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The Economics of Education in Uganda

It is not here proposed to go into questions of whether it is desirable to plan education from an economic point of view, or of the validity or otherwise of economic planning of education. These questions are of course fundamental to the subject, but they have been discussed so widely, and at such inordinate length, elsewhere, that the present writer is reluctant to add, at least in writing, to the volume of argument to which there can be no final conclusion, since it is based, for the most part, on normative positions.

It will be assumed, then, that economic considerations should play an important role in educational policy making, and that it is possible to get a clearer picture of the type of educated person that can best serve the economy by some form of planning, than by an uninformed guess.

For the purposes of this paper, high level manpower will be defined to include all those who require at least three years post primary education or training to carry out their occupation satisfactorily.

Approaches to the Economic Planning of Education

Up to now, the economic planning of education has followed two lines, which may be termed the manpower planning approach, and the cost/benefit, or rate of return approach. Adherents of the two causes spend a large part of their time in mutual abuse, so that the arguments for and against each approach have by now been fairly thoroughly threshed out.

A manpower plan is based on a survey of the number of posts requiring each educational category in an economy. Assumptions are made about the rate of growth of the Economy, and the income elasticity of need for high level manpower. From these the number of posts in each category requiring to be filled in any given period in the future can be projected. Add assumptions on death and retirement, drop out and failure rates, and the required enrolments in all the courses in the educational system can be calculated.

Clearly within this framework a large number of variations can be introduced, and few plans are quite as crude as this description suggests. Nevertheless they have all, to date, conformed to this basic pattern.

The major decisions to be made on undertaking such a plan are:-

(i) How detailed is the plan to be. That is, is one to plan for the number of graduates from University and the number from secondary school, to separate out arts and science graduates, clerical and technical workers, or to plan for the number of mechanical engineers and modern language specialists, of filing clerks and agricultural assistants. Formerly it was thought that the more detailed the plan the better, but these plans caused such embarrassment to the planners, that now more general plans, with perhaps twenty occupational categories, are in favour.

(ii) The income elasticity of need for high level manpower to be assumed. i.e., if the economy is to grow by 10%, must educated manpower increase by 20%, 10%, or 5%. Some years ago it was widely believed that this elasticity should be assumed to be around 2 or $2\frac{1}{2}$. The reason for this belief was never clearly spelled out, perhaps it was felt that as physical capital deepened with development, so there would need to be a deepening of human capital also. It was subsequently argued that as physical capital deepens, human productivity at all levels should increase, which suggests an elasticity of less than unity. Eventually Tinbergen did some cross-section empirical work which gave remarkably good fits for elasticities not significantly different from one. Thus a priori reasoning does not seem to be of much help, and the best that can be done is to follow such empirical evidence as there is, suggesting an assumption of unit elasticity.

The major criticisms of this approach (from those who believe in any economic approach to educational planning) are:-

(i) That it quite unrealistically assumes a Leontief universe, that is, rectangular isoquants. There are two variations to this criticism, one that it is simply unrealistic, that substitution can and does take place between different types and levels of educated manpower, and that prices must be taken in account; the other that one of the functions of education is to change the structure of the economy in a desirable direction, and that manpower planning specifically assumes that there is no change in the structure.

(ii) That if a manpower plan is to be implemented, the shortest period in which this can be done is four years, because of the length of the educational process, that five, ten, and fifteen years are the more usual plan periods, and that to assume an unchanged pattern of employment over such periods, even if the growth rate of the economy is correctly forecast, is absurd.

(iii) That the rigid nature of the plan produced suggests training people for specific jobs, rather than educating them, thus producing a highly inflexible educated population, which is economically, as well as educationally, highly undesirable.

These criticisms remain largely unanswered. The usual reply, is that even an imperfect plan is better than working in the dark, and since one cannot know beforehand in what direction the structure of the economy is going to change, this is the best that can be done. But if a plan is so imperfect as to be wildly misleading, it may indeed be worse than no plan at all. To the third criticism one may reply that because a plan is rigid, there is no need for the educational system to be so. This is true, but it may be difficult to persuade a policy maker of the need for flexibility when he has a plan in front of him, having all the appearances of being 'scientific'.

The rate of return approach is simply a cost/benefit analysis of the various types and levels of education, the costs being the discounted marginal cost of the relevant education plus earnings forgone while that education is being undertaken. The benefit, the discounted average lifetime earnings differential between those who have had a given education, and those who have terminated at the level below. This procedure has been widely discussed, but very little empirical work has been done outside the U.S.A. and the U.S.S.R., because the information on adequate samples is simply not available in most countries. One interesting characteristic of all the work so far done is the very high return to 'sixth form' (HSC) education, and the very low return to University.

The criticisms of this procedure are perhaps even more obvious than in the case of manpower planning:-

(i) Perhaps most important in a low income country. The procedure is, at best, only valid on the margin, while most developing countries are attempting to change a more or less uneducated population, into a relatively highly educated one.

(ii) Income differentials do not reflect differences in productivity, particularly in a civil service dominated economy, but rather such things as historical factors, trade union strength and so on.

(iii) No account is, or can be, taken of the possibility of unemployment reducing or increasing differentials.

Some answers can be made on these points:-

(i) Although long term plans are to increase education on a large scale, in the short run changes in the stock of high level manpower are, if the phrase may be used, relatively marginal. The rate of return calculation is a fairly simple one, once the data are available, and could certainly be done with new data every one or two years. It is important for economic growth that investment at any given time be made where returns are highest.

(ii) Few would claim that wage differentials accurately reflect differences in productivity at any given time. Nevertheless it is surely true that relative productivity has a powerful influence on differentials and that it is effective in the medium rather than the long run. Even in civil service dominated economies a large number of educated workers are still employed in the private sector, in this country at least, at rather higher emoluments than in the civil service.

(iii) If (ii) is accepted, then impending surpluses, threatening unemployment in particular categories, should show up in the calculations. Of course, if the market responds rather slowly, they may show up too late for effective remedial action to be taken.

The Rate of Return of Primary Education to Peasant Farmers

This particular empirical example is given, not because the figures so far obtained are in themselves particularly interesting, but because in this case the second of the objections listed above, and in this country possibly also the third, is not applicable.

A sample of only thirty eight has so far been obtained, this was divided into two groups, those with at least two years primary education, and those with less than this. The mean incomes of the two groups were calculated, and a 't' test carried out for significance, the results follow:

Mean income for those with education	1001/-
Mean income for those without education	697/-
t = 1.67 (t _{.05} = 2.03 with 36 d.f.)	

Income was measured over a 6 month period

Clearly these figures are not a satisfactory basis for any recommendations or conclusions, beyond that of suggesting that it would be worth investigating a much larger sample.

If a larger sample were to confirm the differences in income suggested

by these figures (clearly a big 'if'), an extremely high rate of return to two years education would be indicated, the recurrent cost of primary education in Uganda being approximately £10.5 per pupil per year, and the capital cost £10 per pupil.

It is a common view among agriculturalists that education works indirectly to increase the income of peasant farmers. That is, that the educated man is more likely to take a wage earning job in an urban area than the uneducated, and that it is this contact with a way of life different from that of the village which instills ambition and receptivity to new ideas. The argument might be altered to suggest that school life itself should have a broadening effect in the sense of opening a view of a wider world. In either case it may well be that seven years of education would have very little more effect on income than two years, though for other purposes two years may be nearly valueless. On this argument returns to a full seven years of primary education may be calculated.

$$10 + \sum_{0}^{6} \frac{10.5}{(1+r)^i} = \sum_{0}^{35} \frac{30}{(1+r)^i}$$

Which gives $r = 19\%$ approximately.

This is using the simplest possible assumptions, since with such data it is not worth using sophisticated ones. A more realistic view of the age earnings profiles would reduce this rate quite sharply.

The Uganda High Level Manpower Plan*

Unfortunately this plan is still confidential, since it has not yet been passed for publication by the planning commission, so that details of results and recommendations cannot be given, however the methods and assumptions used, and the reasons for adopting them may be discussed.

The plan was essentially an attempt to combine the two approaches to the economic planning of education outlined above. Firstly, four levels of manpower were defined:

1st level. Those filling jobs for which a University degree or equivalent is required.

2nd. Those requiring at least two years post CSC education or training.

3rd. Those requiring CSC, or at least three years formal post-primary training.

* This was prepared by Mr. C. Sentongo, Mr. J. Mukalazi and myself, under the direction of Mr. N. Bennett. Most of the ideas here expressed originate with my colleagues, particularly Mr. Bennett.

4th. Skilled craftsmen. Those either holding a trade certificate, or with at least ten years on-the-job experience.

A cost/benefit analysis of the four 'formal' educational levels was carried out in 1966 by Smyth and Bennett, which gave a ratio of benefits to costs of:

Primary	1.53
Secondary I - IV	1.11
Secondary V - VI	2.59
University	0.71

This strongly suggested a substitution of 2nd for first and third levels, but gave no indication of the extent to which substitution should take place. A survey has been carried out over a number of countries, both developed and developing, which indicated that the ratio of the numbers of the first three levels tended towards 1:4:4, whereas currently in Uganda they are 1:2.4:4.8, since this was the only information to go on, except that a shortage of highly trained technicians in Uganda is plain to casual observation, it was decided to carry substitution to the point where the ratios were 1:4:4 by 1981. There was no information on the fourth level, and it was decided to maintain the current ratio of second to fourth levels, this being 4:5.

Apart from this, the plan is a detailed manpower plan of the type described under that heading above, there are over two hundred occupational/educational classifications.

The economy was split into the ten sectors defined in the development plan, and, where applicable, further split into public and private sectors. This last breakdown was intended to check that the increase in salaries and wages in the public sector is in line with the planned increase of government recurrent expenditure. The total of manpower in each sector was planned to grow at the same rate as output from that sector. This is a considerable variation on the Tinbergen result of unit elasticity over the economy as a whole, since manufacturing industry, for example, is planned to grow very much more rapidly than agriculture, and is much more high level manpower intensive.

Substitution was carried out by projecting the present structure forward to 1981 at unit elasticity in each sector, and reducing the total in each sector to homogeneous 'manpower units' using current relative rates of pay as rates of substitution. It was desired to take the ratios between the levels in each sector after substitution depend

on those currently obtaining, so that although in all sectors there would be a substitution of second and fourth levels for first and third, a sector with, say, a currently high proportion of first level, would continue to have a relatively high proportion after substitution. Since the current and desired ratios over the whole economy, and the current ratios in each sector, are known, the desired ratios in each sector may be calculated.

At first sight the use of current relative rates of pay as rates of substitution is theoretically highly unsatisfactory, since this is only valid at an optimal point, and the explicit assumption is that the current position is suboptimal; for example, the current rate of substitution of second level for first must, on this assumption, be less than two for one, the relative rates of pay. However, the substitution is planned to take place over the whole period and must, at least to start with, be moving in the direction of current relative rates of pay.

To get an idea of the degree of distortion involved, an isoquant between first and second levels was fitted to the following assumptions:-

(i) That the new position is, from a profit maximizing point of view, precisely as good as the old. This is not, of course the assumption being made in the plan, and the distortion will be less on that account; however, on the national level the new position would still be preferable, since the cost of educating the larger number of second and fourth levels will be less than that saved on the reduced number of first and third, and total employment will increase.

(ii) That the isoquant is a smooth curve, continuously convex to the origin.

(iii) That at the intersection of the isoquant with the first level manpower axis it has a slope of -1. i.e. at this point the two levels are perfect substitutes.

(iv) That it is asymptotic to the second level axis. i.e. that at no point could the output be produced with no first level manpower.

The simplest curve to fit to these assumptions is a hyperbola which gives, with the y axis for first level, and x for second

$$10y^2 + 11xy - 414y - 1980 = 0$$

which gives a rate of substitution at the current position of 1.71, and at the planned position of 2.40.

For the rest, the proportion of each job category to the total within each level and sector was assumed constant. Thus the stock of each category required in 1981, and the stock existing in 1967 are known so that the numbers needed in each of the three planning periods, 1967 - '72, 1972 - '76 and 1976 - '81 can be calculated by reference to the development plan.

The government plans on total Ugandanisation of high level manpower by 1981, so that allowance had to be made for the replacement of expatriates. A death and retirement rate of 2% per year for men, and 10% for women was assumed. This is well below that normally found over a whole population because of the already sharply skewed distribution of educated Ugandans towards the lower age groups, this can be expected to become more marked due to the rapidly increasing output from the educational system.

Conclusion

In the past detailed manpower planning has proved uniformly unsuccessful. It may be hoped that the present plan will prove an exception, but would, perhaps, be unwise to rely on such a hope. This is not to say that such plans are necessarily useless, rather that the useful function they can perform has not up to now been recognised.

Ten months experience working on the plan expected to be published shortly by the Uganda government, has shown that such a survey and projections do indicate very clearly where serious shortages and surpluses in particular job categories can be expected in the short and medium run, up to four years or so; and where, over a longer period than this there is danger of over-expansion of a whole area of education, as for example the University arts faculty. Once a plan is completed it is no great trouble to keep it up to date. If this is done, although the original projections may be over fifteen years, by the end of the period, or indeed by the middle, the emphasis of the plan may have changed beyond recognition. Because prediction beyond a few years is necessarily a wild guesstimate, because education is extremely expensive, especially in relation to the resources of low income countries, and because the preparation of a detailed and accurate survey and forecast is a skilled and very long job, a detailed and long range plan should be drawn up, and adjusted annually as the new data are acquired. The emphasis of the plan must be on this annual revision, for this points up the need for flexibility.

From an economic standpoint two types of flexibility are needed in an educational system. Firstly, prediction over even five years cannot be accurate, hence there is a need for educational establishments to be able

to shift their output from one type of skilled manpower to another in the shortest possible time. Secondly a man's working life may be forty years or more, clearly over such a period the demand for his particular skills may decrease to almost nothing, in this case it is important that he be easily retrainable.

Both these economic requirements for flexibility suggest specialisation at the latest practical time in an educational career, and an emphasis on education rather than training, which may please educationists more than economists.

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