MANPOWER AND EDUCATION PLANNING IN UNDERDEVELOPED COUNTRIES

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The quarter century following the Second World War has seen a worldwide interest in education and manpower planning. Part of this interest is the result of the explosion of education itself in these years and the desire to see the now vast sums of funding well spent; part of the interest stems from the general postwar bias toward planning. A large part of the interest in manpower planning and forecasting has arisen from the recognition that labor markets are imperfect and that surpluses and shortages of different categories of manpower exist side by side at all levels of economic activity. The combination of manpower and education planning attempts to eliminate the human and economic waste involved in such imbalances by achieving a better matching between the outputs of the education system and the needs of the economic complex.

The concept of educational and manpower planning has been particularly attractive to underdeveloped countries in the postwar era. The techniques of such planning have held great promise for the special needs and problems of educational and economic development in the third world.

The need for national educational planning in the underdeveloped nations is one outcome of the history of educational development in these countries. Many colonial powers did little to provide trained manpower in their dependencies and even less to build indigenous institutions. In nations where the educational system was developed under colonial rule, it largely reflects the biases of the metropolitan structure. These systems have many strengths, but they still contain much that is inappropriate and irrelevant to the independent countries of the third world.

The inappropriateness of the traditional educational structure is particularly apparent in the changing economic circumstances of the developing nations. The structural changes in the economy present new needs and opportunities for educated manpower which did not exist a decade ago and toward which the traditional education is not oriented. In most countries the modern industrial sector has greatly expanded, and higher-skill workers and technicians are needed for efficient production. While at first employers sought to reduce costs by hiring unskilled workers, more recently they have recognized the importance of recruiting a skilled workforce and have begun to translate the requirements for skilled labor into an effective demand.

In addition to the skilled technician and educated worker, the growth of the size of the business unit now requires a type of managerial ability not heretofore necessary, and the expansion of the market requires the modernization and rationalization of the distributive trade.

Other structural changes have also led to a change in the demand of various kinds of manpower. Independence in Africa for example was accompanied by a huge expansion of public institutions and services: education, health, transportation and communication, utilities. They, in turn, imply a substantial increase in the demand for specialized personnel. The advances in public health, in turn, have led to an explosion in population. Much of manpower planning in the underdeveloped world specifies that while manpower must meet the specific skill demands dictated by development, development must be planned to absorb the total labor force. Thus the traditional education system must be reshaped to cope with a burgeoning population and changing economic and social frameworks.

Aside from the changes in the structure of the economy and the labor force taking place "naturally," most underdeveloped countries have formulated some kind of plan for economic growth. And once a country has committed itself to accelerated economic growth (it needs a strategy for development...), the decisions that have to be made develop a sense of priority, so that savings and manpower are directed into the most productive channels. In developing countries, the priorities in the plans is not only the independent and national development of the economy, but also such things as a time-table for localization and a concept of national integration. Localization is the process of replacing foreigners by nationals in the middle and upper-level positions in government, education and the economy.

The educational system is expected to provide the basis for national integration by teaching a common language (often English), recruiting a diverse student population, and nurturing a common history and culture. Once the social and economic framework is being planned, the educational sector must be structured in such a way that shortages of skilled manpower or the approach of the curriculum do not act as a constraint on the fulfillment of the national plan. In the process the preferences of those being educated may have to be subordinated to the government's overall national planning: the educational system in most of the third world is being restructured to be more responsible to government goals than to student demand. This kind of requirement imposes "planning" rather than "natural development."

The crucial incentive for the attempts at manpower and educational planning in underdeveloped countries is that they can rarely afford the waste of resources involved in imperfect labor markets. "Surely to say that what is needed is more of everything begs the hard facts of life... What is spent on education cannot be spent on capital outlay for a steel plant. Money ploughed back into teaching are not available in the industrial laboratory." The unplanned expansion of education has involved tremendous waste, both in terms of the creation of an unemployed educated class and in some cases of an over-qualified working class. As early as 1963, Achballi Cullaway documented the beginning of the existence of an unemployed educated class in Nigeria: "Mainly primary school leavers with an average to traditional farming, they set out hopefully to become the first generation wage-earners. But neither the jobs nor the vocational training exists that could meet their demands. And, as each year passes, the numbers of unemployed in the cities..."
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limited funding for education. One result of using this kind of planning in Africa is that education generally absorbs 20% of the national budget and in several countries accounts for as much as 40%. Also, the high social demand for universal literacy has led to a rapid expansion of the primary system, which has left few resources for the balanced development of secondary and higher levels.

The counter-part to the social objectives method in manpower planning is to work forward from student supply projections. The output of the educational system is estimated and then the economic system is analyzed to discover what sectoral growth rates, rates of productivity and occupational composition would be required to absorb the educated manpower. The problems of forecasting student flows of this approach are simpler than the problems of forecasting demand for educated manpower, but it seems unlikely that the optimum plan for economic growth would be that which maximizes the employment of the educated manpower.

There are several types of models which attempt to establish optimal patterns for education and manpower development. One model, based on an analogy with Golden Age capital accumulation models, was developed by Corea, simplified by Corena and Tinbergen, and extended by Tinbergen and Box, and has been used in India and some African countries. Essentially, they relate the number of educated personnel to given rates of economic growth through a series of linear equations with fixed coefficients expressing a basically proportional relationship. The proportions themselves have been determined by a cross-sectional regression of twenty countries. The formulation can be used both to substitute actual values for GNP and per capita GNP to test whether a country has the optimum number of educated manpower; and, by differentiating, substitute projected values for the growth rates of GNP and population to obtain the optimum growth rate for manpower stock.

There are several theoretical objections to the Corena-Tinbergen-Box model. The assumption of proportionality between demand for educated manpower and growth rate is dubious, as is the assumption of constant technology and productivity. Also, the model does not provide for substitution, other between different levels of education or between capital and manpower. Amartya Sen suggests that the model describes minimum requirements, rather than optimal, which would make it more akin to the Manpower requirements approach than other optimization models. He suggests four theoretical modifications: first, a weighting of the labor force in terms of formal education and "learning by doing"; second, the investigation of productive substitutability; third, the investigation of the effect of technological progress on input requirements and substitutability; and last, the formulation of a model that sets target rates of growth, considers alternative methods of achieving them and chooses between the alternatives on the basis of their relative costs and non-economic implications. Questionably, J. Blum, who used the Tinbergen model to calculate educational requirements for economic development in Turkey, concludes that a great deal more experimentation should be made with the models before they are proposed as practical planning instruments.

Rate of return models attempt to relate two sets of data: the costs of education, direct and opportunity, and on the returns to educational training, economic and non-economic.

15. M. F. C. Kupkow, "The Effects..., p. 3.
They can be used in cost-benefit analysis for individual projects and programs, or as the basis of linear programming models. The two best known linear programming models are the model of Nigerian education by Samuel Bowles and the model of the Argentine education system and economy by Irma Adelman. There are serious problems, both conceptual and data, with using rate of return analysis for education. Properly speaking, rate of return applies only to marginal changes and the changes in the underdeveloped countries’ educational output are considerably more than marginal. The direct costs are equal to government expenditures, but public education is not a competitive market where costs reflect the value of real relative scarce factor inputs; private schools are not profit maximizers and the costs of on-the-job training, in part, reflect a joint product. Also, education has aspects of a public good and a consumption good as well as the investment good whose return is being measured.

Once one accepts that rate of return analysis is appropriate for educational planning, there will remain problems of definition and measurement. The crucial question is how to specify the maximand. Most studies simply use net contribution to national income, i.e., net discounted life-time earnings. This use, however, assumes that all the wage differential is due to the increased education level and that the private benefit of education is equal to the social benefit. Neither of these assumptions is true in underdeveloped countries. Social inequalities in underdeveloped countries assure that the children of wealthier families are most likely to obtain higher education and are also most likely to have the connections to obtain better paying jobs. Also, salaries are determined more by institutional arrangements (many of them inherited from the colonial era) than by market forces, and do not reflect marginal or average productivity. A critical weakness of an approach based on earnings is that it assumes that the current structure of wages will be perpetuated through the life of the plan. Most of economic planning in underdeveloped countries is directed towards making this assumption false.

Even more serious is the fact that private benefits of education—wages—do not measure the non-economic social benefits. Education performs many functions important to the political and economic progress of underdeveloped countries which are not reflected in the wage structure. Literacy of the labor force enhances its mobility and increases its ability to absorb new techniques, but does not necessarily increase total employment by 5%. There is a number of questions concerning the derivation of these coefficients and the indexing system used. The primary objection to its use, however, is that the recent experience of at least the African countries has been that the elasticity of educated manpower in employment with respect to GNP tends to range around 0 to 1.0, suggesting that Habrison and Myers have greatly underestimated the coefficients.

The third approach to manpower and educational planning is to forecast a future state and derive manpower and education requirements from that forecast. The concept of “target setting” and “Habrison’s rule-of-thumb” are in this category, as is the more rigorous MRP or high-level manpower planning technique. The first step of the target setting approach is the assessment of the political, social and economic goals of a country. The targets are not predictions of what will take place, but indications of the direction in which the planer wants the society to move. The target is broken down by sector and the work force per sector in the target year is calculated, using a survey of current employment per sector and the sector target growth rates. In more complex models, national income is total employment of the labor force and the mobility and flexibility of the work force.

The problem of a rate of return is not limited to education. The same difficulty arises in calculating the benefits of such things as public health and transportation networks, which competes for government funding. Ultimately, the planner is reduced to subjective valuations of relative benefits of various projects. Rate of return analysis has been more popular with academics than with planners, and has not been much used in underdeveloped countries. The evaluation of one writer of the Adelman and Bowles models is that “such algebraic foibles may someday be useful.” The difficulty of specifying the maximund, the assumptions of linearity, and the lack of substitution possibilities in the models mean that the models have a spurious air of precision and accuracy. Adelman herself, after giving the usual caveats on problems of data, comments that the model “does not necessarily apply to the real Argentina.” The same could be said of supposedly less theoretical applications.

The procedure involved in high level manpower planning is similar in the others in target setting. The main difference is that manpower planning is usually restricted to calculating the requirements for skilled manpower in the modern sector, whereas target setting may include the entire labor force and economy; also, manpower planning starts from a forecast of future output rather than a targeted desired state. This technique has been used extensively in Africa, although not with any great accuracy.

Whether the final state is a target or a forecast, this approach has a number of problems. A first conceptual problem is that the model deals with requirements and not demand. It makes no allowance for the fact that the increase in the
output of the educational sector may lower the relative price of educated manpower and that this will have an impact on the demand for labor. Secondly, the model makes no provision for substitution among occupations and among education levels. Because a characteristic of increased training is an increase in flexibility, the links of the industry-occupation-education chain are bound to become less rigid. The education-occupation link is particularly tenuous, given the rapid change in the educational structure of the labor force. The last decade in Nigeria, for example, has seen a very rapid “devaluation” of the school certificate. Underdeveloped countries also present a peculiar modelling problem. Manpower forecasts start from a base year estimate of occupational and sectoral data. The occupational and sectoral data have limited usefulness however, because of the widespread practice of workers holding two or three jobs. Part-time, family and self-employment make it extremely difficult to estimate how many “full time worker equivalents” are required for a given level of productivity. It is also difficult to define what is meant by the public and private sectors, a distinction which may influence hiring standards, because government ownership of an unspecified number of shares of private corporations is common. All three approaches to manpower and education planning require certain basic information on the labor force, the education system, national income and productivity. These data are inadequate in all countries, but the gaps are particularly obvious in the countries of the third world. Each approach requires a basic survey of the current labor force broken down by occupation, industry and education. In many countries the size of the population is unknown, and the size of the labor force can be calculated only as a proportion of an estimate of population size. For more specific information, Morris Hone’s experience with Argentine data for a high level manpower study is typical:

For various reasons, these statistics provide only an approximation of the supply. The figures on degrees granted include some duplication. Changes in profession, deaths and retirements were not taken into account. In addition, the figures do not take into account the net immigration or emigration of members of specific professions. Not only has Argentina failed to develop an overall economic plan, but it also failed to collect current statistics on such items as labor force, employment, unemployment and educational. As a result, there are no official statistics upon which one can make a judgment about the current, let alone the future, demand for manpower.

In general, the data are worse for studies of the overall labor force, including the unskilled rural sector, than for the semi-skilled and professional sectors of the labor force. Not is there much information on other influences on the labor force: such things as labor skills other than those used in the primary occupation, physical well-being, efficiency of manpower utilization, land tenure, attitudes toward work, accustomed work discipline, all have implications for the number of workers, current and future, needed to produce a given level of output. Where statistics are available, care must be used in their use. If, for example, they were collected to provide evidence of progress toward localization, they are almost bound to be biased in the direction of greater numbers of nationals holding top-level jobs.

Data on national income also are unreliable. Small service and craft industries often are omitted because of the difficulty of assessing output from people with multiple occupations. Output from agriculture can only be estimated. Where a technique of sample productivity times population is used, figures for output are dependent on the often inaccurate population estimates.

Education figures also should be questioned. In many countries a large proportion of schooling, especially as the secondary school level is, is provided by private schools. The government rarely has accurate figures on private education, and what figures it has are certain to be inflated, especially in those countries where private schools receive a per student subsidy from the government. Abstinence is generally high, and there is a serious problem of large scale relapses into illiteracy because of inadequate follow-up programs. Thus, years of schooling are not necessarily equivalent to level of education. Forecasting is even more difficult, especially given the lack of hard data on the base year. There are three trends which have to be forecast for manpower and education planning. First, population estimates are based on current census data with population classified by age and sex; life tables for male and female, and fertility data. The first is generally inaccurate and the second two are changing in unpredictable ways. Also, most countries have an expatriate community whose future in the underdeveloped countries may be uncertain. The second trend is the development of national income or output. This is often assumed to be the targeted output of the development plan, which of course depends on the fulfillment of the plan. Trend analysis is impossible in most countries; there are few countries which have “a record of long-sustained industrial progress from which trends might be discerned.” Besides, to most planners of the third world “the past represents backwardness, stagnation, exploitation; trends must be broken, not continued.” In addition, however well-calculated a forecast of output may be, the not infrequent political and economic crises of the third world can render them invalid. Third, closely connected with population and output forecasts is a forecast of employment. Even where total employment can be forecast, it is an extremely complex task to project the occupational and skill structure of the labour force... A number of methods—inter-country and inter-firm comparisons, employers’ estimates of future occupational requirements, and extrapolation of past trends—have been tried out on the bases of a number of heroic assumptions. There is virtually no evidence to suggest which method, if any, provides reliable estimates of future skill structure.

With few exceptions, most manpower plans ignore potential changes in the occupational and educational structure, assuming presumably that the changes are either too difficult to measure or that the society and economy will not be changing as much as the politicians hope. Once the plan is formulated, there are obvious problems of implementation. First, the plan may not be accepted by the ministry at all if the recommendations are at variance with established policy or prejudices. Also, many planners become submerged in the process of formulating the plan, so that by the time the plan is finally presented, the data on which it is based are out of date. A second problem with implementation is that the planners seldom include incentives to have the plan fulfilled. A plan may succeed in

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33Muhibbet, Patrimon Dilemma... pp. 195-196.
37Loken, pp. 16-19.
establishing vocational schools but their establish-
ment does not necessarily guarantee that they will be able to attract students or that their graduates will, in fact, enter technical professions. Similarly, while planners may advocate the nation-wide establishment of primary schools and universal literacy, the local interest in education will vary from one district to another. Where some districts will build their own, unplanned, schools and demand teachers for them, people of other districts are reluctant to send their children to schools even at govern-
mental expense. P.J. Foster for example de-
scribes a traditional fishing village in Ghana:  
Asan represents one of those settings in which schooling is not important so far as an individ-
ual's status and authority are concerned. It is a basically conservative type of traditional organization in effectively prepare where it coexists with a relatively simple oc-
cupational structure and a homogeneous population.  
From this viewpoint, education is not highly regarded by the people of Asan since it ma-
teri4ly does not 'lead anywhere' within the tra-
ditional context.34  
A third problem is that the civil service is often simply incapable of carrying out a plan. The planning officers are seldom directly respon-
sible for implementation. Rather, the plan must be implemented through the cooperation of various technical ministries and the coordina-
tion of the central administration and regional and local authorities. Medium and short-term plans have to be formulated to supplement long-
term plans, and regional plans to supplement national plans. The finance ministry has to collaborate to provide capital and operating costs. This type of complex coordination en-
counters jurisdictional disputes, shortages of competent administrators, venal and insensitive bureaucrats, weak central governments and  
35Ibid., pp. 126.  
36Barth, Economic Resources of the Wealth of Na-
tions, p. 59.  
37Neville and Colquhoun, pp. 254-255.  
38In 1967, the government was unable to impose a plan contrary to the will of the population. This partly because of the weakness of the central governments, but even more because of the nature of choices in the underdeveloped countries. In the developed countries planning is done within the framework of satisfying basic social demands: primary and usually secondary school is provided for everyone, and planning attempts to shape the system so that train-
ing is available for the potential jobs. In under-
developed countries the choice is often between satisfying social demand and rational manpower planning. The social and political fabric is not strong enough in any third world country to withstand popular demand, and planners are merely put in the position of saying "I told you so." When the economy is faced with the problem of unemployed school leavers. 
On the negative side, manpower planning may have diverted attention from the other aspects of human resource development. Short-run op-
opportunities, qualitative problems of education and training, comparative costs of vocational pre-job training and on-the-job training, the effects of education in distribution of income and opportunity. Preoccupation with those aspects of the problem which can be quantified diverted attention from more important issues which could not. Given the personnel de-
mands of collecting and analyzing data and forming manpower plans, and the limited contribution that such plans have made to policy, one could ask whether the return on the educated talent required for the plan would be greater if used on other projects.  
The question remains that if the results of the models used in the past are not worth the de-
mands they make on scarce administrative and technical resources, what kinds of approaches to the problems of education and manpower are likely to prove more fruitful? The problem which had been posed to planners was whether to depend on judgment and analogies and pro-
cede immediately to manpower forecasts, or to start at the beginning with data collection and analyses of the key relationships. Most plan-
ers, under pressure from the educational authorities and economic planners, produced national manpower forecasts, only to discover that their findings were of dubious accuracy and their plans impracticable. Attention and effort has now been shifted from the macro ques-
tions of planning to the micro questions. Study is being made of the basic relationships, and planning now starts at the project and local level.  
Areas of research which at the moment seem to be the most fruitful are on the composition of the labor force in different industries and its change with respect to different levels of out-
put; the education-occupation linkages; detailed studies of clusters of related occupations to assess possibilities of substitution, adequacy of training and institutional frameworks, and comparative costs and quality of formal and informal training, and work on such issues as educational and income distribution and the structure of institutions and incentives. Also, economic planners recognize that the modern sector cannot develop without significant progress being made in the rural sector, research will have to move away from high-level man-
power forecasting toward analyses of the man-
power-investment relationships in agriculture and in small scale non-agricultural enterprises. Planning now recognizes that markets are considerably more flexible than the planners had supposed. Gaps between supply and de-
mand of trained people can be filled by the importation of skilled workers, substitution of capital for labor, upgrading lesser skilled workers and adjustment of relative wages. In the rapidly changing economic structure, schools should concentrate on turning students educated to the point that they can be readily
trained by prospective employers; this necessitates proficiency in language, mathematics and basic science. Most countries have recognized that implementation of any plan is a local responsibility and national planning of any sort is most productive when it is built up from a myriad of local plans rather than imposed from above. Manpower forecasting and allocation is now done on a project basis, with scarce manpower being budgeted in the same way that scarce capital and materials are allocated.43 Governments then pay more attention to all types of training potentials in the country, especially on-the-job training by contractors, and not just to formal education system.

The conclusion seems to be that the approaches to manpower and education planning created in the developed countries are too ambitious, too complex and too data demanding to be applied in the third world. Here, the most fruitful approach seems to be a combination of basic research into the fundamental relationships and a project-by-project system of manpower allocation.

References


ices of Education, I, "An Evaluation of a Manpower Forecasting Exercise."


