

OUTLINE CRITIQUE OF ECONOMETRIC METHODOLOGY
IN TECHNOLOGICAL AND EDUCATIONAL PLANNING

1. General

Through historical accident, I am looking at some effects of introducing telecommunication systems into developing (underdeveloped) countries. The subject embraces the social politics of the mass media, the economics of imperialism, and planning; but it is the research methodology behind the latter I describe here. It consists of;

- (a) Cost-benefit or cost-effective studies in technology transfer and supply-push models of industrial production;
- (b) Educational rates of returns to investment in capital including "human capital";
- (c) Manpower planning and development economics.

These areas are linked in the planning decision and typically share a set of common assumptions which are ideological rather than neutral. Readers of Radical Stats. Newsletter can tell me a lot about such techniques, and I wish they would!

2. Summary of Underlying Assumptions

This is in two parts: a criticism of neo-classical economics (vis-a-vis objectivity in science), and an argument against positivist science in economics.

Mainstream economic theory possesses unverifiable laws, some of which are said to be immutable (such as "supply and demand counteract to produce equilibrium") and which are characterised by cause-and-effect mechanisms (a priori reasoning). This sort of reasoning emphasises "facts" (especially quantitative ones, i.e. statistics) which are only interpretable by those empiricists whose job is to defend the status quo (members of some Government commissions and productivity bargainers, for example).

The aim of this theory is to avoid externalities and thereby (it is assumed) to remain politically neutral. To this end economics tries to emulate the "exact" sciences (physics, logic, astronomy) and emphasises its analytic character until it is irrelevant to socio-political reality. Here are some examples of such analyses.

- (a) Costing in money terms where factors (like convenience or environmental pollution) have poor fiscal proxies.
- (b) Costing in index terms where the values of factors are said to be objectively assessed (but are inevitably given ratings from the dominant value system). Such "rational resource allocation" relies on the imputing of numbers (prices, ratings) to any effect you like.
- (c) Tendentious techniques such as over-emphasis on correlation, the calculation of amortization rates which ignores the inflationary effects of structural under-development, or the calculation of educational rates of return using (a) or (b). Common to such a procedure is the calculation of the most efficient means to achieve desired objectives. Even if it takes social benefits into account the solution to this input-output matrix depends on the extant allocation of factors.
- (d) Covertly ideological procedures. One example is to look at education as either an investment or consumption good; another is to describe the end of education as the student's potential to earn more so that she/he embodies various quantities of (human) "capital". This concept assumes that the educated person is the "output" of the system and the accumulation of such "capital" comes from the desire to maximize surplus and satisfaction (an optimization process which I criticize below). A third example is linear programming which assumes autonomy between productive and consumptive sectors: the limitations of linear expansion strategies have been recognised by development educationalists who perceive a need for qualitative changes and diverse alternatives in growing educational systems (Faure, 1972).

The validity of this economic theory and its teaching are brought into question: even ascribing to economic features of the other sciences makes little difference. Thomas Kuhn (1962) and Paul Feyerabend (1975) have convincingly argued for the relativism inherent in the physical sciences: many scientific theories which are partially falsified remain in use (contrast this with Popper, 1959) while other branches of science escape verification of any sort. On the contrary, both economic and physical science are most successful when their findings are politically expedient (for evidence in the latter field, see recent issues of Radical Science Journal). As Rose Dugdale has remarked (1972), "Economic policy is not derived from economic theory. Rather, the dictates of economic need and political-economic policies, determine acceptability of the theory - acceptability by the ruling classes, for the ruling class."

The attempt to make economics a positivist science is thwarted by the reference point - embedded in the status quo - from which reality is oversimplified. The political thought in which mainstream economics has its base comes from bourgeois rationality which (1) indulges in spurious quantification and (2) claims a neutrality which allows it to make objective prescriptive statements. The healthy state of this art comes from its political existence and its remoteness from practice.

3. Problems in the Economics of Technology and Education

I want to look now at the following areas in the wider problem of technology and education:

- (a) The "expert" myth and increasing quantification in econometric models; management approaches.
- (b) Social costing and analysis.
- (c) Economics of education and a consideration of capital.
- (d) Summary/postscript.

(a) The stated and unstated reason for introducing numbers into a study is supposedly to give a more accurate picture of reality. To get any meaning out of these numbers they must be manipulated by increasingly complex algorithms and computing aids.

It is argued that this complexity merely justifies the growth of specialization and the need for expertise; added to these institutional barriers, quantification also serves to disguise the expedient role of economics. By this means, the uninitiated are kept out and criticism of the way economics is taught is made more difficult. All sciences tend to have this feature of mystification: if proofs and theorems were too easy to understand, professionals would soon be out of a job.

A common analytical mistake of investigators is in comparing non-equivalent populations (Moroney, 1975). I have often discovered in development studies that causal relations are imputed between populations that differ structurally. For example, when studying costs and returns to on-the-job training (Mincer, 1962), one aim is to investigate the link between education and income. If, however, property income is added to labour income, we get a case of false causality: income profiles are artificially widened because there is a positive correlation between property income and education (and age) in most societies, a feature related to class structure as much as anything.

The reasoning that describes Third World economies as merely being at an earlier stage of development to those of advanced industrialised countries is the most misleading use of this technique.

Another result of the psychology of quantification in development plans is a reliance on operational research. It is interesting to note that it was only long after the contract was signed for the Satellite Instructional TV Experiment that the crucial issue of software was thought about (educational broadcasts to village communities). One Indian commentator sourly remarked that the programming department was "staffed by persons who belonged to our newly created 'operational culture' of management experts who talk glibly of systems and operational research".

At least half a dozen variables are important to understanding growth: economic institutional, socio-cultural, psychological, education and technological (each exhibiting ideological elements). Typically, the last five of these are seen as exogenous factors to econometric planning.

(h) In industry, optimisation is used to increase the ration of capital to labour and in planning a similar procedure is used to allocate scarce resources. The object of the former is to increase productivity per man hour while the motive for the latter is to "maximize welfare" (through education, for example). Historically, however, mechanisation has usually gone on without drastically cutting the workforce. The capitalist's answer is to expand the market through built-in obsolescence and titillation of consumer demand. The social costs of this are rarely included in optimisation: advertising, packaging, hoarding, and pollution come to mind. If demand were not artificially created, other social costs might result: unemployment, health and crime (Commodity liberation).

There exist many recent studies that draw attention to value-laden choices in cost-benefit and cost-effective analyses, so I would like to give just one example from a study of the introduction of satellite TV into India (Dhawan, 1972). Cost calculations are a sum over the amount of each resource-use multiplied by its marginal opportunity cost. But these are difficult to measure in an imperfect market economy and are only speculative (unless you happen to have an intimate knowledge of all other projects competing for resources). Dhawan remarks that "costing a project in isolation is speculative to the extent one speculates about prospective opportunities being missed in undertaking the project ... a project being evaluated in isolation renders cost-benefit analysis a far less objective tool of project selection for development than it is widely believed to be".

The shadow prices of opportunity costs are calculated from simultaneous equations to determine the foreign exchange value of the resource. The drawback of this linear programming is that results are highly sensitive to assumptions (in one case there was a 100% difference in exchange rate between two sets of assumptions).

(c) The economics of education is an optimising exercise to allocate resources. Behind the provision of state education is the liberal ideology that the distribution of intangible assets helps balance economic disparity. In the 1940's, the American economist, T.W. Schultz, introduced the idea that the school system held a great stock of human capital. In the second section I mentioned the mistake of regarding education as an item of exchange: the notion that education acts as a leveller has some validity (this thesis is the basis of OECD's indicator programme on which Roy Carr-Hill is working), but the argument falls if the social rate of return to education exceeds the private return.

Rate of return sums are one of three methods used to allocate educational resources, the other two being manpower forecasting and social demand projection. Rate of return sums often exhibit many anomalies related to class education and income. The early importance of socio-economic background to the scholar over-rides the ability factor later on, for example (Psacharopoulos, 1973). Secondly, society does not assess income in terms of social returns - compare the income of a dustman with that of an airline pilot: high remuneration does not depend on actual output (cf. doctors and nurses).

Manpower forecasting aims to achieve the desired labour to output ration (L/O). Since targets are extrapolated from past trends, the increasing O may hasten innovation, thus making L more productive, development economists are required to compare technologically advanced production with under-developed industry. Predictions based on such comparisons lack confidence.

Rate of return analyses really break down with their narrow definition of private costs to education. These costs are regarded as the foregone earnings of the student but since it is the productive surplus of the learner or his/her sponsor which economists are talking about, we get ridiculous results like an infinite rate of private return to four years of primary education! (No earnings foregone.)

(d) Econometric methods in technology and education thrive on a myth of objectivity and accuracy. Through increasing quantification and the present methods of teaching, economics claims a spurious neutrality. In fact, the acceptability of economic theory depends on its compatibility with political choices about economic policy. An A.I.D. study of the costs of instructional media (Jamison and Klees, 1973) indicates the misplaced importance of capital in such estimates, remarking that even markedly different ways of treating capital result in the same politically acceptable value for costs per student hour. A case for intuitive statistics?!

In conclusion, it is clear that research methods derive in the first place from the ideology behind present courses of action and these require radical revision.

I would be very interested to hear from any reader of similar examples in this field and more importantly of criticisms of this approach. To show that not all my work is negative, I am also trying to figure out a way of assessing the effect of introducing telecommunications into a West African country and I would welcome any ideas for this.

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REFS.

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