per cent in Tanzania, and resolves the anomaly. The premium in Tanzania (0.64) now exceeds that in Kenya (0.51), and the elasticity of relative wages with respect to relative supplies of educated labor is negative (-0.25).

This would be an accurate estimate of the elasticity only if the relative demand for secondary-leavers was the same in the two countries. For instance, differences in sectoral composition or technology could cause Kenyan production to be more skill-intensive and so raise the premium in Kenya. It was possible to simulate what the premium on secondary education would be in Tanzania if Tanzania had Kenya's greater relative supply of secondary-leavers, or in Kenya if Kenya had Tanzania's lesser relative supply. Once we standardize both for pay policy and relative supply, the premia on secondary education in Kenya and Tanzania are remarkably similar, i.e. the relative demand for secondary-leavers is much the same in the two countries.

The somewhat higher elasticity estimated for the manufacturing sector than for the wage sector as a whole probably reflects the lower occupational skill intensity of manufacturing production and the preference of secondary-leavers entering a manual job to do so in manufacturing: filtering-down has proceeded further in that sector than in the wage sector as a whole.

In sum, educational expansion can be an important means of compressing wage structure in developing countries. In both Kenya and Tanzania the wage structure by education was remarkably wide at the time of independence; in both countries the structure has since been narrowed. Kenya achieved this outcome by means of its expansionary post-primary educational policies. The mechanism was one of filtering-down into less
skilled occupations rather than of wage flexibility within occupations: the
standardized occupational wage structure is very similar in the two
countries. Tanzania, because it restricted educational expansion,
intervened by means of an egalitarian public sector pay policy to prevent
scarcity rents accruing to the educated. Such segmentation of the labor
market is not without its drawbacks, however. It may well produce new
inequities and misallocation of labor.

5.3. Educational Expansion and the Kuznets Effect

In making normative judgements economists are usually concerned with
the inequality of wages received by individuals rather than with the
structure of wages. The inequality of wages is a function not only of their
structure but also of the distribution of employees across that structure.
Educational expansion can therefore have two effects on the inequality of
pay. We refer the narrowing of the wage structure, analysed in the previous
section, as the 'compression effect'. The changes in inequality which
result from changes in the educational composition of the labor force
consequent upon educational expansion, we refer to as the 'composition
effect'. Our natural experiment allows us to examine how the inequality of
pay changes with educational expansion (Knight and Sabot, 1983).

There is a widely accepted view that in the process of economic
development the inequality of income first increases and later decreases.
An explanation for this phenomenon has been put forward in terms of what we
call the composition effect. Kuznets (1955) has argued that the transfer of
workers from a large, traditional sector in which mean income is low to a
small, modern sector in which mean income is high initially causes
inequality to rise and later, when the sectors are of roughly equal size, to
fall. Although Kuznets did not incorporate any compression effect and our analysis is confined to educational groups within the urban wage sector, it is in the spirit of the broader Kuznets hypothesis.

The compression effect of educational expansion is always to reduce inequality; the composition effect may either increase or decrease inequality. It is possible, therefore, for the two effects to work against each other, the net outcome then being unclear. By considering the three manufacturing sub-samples, or the two wage sector samples, it is possible by means of simulation analysis to isolate in turn the compression effect, the composition effect, and their combined net effect.

Considering the manufacturing sub-samples, we find that the compression effect of educational expansion, as measured by substituting one educational composition for another, indeed reduces inequality. Moving from Tanzania, 1971 to Kenya, 1980, inequality as measured by the variance of the natural logarithm of wages is reduced by approximately half its value. As the share of secondary-leavers increases from its initially small size, so inequality increases: the composition effect is positive. However, the compression effect predominates, and the combined effect is for the variance of log wages to fall by a quarter or a third of its value. Significant further expansion of the secondary-leaver group (accounting for 42 percent of combined primary- and secondary-leavers in Kenya, 1980) might well cause the composition effect to reinforce the compression effect rather than work against it.

Because educational expansion reduces the wage premium less dramatically in the wage sector as a whole, the compression effect is weaker there than in the manufacturing sector. However, the composition effect also reduces inequality on account of the greater importance of
secondary-leavers in employment (representing 54 percent of the combined total in Kenya). The combined effect of educational expansion from the Tanzanian to the Kenyan level is therefore significant: the variance of log wages falls by some 15 to 20 percent of its value.

We have shown that educational expansion can involve an important externality which will not be taken into account by private agents and possibly not even by policy-makers. This effect on the degree of wage inequality is normally left out of account by conventional cost-benefit analyses of education, but it is relevant whenever government holds to an egalitarian social welfare function.
6. EDUCATIONAL EXPANSION AND EQUALITY OF OPPORTUNITY

Because land was abundant and capital negligible, the tribal communities in East Africa were traditionally economically egalitarian. Economic development, particularly in the urban modern sector, involved both physical and human capital accumulation. Economic inequality increased - both income inequality among persons and inequality of opportunity. As economic and social stratification grew, an important question arose: who in these predominantly poor societies would be the lucky few to gain the economic prizes?

The inequalities of opportunity which stem from the inheritance of wealth are well recognised in industrial societies. The advantages take such forms as income from wealth, economic gains from family connections including marriage with others of similar status, and the means to invest in human capital. There is a strong positive correlation between the educational attainment of children and the economic status of their parents in industrial societies, both those in which post-compulsory education is privately purchased and those in which it is heavily subsidised. For instance, British higher education is almost entirely publicly funded and access is on the basis of meritocratic selection criteria. Yet in 1980 social classes 1 and 2 (out of 5), representing fathers in professional and technical occupations, accounted for 27 per cent of the 18 year-old population but for 70 per cent of those accepted by universities (Royal Society, 1983).

This section is concerned with a dimension of inequality that is relatively neglected by economists, i.e. intergenerational mobility. In
Kenya and Tanzania the great shortage of educated labor after independence created scarcity rents, and educational attainment became perhaps the most important determinant of income. It was possible that access to education would depend on family background, i.e. on the education or income of parents. Have Kenya and Tanzania been characterised by increasing economic and social stratification based on the emergence of a self-perpetuating educated elite? The near achievement of universal primary education implies that in neither country is there now much selectivity by family background in access to the first level of the educational pyramid. Therefore our focus is on post-primary education. In which of the two secondary school systems is the distribution of school places by family background more equal? How has the rapid expansion of secondary enrolment in Kenya, and its failure to expand rapidly in Tanzania, affected the degree of intergenerational mobility and the process of class formation? These are some of the questions to be examined, drawing on Armitage and Sabot (1983).

6.1 Educational Policy and the Distribution of Secondary Education

(i) Determinants of Educational Access

The Tanzanian government introduced policies to reduce the role of family background in determining access to secondary schooling. It heavily subsidized the cost of attending government schools, so bringing secondary schooling within the financial reach of all segments of the community. It was inevitable that these subsidies, together with the high private returns to secondary schooling and the small size of the secondary system, would result in substantial excess demand for places in government schools. The promotion rate from the final year of primary school to the first year of secondary school fell, as the move to universal primary education took
place, from 36 per cent in 1961 to 19 percent in 1967 and to 7 percent in 1980. The corresponding promotion rate to government secondary school fell even more dramatically: 36, 15 and 4 percent respectively (Cooksey and Ishumi, 1986, Table 2.3). The figure for 1980 is one of the lowest progression rates in the world. Therefore the government adopted formal meritocratic selection criteria to prevent 'class collusion' in the rationing of the scarce places. The government's restriction of the private sector was due not only to the advice of its manpower planners but also to its belief that access to secondary education on the basis of ability-to-pay should be discouraged.

In Kenya government secondary schools were also highly subsidized and meritocratic criteria were used to ration scarce places. The important policy difference between the two countries was that the government system grew more rapidly in Kenya and restrictions were not imposed on the private sector, so enabling the Harambee system to mushroom.

It might be expected that the greater importance of private schools in Kenya would produce greater inequality in access to secondary school places. However, this overlooks the role played by the size of the system. We have already seen how the Kenyan policy 'failure' to curb expansion contributed to the higher labor productivity and lower inequality of pay observed in Kenya. It also contributed to a more equal distribution of secondary schooling in Kenya.

The hope that meritocratic selection criteria would prove sufficient to ensure that the various income groups would be represented in secondary schools in proportion to their numbers was disappointed in Tanzania. In part this resulted from the pressures to subvert the selection system which inevitably flowed from the scarcity rents associated with extreme rationing
(Cooksey and Ishumi, 1986, section 2). Entry to government schools is based on a quota system calculated on the basis of the number of Standard VII leavers in each district. Marks in the primary school leaving examination are the main criterion for filling a quota. Minimum entry requirements in terms of marks in the examination vary substantially from region to region. In principle the quotas help children in poor regions, but in practice the localisation of decisions is said too result in favoritism for the children of local administrators and influential parents (p.18). Moreover, although the practice is officially banned, children have been transferred 'through the back door' from private to government schools in Forms II and III (p.16).

There is a second and probably more important reason for the unequal access to secondary school, even less avoidable than corruption. It stems from the phenomenon, observed in many countries, that children from educated backgrounds are at an advantage in academic competition. In East Africa the children of more educated parents tend to be in the higher quality primary schools. Children from educated homes also have better opportunities to acquire cognitive skills and appropriate attitudes in the home. This effect may be particularly powerful in East Africa because education is often entirely new to a family: no less than half of the urban wage labor force in both countries had parents with no education at all. The children of the educated are therefore concentrated in the upper tail of the distribution of cognitive achievement at the end of primary-school. Accordingly, a disproportionate number of them are among the few who are able to clear the meritocratic hurdle into government secondary school.

(ii) Differences in Educational Access

We explored the determinants of educational attainment in our
samples by means of 'educational attainment functions', in which the highest level of schooling that a worker reached is explained in terms of various characteristics, including family background (the educational attainment of his parents), age (being a proxy for the size of the school system when he would have gone through it), race and rural/urban location. We found that the distribution of secondary school places by family background is highly unequal in Tanzania. In 1960 the probability that a primary Standard VII leaver would get into secondary school was no less than 0.81 if one parent had at least secondary and the other at least primary education but only 0.13 if neither parent had education. Fifteen years later, in 1975, these probabilities were little changed, being 0.83 and 0.21 respectively.

The policy of applying academic selection criteria within a quantitatively constrained secondary system did not have the egalitarian distributional impact that had been expected. The children of Tanzania's educated elite continued to claim 'their' places. Children from relatively poor and uneducated households would have benefitted disproportionately from expansion of the secondary system, both of government and of private schools. Our survey indicated that many of these families were willing and able to pay private school fees. The frustrated demand for secondary education that resulted from government policy was concentrated among the poor.

These results for Tanzania are to be contrasted with those for Kenya. In 1960 the degree of inequality of access in Kenya was very similar to that then prevailing in Tanzania: the probability of secondary access for Standard VII leavers was 0.83 for children of parents of the most educated group and 0.21 for children of uneducated parents. However, the corresponding figures for 1975 were 0.89 and 0.73. Thus the inequality of
opportunity narrowed dramatically over the 15 years in Kenya as secondary access tripled for the children of the uneducated.

A child of uneducated peasant farmers was 3.5 times more likely to attend secondary school if he was born north of the border separating Kenya and Tanzania. This is another example of how an unintended consequence of intervention in the market for education yielded an outcome in conflict with a strongly avowed goal of the Tanzanian government.

6.2 Educational Policy and Intergenerational Mobility

Today all children in Kenya have roughly the same chances of attending primary school and secondary school, irrespective of family background. It might be expected, therefore, that family background no longer exercises an influence on performance in the labor market. We find that this is not the case. Intergenerational mobility, defined in a relative sense, is no greater in Kenya than in Tanzania. We illustrate by reference to occupational attainment. In both countries there is a sharp difference in the probability of attaining a high-skill, high-paying job according to family background. Consider how the probability that a worker will have a non-manual job depends on the education of his parents. If both parents are uneducated, that probability is 0.22 in Kenya and 0.18 in Tanzania; if both have primary education, the probabilities are 0.53 and 0.52 respectively; and if both have secondary education, the probabilities are 0.90 and 0.99 respectively.

(i) Determinants of Intergenerational Mobility

This rather surprising finding cannot be explained in terms of differences in the distribution of workers among occupations: this distribution is almost identical in the two countries. The explanation is
rather to be found in the influence of family background on academic performance in secondary school and on access to tertiary education. Family background has an equally powerful effect on primary-school performance and on access to government secondary education in both countries; this was described and explained above. However, Kenya and Tanzania differ markedly in the relation of family background to performance in secondary school.

The relatively small size of the Tanzanian secondary system gives rise to a very low progression rate from primary to secondary education, being a mere 7 per cent in 1980. This means that—apart from the regional balancing effect of quotas—only the most highly qualified primary-school completers gain access to secondary-school. Insofar as the system is corrupted at the local level, this brings in the less well-qualified children of the rich and powerful. The few children from uneducated family backgrounds—the extraordinary few—who are admitted are at least as well qualified as their more privileged peers; and they can compete on equal terms with them in secondary schools, most of which involve boarding away from home. Performance in the national Form IV examination and promotion rates to upper secondary school (Forms V and VI) and to tertiary education are evidence of this equality. There are no substantial differences by family background either in Form IV examination results or in access to Form V in Tanzania.

Because the secondary system is larger in Kenya, it is less selective and the variance in entry qualifications is greater than in Tanzania. The children of the uneducated going on to secondary-school are not limited to the very few who perform outstandingly in the national primary-leaving examination. Owing to the academic advantages conferred by their family background, the children of educated parents perform better on
average in that examination. Not only are the children of the uneducated less well qualified when they enter secondary school but also this initial disadvantage is accentuated by their concentration in the relatively low-quality harambee schools. Evidence that children do not compete on equal terms in secondary school is provided by their results in the national Form IV examination and by promotion rates to Form V. In contrast to Tanzania, in Kenya there is a strong positive relationship between the education of a worker's parents, on the one hand, and his Form IV examination performance, access to Form V, and access to tertiary education, on the other hand.

In both countries entry to the heavily subsidized tertiary education system is decided on the basis of meritocratic criteria. It might be expected that in Kenya, where there is far greater equality in access to secondary school and where the tertiary system is somewhat larger, access to tertiary education would be more equal than in Tanzania. In fact it is less equal: the probability of access to Form V (the gateway to tertiary education) ranges from 0.23 for the children of uneducated parents to 0.36 for the children of the most educated group of parents in Tanzania, whereas the corresponding range is from 0.06 to 0.42 in Kenya.

The explanation for this surprising result is to be found in the small size of the tertiary system in both countries and the difference between them in relative secondary and tertiary enrolments. In Kenya the progression rate from secondary to tertiary education is far lower than in Tanzania, and the secondary system is more heterogeneous in quality. Since only a small elite of Form IV completers can enter the tertiary system, the academic competition is intense. The children of the educated are at an advantage in this competition. The low promotion rate into tertiary
education no doubt generates political pressures for the expansion of tertiary enrolment in Kenya, just as earlier pressures were generated for the expansion of secondary enrolment. Until the tertiary system expands greatly, however, there will be few tertiary places left for the children of the uneducated once the children of the educated have claimed 'their' places.

In Tanzania disproportionate numbers of children of the uneducated leave the educational system on the completion of primary school, whereas this is not the case in Kenya. In Kenya disproportionate numbers of the children of the uneducated drop out after secondary school, whereas this is not the case for those Tanzanians who complete Form IV. In Kenya, therefore, the phenomenon of differential access is not avoided but is merely postponed.

(ii) The Extent of Intergenerational Mobility

Intergenerational mobility can be thought of either in absolute or relative terms, and in terms either of education or of success in the labor market. In absolute terms there is clearly more intergenerational mobility in Kenya than in Tanzania. The average difference between the education of parents and that of their children is greater in Kenya. Similarly, the higher productivity which additional education brings must raise the income of Kenyan children in relation to their parents; this ratio is greater in Kenya than in Tanzania.

In relative terms, however, there is roughly the same degree of intergenerational mobility in the two countries. We have already seen that, measuring intergenerational mobility in terms of the educational attainment of the second generation, the greater equality of access to secondary education in Kenya is offset by the inequality of access to education beyond
Form IV. There are three reasons why intergenerational mobility, measured in terms of the labor market success of the second generation, is also low in Kenya (Armitage and Sabot, 1984).

First, recall the strong positive effect of education on occupational attainment. The greater access of the children of the educated in Kenya to education beyond Form IV gives them priority in the queue for jobs. The children of the uneducated therefore do no better in the hierarchy of occupations than those in Tanzania. Second, even standardizing for years of schooling and concentrating on Form IV leavers, we find a strong positive relationship between examination score and earnings in Kenya; this gives the children of the educated an advantage in the labor market. The same relationship is found in Tanzania but it is weaker. Third, standardizing as well for examination scores, we find that those from educated families earn more in Kenya. It appears that the expansion and consequent democratisation of the secondary school system has given rise to labor market discrimination by employers on the basis of family background. Consistent with its greater scarcity of Form IV leavers, we find no such discrimination in Tanzania.
Cost-benefit analyses of investment in education have been conducted in most low-income countries. These studies have been influential: much of the conventional wisdom about private and social returns to investment in education and the contribution of educational expansion to economic growth can be traced to their findings, and in many countries these findings have entered the formulation of policy. A fairly standard methodology is employed, at the core of which is the relationship between education and earnings, used to measure the benefit of educational investment. This seemingly straightforward relationship, on closer examination, presents economists with some thorny methodological issues. The resulting controversy has clouded the interpretation of rates of return to education. The data sets generally used to measure rates of return do not permit the empirical resolution of this controversy. Our surveys provide an opportunity to shed light on several of the more troublesome issues.

First, our measurement of the separate influence on earnings of cognitive skill, reasoning ability and years of schooling has a bearing on a long-standing question in the economics of education: what proportion of the conventionally measured rate of return to education is due to the effect on productivity of human capital acquisition in school? The standard methodology assumes that the proportion of the rate of return due to screening or credentialism is negligible; this assumption has been an important source of criticism of rate of return studies.

Underlying the standard method of estimating rates of return is the
presumption that the wage structure results from the unfettered market interaction of sellers and profit-maximizing buyers of labor services and, therefore, accurately reflects the difference in productivity between more and less educated workers. But for countries in which government actively intervenes in the labor market - the majority of developing countries - public sector pay policy has the potential for segmenting the labor market and biasing estimates of the returns to education. Moreover, bias can arise from employment policy as well as wage policy. In the private sector it is reasonable to assume that profit-maximising employers will not hire workers whose marginal product is less than the wage. However, in the public service and in public sector enterprises with access to subsidies, employment need not correspond to the level at which wage equals marginal product. Without account also being taken of government employment policy, therefore, rates of return to education based on the educational structure of wages may be seriously biased.

We have shown how educational expansion compressed the educational structure of wages in East Africa. The process by which expansion achieves this compression - primarily through changes from one cohort to the next in the occupations entered by workers with a given level of education - is relevant to a third issue in rate of return methodology. Average returns to education are generally measured, though marginal returns should be the basis for investment policy. The assumption is that the average wage of (standardised) labor measures the wage received by the marginal (i.e., the most recently recruited, standardised) worker. However, because of changes in labor market conditions resulting from the growth in the supply of educated labor, the average may be a poor indicator of the marginal wage. For example, the average performance in the labor market of all
primary-completers may be a hollow prospect for those just entering the market. The average reflects the performance of older cohorts for whom a primary-school certificate was a passport to a white collar job, while today a primary-school completer may be fortunate to get the most menial blue collar job. Not taking account of the gap between average and marginal returns can result in overestimates of returns to education and to potentially serious reversals in the hierarchy of returns.

We also focus on a fourth issue in Section 7: the comparative costs and benefits of government and harambee secondary schools in Kenya. We disaggregate the cost-benefit analysis by type of school and calculate separate rates of return, both private and social, to government and to harambee schooling. This allows us to assess the extent to which the market for secondary education is segmented - the extent to which the net private benefits to secondary education vary with type of school attended - and the efficiency and equity implications of such segmentation. This analysis provides the basis for an evaluation of the way in which government chooses to subsidize secondary education.

7.1 The Returns from Cognitive Skills Acquired in School

It was shown in Section 3 that the human capital interpretation of the education - wage relationship, rather than the screening or credentialist interpretations, is borne out by the survey evidence. This result appears to provide support for the standard method of estimating the social benefit of education. However, our three-equation recursive model enables us to conduct a more precise evaluation of the standard method - an evaluation of the sort first suggested by Becker (1964). The analysis is confined to Kenya because of the additional complications introduced by
government pay policy in Tanzania, which are difficult to isolate in the tested sub-samples. We compare the social rate of return to secondary education estimated in the conventional way with the return obtained by using the recursive model to trace the productive effects of secondary schooling (Knight and Sabot, 1985d).

The educational attainment function identifies the contributions to human capital acquisition - through the interaction of ability and schooling inputs - that is made by secondary schools in selecting the more able primary-completers. The educational production function shows the effect of secondary schooling on cognitive skill level. The earnings function predicts the effect of higher cognitive skill on earnings and, by implication, on productivity. These three relationships are different aspects of the productivity-enhancing role of secondary education. The earnings function also shows the direct effects on earnings of ability and credentialism, so enabling us to separate them from the human capital effects.

On the standard definition of the benefit stream, the social rate of return on secondary schooling is 13 percent. Using the recursive system and combining all of the effects, it is insignificantly different, 15 percent. The direct effects of ability being negligible, cognitive skill and credentialism together produce a return of 14 percent. Cognitive skill makes the larger contribution of the two, since it raises earnings by 33 percent whereas secondary school attendance on its own raises earnings by 21 percent.

It is difficult to interpret the effect of cognitive skill on earnings except in terms of human capital acquisition. The direct effect of schooling could represent credentialism, or screening by employers on the
basis of education, or elements of human capital acquisition not captured by our measure. For instance, schools may impart cognitive skills other than numeracy and literacy, or valuable affective traits such as personal motivation or discipline. On this aspect of the standard methodology, therefore, our findings tend to vindicate its use in Kenya.

7.2 Public Sector Pay and Employment Policy and the Return on Education

It was shown in Section 4 that egalitarian pay policy in the predominant public sector has compressed wage structure by educational level and reduced the premium on secondary education in Tanzania. Does public sector pay policy bias conventional estimates of the social rate of return on secondary education? There is a second complication, arising from the fact that the public sector is not necessarily profit-maximizing and that wages need not therefore equal marginal products. To explore these issues we examine the sensitivity of conventional estimates to alternative models of government pay and employment policy (Knight and Sabot, 1985e).

Using standard methods of estimation, we find that the rate of return to secondary education is 13 percent in both countries. These results are not consistent with our expectation that the return is higher in Tanzania where secondary-completers are in scarcer supply. The explanation lies in the difference in public sector pay and employment policies in the two countries and in the conventional abstraction from those differences.

Rate of return estimates for the public and private sectors separately indicate that there is relatively little difference in Kenya, reflecting the only mildly compressive pay policy (the rates of return being 10 and 15 percent respectively). In Tanzania public sector pay policy gives rise to a larger difference (9 and 20 percent respectively). Tanzania can
maintain such a large gap because of constraints on the ability of educated labor to move from the large public sector to the much smaller private sector. Since there is no consistent evidence of a positive relationship between the examination performance of secondary-completers and their employment in the private sector, the difference cannot be due simply to "creaming" of better workers by private employers. As expected, the private sector rate of return is higher in Tanzania than in Kenya.

Wherever government intervenes to reduce pay, the wage in the public sector may measure the marginal product of government employees (if government behaves as a profit-maximising employer) or fall short of marginal product (if government allocates labor optimally between sectors but pays no more than it has to) or exceed marginal product (if there is overmanning in the public sector). The estimated social rate of return in the economy is shown to be sensitive to the choice of these assumptions, particularly in Tanzania.

In both countries additional knowledge of the workings of the public sector labor market would be required to estimate definitive rates of return to secondary education. Rate of return analysis should not be conducted mechanically: rather, it should be based on a knowledge of government objectives and behavior.

7.3 The Relative Rates of Return to Primary and Secondary Education

Perhaps the most influential stylized fact to emerge from twenty five years of rate of return studies in dozens of developing countries concerns the relative rates of return to primary and secondary schooling. Averaging over a large number of these studies, social rates of return are 27 percent for primary education, 16 percent for secondary and 13 percent for
tertiary. The implication generally drawn from this ranking is that top priority should be given to primary education as a form of investment in human resources. Taking account in Kenya of a well known but little heeded criticism of conventional rate of return studies, however, casts doubt on this conclusion.

In these studies the returns to education are measured by the wage differences associated with educational differences. The assumption is that the wage difference between primary- and secondary-completers measures their difference in marginal product and therefore indicates the marginal product of education. This assumption will be misleading if the average wages of all primary- and secondary-completers are inapplicable to those now entering the labor market. Rapid expansion of the educational system, as in Kenya, can change dramatically the labor market conditions faced by school-leavers. Growth in the supply of educated labor has tended to outstrip growth in wage employment in many developing countries, necessitating substantial adjustments in the labor market. In particular, the education-occupation matrix tends to change from one cohort to the next. The issue is examined in Knight and Sabot (1985c).

In the Kenyan wage sector, uneducated workers are the only group who have generally remained in the same (unskilled) occupations from one cohort to the next. Two or three decades ago primary-school completers were in scarce supply: a primary-school certificate was a passport to a white collar job. Those who obtained those jobs remain in them today. But, owing to the rapid expansion of the educational system, today's primary-school completer is fortunate to get the most menial blue collar job. His chance of obtaining a senior white collar position similar to those obtained by many of his predecessors is negligible. Similarly, whereas earlier cohorts of
secondary-completers were assured access to non-manual occupations, a rising proportion of recent cohorts have had to accept manual employment.

The process by which successive cohorts of workers at a particular educational level enter less skilled jobs, referred to above as 'filtering down', was taken into account in calculating rates of return to primary and secondary education in Kenya. In addition to average rates of return, marginal rates of return were calculated, by using the occupational distribution of the most recent cohort of labor market entrants to derive the wage difference attributable to education. In contrast to conventional rate of return studies, wages of workers with a particular educational level were not inflated by including in the calculation the currently unattainable, occupational attainment of earlier cohorts.

In Kenya the rate of return to primary education is highly sensitive to the distinction between average and marginal rates of return, whereas the rate of return to secondary education is not. The average rate of return to primary education, as conventionally measured, is 17 percent and the marginal rate of return only 12 percent. The marginal return is markedly lower than the average for two reasons. At the primary level there is both substantial filtering down and large differences in wages by occupation, whereas for the uneducated there is less scope for filtering down and wage differences by occupation are small.

The return to secondary education, by contrast, is not affected by the corresponding adjustment: the average and marginal rates of return are both 13 percent. Because the degree of filtering down of primary- and secondary-completers is similar, their difference in earnings is little altered. Moving from the average to the marginal concept of the rate of return reverses the usual hierarchy: at the margin the rate of return to
secondary education exceeds that to primary education.

The Kenyan analysis suggests that the conventional wisdom about the hierarchy of the returns to education in Africa and elsewhere is based on studies which are likely to contain a methodological error. While the average rate of return on primary schooling, averaged over a large number of countries, may be as high as 27 percent, the marginal return is likely to be considerably lower, and may be less than the return to secondary schooling.

The conventional assessment of educational investment priorities accords the highest priority to primary education in those poor countries where, unlike Kenya and Tanzania, universal primary education has not yet been achieved. The implication of our illustrative analysis for Kenya is not that the conventional assessment is necessarily wrong. In some countries even the marginal rate of return to primary education may be high. Moreover, the expansion of primary education could yield important distributional benefits and positive externalities. Rather, the implication is that, contrary to the conventional wisdom, the jury is still out.

7.4 Efficiency and Equity Implications of Subsidies in Secondary Education

Figure 3 summarizes our comparative cost-benefit analysis of government and private (harambee) schools in Kenya (Armitage and Sabot, 1985). The analysis is confined to Kenya because of the absence of data on costs in the private sector in Tanzania. It shows that the market for secondary education in Kenya is highly segmented.

The cost to a parent of sending a child to a government secondary school is less than the cost of sending him to a harambee school. Moreover, the difference in predicted lifetime earnings between Form IV completers from the two types of school indicates that the private return is
substantially higher in the case of government schools. Our estimate is that the private rate of return to government schooling is some 50 percent higher than that to harambee schooling, 14.5 percent as compared to 9.5 percent.

Government subsidies explain this gap. While the costs to parents of sending a child to a government school are only 63 percent of the corresponding costs at a harambee school, per pupil expenditures are 35 percent higher in government schools. In 1980 the per pupil subsidy was roughly 2000 shillings in government schools and 200 shillings in harambee schools. Government schools charge less for a higher quality education. We show that the difference in earnings streams between government and harambee school completers is due to the higher cognitive skills of the former, and not, for instance, to the greater selectivity of government schools. Taking account of the higher "wastage" rates from harambee schools widens the gap in rates of return.

The result of this marked segmentation of the market for education is that parents strongly prefer to send their children to government schools. This preference is manifest in the substantial excess demand for government school places, and consequent stiff academic competition for access, and in the role of harambee schools as the secondary schools of last resort.

The private and social returns to harambee secondary schools are essentially the same: adding the negligible government average subsidy to private cost does not measurably reduce the rate of return. The subsidy per pupil in the government system is far from negligible: adding government subsidy to private cost increases total cost by 133 percent. This reduces the social return below the private return, and yet the social return, at 13
percent, remains substantially higher in government than in harambee schools. This suggests that the government system is the more cost-effective system for society.

One justification for introducing subsidies of government secondary schools in Kenya was the belief that, in their absence, children from poor families could not afford to attend. Who then reaps the benefits of these large subsidies? Among those in secondary school, children with highly educated, high-income parents disproportionately gain access to government schools: the probability rises from 0.16 for the children of uneducated parents to 0.51 where one parent has at least primary and the other at least secondary education. The reasons, predominantly meritocratic, have been explained in Section 6. Whatever the reasons, those with the greatest ability to bear the cost of their children's education are the most likely to receive large subsidies.
Tanzanian policies for secondary education were much influenced by President Nyerere's (1967) policy of "Education for Self-Reliance" (ESR), introduced shortly after the Arusha Declaration which put Tanzania on a socialist path. The objective of ESR included controlling the expansion of post-primary education to satisfy manpower requirements rather than private demand for education, reducing elitism and the tendency for schooling to promote inequality and class formation, and preparing children better for life in socialist Tanzania.

Manpower planning involved, on the one hand, forecasting future requirements for educated labor and, on the other hand, imposing restrictions on the expansion of the post-primary school system. Among the policies adopted to promote the egalitarian objective were the use of academic criteria, tempered by a regional quota system, for entry to secondary education, the waiving of all fees in government secondary schools, and the discouragement of private schools which would offer secondary education only to those who could afford it. The attitudinal and vocational objectives involved introducing self-reliant activities (such as farm plots) and political education into the schools, diversifying the secondary curriculum away from general academic towards vocational subjects, and making the primary curriculum more appropriate for the majority who would never enter secondary school and would become farmers.

The educational policies adopted in Tanzania have aroused interest and comment in the international education and development community. These policies are radical not just in rhetoric but in fact: they have saddled
Tanzania with one of the smallest secondary systems in the world and have changed the nature of education. Some commentators have held up Tanzania as a model to be followed. Others have been critical, perhaps recognizing that government intervention frequently generates countervailing tendencies and side-effects that can produce outcomes different from those intended.

How successful have these policies been, both in terms of their own objectives and in terms of the usual economic criteria? The evidence adduced by educationalists, recently surveyed by Cooksey and Ishumi (1986), is discouraging. Our aim has been to apply economic criteria to the policies as they concern secondary education. Our method has been to evaluate the natural experiment that Kenya and Tanzania represent.

Kenya has followed a more conventional set of educational policies. Forecasts of manpower requirements have not governed the expansion of post-primary education. At the secondary level the supply of educational opportunities, both in the government and in the private sector, has been more responsive to demand. The government has tolerated the rapid growth of a private secondary system in which ability to pay is necessarily a criterion for access. Unlike Tanzania, Kenya is roughly on the curve, based on cross-country comparisons, which relates the secondary enrolment ratio to national income per head (Figure 1). Nor has primary- and secondary-schooling Kenya strayed far from the usual curriculum, with its stress on academic subjects.

In previous sections we have summarized the results of the East African natural experiment. In this section the emphasis shifts from positive to normative analysis and we draw out the policy implications. We evaluate each aspect of the experiment by the criteria of efficiency and equity and then, recognizing that the policies are an integrated package,
8.1 Educational Policy and Efficiency

Our research has attempted to study the relationships between educational policy and efficiency in greater depth and breadth than is conventionally the case. The greater depth is made possible by introducing reasoning ability and cognitive skill as the links between education and wages. That analysis lends strong support to the human capital interpretation of the education-wage relationship. It implies that standard cost-benefit methods of appraising education are valid in this crucial respect.

A corollary of this finding is that the assumptions underlying manpower planning approaches to educational policy are invalid. Within our six skill-based occupational groups we find that earnings vary by educational level; indeed in the case of Form IV completers, they vary with examination performance. The cognitive skills that a worker brings to a job affect his productivity and therefore his pay. The very different education-occupation matrices in the two countries imply that the Kenyan workers, being better educated, are more productive in their jobs. Although secondary educational expansion is shown to reduce the wage premium on secondary education and, by implication, its marginal product, the elasticity of substitution between primary- and secondary-educated labor is fairly high, being well in excess of unity.

The governments of both Kenya and Tanzania have made forecasts of manpower requirements on the basis of fixed input coefficients for educated labor. Because of political pressures for expansion, Kenyan educational policy-makers have paid lip-service to the forecasts, whereas their
Tanzanian counterparts have taken them more seriously. Quite apart from the serious informational problems which have resulted in widely divergent forecasts of requirements (Cooksey and Ishumi, 1986, pp. 55-8), our analysis suggests that such forecasts are fundamentally misguided. Tanzanian manpower planners have viewed the filtering-down of secondary-completers into lower occupations as a waste of resources. We have demonstrated that the process is better viewed as human capital deepening.

The two countries differ not only in the quantity but also in the quality of secondary education. Our educational production functions indicate that the cognitive skill of workers with the same reasoning ability and years of education is substantially higher in Kenya. This result, surprising in view of the greater importance of low-cost community schools in Kenya, no doubt reflects the Tanzanian switch from Kiswahili as the language of instruction in primary school to English in secondary school (in Kenya English is used throughout), and the diversion of time away from academic subjects that resulted from curriculum reform. Moreover, curriculum diversification has not achieved some of the economic objectives for which it was intended (Psacharopoulos and Loxley, 1985, pp. 205-9). Insofar as it has furthered the ideological objectives of socialism and self-reliance, that gain has involved a high cost in terms of cognitive skill acquisition and consequent labor productivity.

Because of the difference in both the quantity and quality of secondary education, the mean level of cognitive skills, and therefore of labor productivity and earnings, is far higher in Kenya. The difference between the two countries in educational policy regimes appears to account for a substantial proportion of their difference in the average productivity of wage labor. Tanzania intervened in the market for education so as to
save resources that, it was perceived, would otherwise be wasted. Perversely, it has paid a high price, in terms of output foregone, for this intervention.

Furthermore, the full price has not yet been paid. The gap between Kenya and Tanzania in the educational attainment of the labor force would inevitably widen even if Tanzanian policy were to change, on account of lags in the supply of educated labor in response to the expansion of the secondary school system. Looking further ahead, the Kenyans will be reaping an intergenerational benefit that the Tanzanians will forego. A markedly higher proportion of the current generation of children in Kenya have parents with secondary education. This will increase the efficiency with which they learn in school and their subsequent performance in the labor market.

8.2 Educational Policy and Equality

Given that the governments of Kenya and Tanzania both claim to hold egalitarian objectives, we have examined the effects of their secondary educational policies on various dimensions of inequality. Such effects can have important externalities in the sense that they are either ignored, inadequately recognized or inadequately understood in educational decision-making. The four dimensions of inequality that have been examined are the structure of wages among educational groups, the dispersion of pay among individuals, differential access to education, and the extent of intergenerational mobility. Each of these distributional effects has policy implications.

The governments of both countries have expressed their concern to compress the widely dispersed wage structure which they inherited. Our
estimate of the response of relative wages to supplies of secondary-relative to primary-completers confirmed that the expansion of secondary education is a means of achieving that objective. Although the responsiveness is not high, the degree of compression achieved in Kenya has been significant. On account of this effect the premium on secondary education in the market sector is some 20 percent lower in Kenya than in Tanzania.

It may well have been because of its policy to hold back secondary enrolment and the consequent scarcity rents accruing to those with secondary education that the Tanzanian government intervened in the labor market to compress the wage structure. Despite having to work against the market, the policy is effective in the public sector, which is dominant in Tanzania. Government pay policy halves the premium on secondary education in that sector. Thus one policy intervention—in the market for education—begs another—in the market for labor. A side-effect of the latter intervention is that the labor market is segmented by sector of ownership, which produces new inequities and a misallocation of labor.

The Kenyan government, in adopting the "prevailing wage rate" approach to public sector pay, implicitly chose to follow market forces because the rapid expansion of enrolment in Kenya could be relied on to reduce the premium on secondary education. The two different education and labor market policy regimes have been similar in the size of their compressive effects on the structure of wages.

Not only does secondary educational expansion compress the education wage structure but it also reduces the inequality of wages among individuals. This would occur even at Tanzania's low initial position, where the "compression effect" is partly offset by the "composition effect"
of educational expansion. On both these scores - the structure and dispersion of wages - it would seem that the Kenya policy of permitting secondary educational expansion is preferable to the Tanzanian policy of containment.

One aim for universal primary education was to reduce inequality of access to the educational system. This has been achieved in both countries: even the children of the poor and uneducated, who once were excluded, now receive a basic education. Both the Kenya and Tanzanian governments have revealed their concern for equality of opportunity to enter secondary education. They heavily subsidize government secondary schools and ration the scarce places on the basis of meritocratic criteria. Furthermore, one reason for the Tanzanian restrictions on private enrolment is the view that those who can afford to pay should not be at an advantage.

The extreme rationing of government secondary places in Tanzania has given rise to some corruption - perhaps less than might be expected - and this has contributed to inequality of access. More importantly, and as in other countries, eliminating the direct effects of differences in income has not resulted in equality of access. The academic advantages conferred by family background mean that it is primarily the children of the poor and uneducated who are excluded by the quantitative restrictions imposed by government. Many less privileged families willing and able to meet the cost of private secondary education are constrained by policy from doing so. This is yet another example of Tanzanian government intervention having unforeseen side-effects and producing an outcome the opposite of what was intended. Restraining the size of the secondary system has contributed to class formation: an educated elite is in the process of perpetuating itself in Tanzania.
Ex ante, the Kenyan policy on secondary expansion appeared to be less egalitarian than the Tanzanian policy because of the greater importance placed on the fee-charging private sector. Ex post, the greater expansion of the secondary system in Kenya has resulted in far less inequality of access. The larger size of the secondary system has meant greater access for the children of the poor and uneducated in Kenya than in Tanzania.

Yet intergenerational mobility is not greater in Kenya: the exclusion of the children of the poor and uneducated now occurs at the tertiary level, and this continues to order the labor market by family background. There has been more intergenerational mobility in absolute terms in Kenya: the gap between generations in education and income levels is greater than in Tanzania. But the influence of family background on position in the socioeconomic hierarchy remains much the same in the two countries. The widely heard claim that education is "the great equalizer" is not borne out in East Africa. It is also disappointing to note that the behavioral mechanisms at work in East Africa are likely to operate elsewhere.

In sum, the externalities associated with the distributional effects of educational expansion are varied. For the structure and dispersion of wages and the distribution of educational opportunities, they are positive and therefore reinforce efficiency arguments for expansion. However, the East African experiment suggests that the promotion of intergenerational mobility cannot be used as an additional argument for the expansion of secondary education.

8.3 Policy on Subsidies

We have used our comparative cost-benefit analysis of harambee and
government secondary schools to evaluate subsidy policy. Government secondary schools are highly subsidized in both countries whereas private schools are not. Although data availability limited the analysis to Kenya, the findings and their policy implications should be applicable also to Tanzania.

As a result of government subsidies the market for secondary education in Kenya is highly segmented: the private returns from government schooling are markedly higher than those from harambee schooling. This implies rationing of government secondary places and an insensitivity of demand for them to even substantial increases in school fees. A reduction in subsidy per pupil could therefore be achieved without a reduction in expenditure per pupil and thus in the quality of the education provided.

The children of high-income parents, being disproportionately represented in government schools, benefit disproportionately from the subsidies. This suggests that an increase in school fees, tempered by a need-based scholarship scheme, would be progressive in its distributional effects. The regressiveness of government expenditures on secondary education should be considered in the light of evidence that, as in the many developing countries that derive a high proportion of revenue from taxation of agriculture, the incidence of taxation in Kenya may also be regressive.

Our analysis suggests that the fees charged by government schools would have to be increased more than fourfold— to a level in excess of the cost per pupil— if the private rate of return is to be reduced to the level prevailing in harambee schools. Only at that high level would parents be indifferent in choosing between the higher quality government system and the lower cost harambee system. Such a reduction of the private return would not involve a reduction of the social return to government secondary
education, but only a shifting of the burden.

The revenue potential of increases in user charges is so substantial—more than 300 percent of government recurrent expenditure on secondary education—that even a more modest increase in fees and a large scholarship program would greatly ease the constraints on the educational budget. This is particularly important in Tanzania where budgetary constraints have shared the blame for the slow expansion of government secondary schools and where, until 1984, no fees at all were charged in government secondary schools.

The efficiency gains from reducing subsidies in Tanzania would come from the opportunity to make high-yielding investments in secondary school provision. Even in Kenya there are efficiency gains to be reaped from a reduction of per pupil subsidies. If government were to provide small subsidies to harambee schools for quality-improving purposes the current gap in the social rates of return between the two systems could be reduced.

8.4 Overall Appraisal

We have discussed the various dimensions of the efficiency and equity consequences of the East African natural experiment. The overall assessment of the difference in educational policy regimes should be clear. The Kenyan policy regime is to be preferred both according to efficiency criteria and, ironically, according to the distributional criteria on which the Tanzanian government places so much weight.

(i) Limitations of Rate of Return Analysis

We have reached this important conclusion without referring once to the social rate of return to secondary education in either country. When we calculate conventional rates of return we find that the return, at 13
percent in both countries, is high and competitive with other investments. It suggests that there is a case for expanding secondary education in both countries, but there is no indication of any greater urgency in Tanzania. Our examination of methodological issues in cost-benefit analysis provides some insight.

First, the usual practice of abstracting from pay and employment policy in the public sector results in large biases in estimates of social rates of return to secondary education in Tanzania, where the government has aggressively intervened in the labor market, but only small biases in Kenya. Second, moving from measures of average rates of return to more policy-relevant measures of marginal rates can substantially alter the level and structure of returns.

We have used our data to examine both these and other issues. We have not attempted to combine the exercises in one and thereby to unveil the "true" rate of return to secondary education in Kenya and Tanzania. This is partly on account of data constraints. The subsample of workers for whom measures of ability and cognitive skill are available is not large enough to estimate the direct effect of cognitive skill while both taking account of government pay and employment policy and moving from the average to the marginal concept of the rate of return.

Quite independent of data constraints, however, we would be reluctant to make such an attempt. The consequences of educational expansion are multi-dimensional and the assessment of each of the dimensions can be quite complex. Educational cost-benefit analysis was developed as a means of assessing only the productivity dimension of the consequences of expansion. For informing policy on the expansion of secondary education, this approach is both in concept and in practice clearly superior to
manpower planning. Nevertheless, it is seriously flawed.

The desire to generate a single number, a rate of return to educational expansion comparable to the rate of return estimated for a steel mill or a port facility, is understandable. The effort was of particular value in the early years of development economics when some still needed to be convinced that growth could be generated by, and indeed required, investments in human capital as well as in physical capital. However, this reductionist approach to the assessment of educational investments, by abstracting from much of the complexity in educational and labor markets, is prone to be misleading.

Rates of return turn out to be sensitive to several issues generally ignored in cost benefit analysis. In some instances still more research would be required to determine the precise way in which an issue should be resolved. For example, the impact of government employment policy on the returns to secondary education is ambiguous without more information. Nor is it clear how to incorporate an analysis of the distributional consequences of educational expansion into the calculation of rates of return, and we have made no attempt to do so. While our non-reductionist approach can inform educational policy, it does not provide the basis for estimating the "true" rate of return to secondary education. We do not wish to perpetuate the illusion of precision created by oversimplification.

(ii) Quo Vadis?

Our approach suggests that the Tanzanian policy regime should move closer to that adopted by Kenya. It does not provide clear guidance as to the future rate of expansion of the Kenyan secondary system. The high social rate of return in Kenya suggests that secondary education should be further expanded. Even at the margin, as we have measured it, the returns
are high. We have doubts, however, about this policy implication of the analysis.

Most of any incremental output of the secondary system in Kenya are likely to become self-employed farmers. It is tempting to presume that the social returns to secondary education will not be high in agriculture. But this is the sort of trap into which manpower planners are prone to fall. To measure these returns and the distributional consequences of this next phase of expansion requires a different methodology, based on rural surveys and farm-level production functions, from the one that we have used. We view this as the highest research priority for future educational policy in Kenya. Major expansion of the government system should wait upon its results. In the meantime we would not counsel government curtailment of the further expansion of privately funded education.

We are confident of the case for a substantial expansion of the secondary system in Tanzania. Human capital deepening will yield both productivity and distributional benefits. Our social rate of return analysis, when based on the market sector, merely reinforces this judgement. There is, however, one qualification concerning public sector employment policy. If the government service and public enterprises respond to the increased supply of educated labor by creating unnecessary white collar jobs, this opportunity will be wasted. The increase in labor productivity can only occur if incentives in the labor market encourage secondary-leavers to filter down and bring their greater skill to bear in lower-level occupations.

In the 1980s Tanzanian policy has been changing. Between 1980 and 1985 government secondary places increased by 10 percent and private places were permitted to increase by 29 percent. This reflects a growing
recognition by the government of a need for change. For instance, the Presidential Commission on Education recommended large scale expansion by the year 2000 (Ministry of Education, 1984). The change also reflects a bowing to the increasing political pressure for secondary expansion as the number of Standard VII leavers has grown.

How is it that the popular demand for secondary education could have been suppressed for so long in Tanzania while it was satisfied in Kenya? The answer appears to lie fundamentally in the difference in political systems. The greater centralization of power in Tanzania meant that educational policy was handed down from the top. There is another possible externality that Tanzania may reap from educational expansion: education produces a better informed citizenry, making it more likely that the benefits and opportunity costs of government initiatives are more fully recognized and debated.
References


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