Benefit-Cost Analysis of Alternative Techniques of Production for Employment Creation

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TRADITIONALLY economic growth has been regarded as a planned attempt at maximising real per capita income subject to certain financial and resource constraints. Employment creation, too, has typically been recognised as a goal of development, even though it has generally taken second place to the income objective. In the main, this reflected a wide consensus that the two objectives are reconcilable.[2] However, it is being increasingly realised in several developing countries that while the income objective of development may be achieved, the employment objective is often frustrated owing, among other things, to the capital-intensiveness of industrialisation.[3] With improved public health acting to reduce death rates, several developing nations are witnessing a one-sided contest between rapidly expanding labour forces and dismal rates of employment creation. The resulting swelling of unemployment puts a new and urgent premium on massive job creation to prevent an otherwise inevitable human tragedy.[4]

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[2] There are some important exceptions, however. See ILO: *Employment objectives in economic development*, Studies and Reports, New Series, No. 62 (Geneva, 1961), and idem: *Employment and economic growth*, Studies and Reports, New Series, No. 67 (Geneva, 1964).

[3] For recent research on this subject see Michael P. Todaro: " An analysis of industrialization, employment, and unemployment in less developed countries ", in *Yale Economic Essays* (New Haven (Connecticut)), Vol. 8, No. 2, Fall 1968; and Werner Baer and Michel Hervé: " Employment and industrialization in developing countries ", in *Quarterly Journal of Economics* (Cambridge (Massachusetts)), Feb. 1966.

[4] Gunnar Myrdal's vivid but alarming account of prospects in Asia is highly relevant. See his *Asian drama. An inquiry into the poverty of nations*, 3 vols. (New York, Pantheon, 1968), particularly Part 5 of Vol. II: " Problems of labor utilization ".

The emphasis on employment creation represents a formidable challenge to economists and manpower planners. For several years now the attention of manpower economists has focused on long-run forecasts of future labour market conditions. The new stress on employment creation, on the other hand, with its sense of urgency, directs attention to short- and medium-run conditions.

The present article argues that employment creation in developing countries could be given a major boost if only alternative techniques of production were evaluated *ex ante* using *social benefit*-cost techniques. In the past, benefit-cost studies have been applied only to capital utilisation since it was universally believed that shortage of capital is the bottleneck in development. While this view no longer commands the same degree of acceptance, it is surprising that manpower planners have shied away from benefit-cost analyses of labour-intensive relative to capital-intensive techniques of production, since such analyses could throw much light on the potential scope for employment creation in developing countries. The first part of the article attempts to examine the limitations of conventional manpower planning, the second part presents, in outline, a suggested method for applying social benefit-cost analysis to manpower planning, and the final part provides a hypothetical illustration of the method at work.

I. Macro- versus micro-level manpower planning

At some risk of over-simplification, traditional manpower planning can be described as macro-planning in the sense that it aimed at deriving labour requirements for economic growth from certain macro-economic data such as planned investment and aggregate input-output relationships.[1] In the absence of detailed labour market information, such an approach had the merit of yielding quantitative guidelines valuable for educational authorities as well as economic planners. Unfortunately, macro-economic manpower planning ignored a considerable amount of micro-economic detail, such as wages and earnings and relative factor prices, which are essential for any meaningful manpower study.[2]

This must not be understood as implying that in the past all manpower studies entirely ignored micro-economic data. To be sure, these

[1] For good examples of macro-planning covering the experience of a large number of developing countries see C. Hsieh: "Planned rates of employment increase in development plans", in *International Labour Review*, Vol. 97, No. 1, Jan. 1968, pp. 33-71, and idem: "Approaches to fixing employment targets in development plans", ibid., No. 3, Mar. 1968, pp. 273-296.

[2] An important exception is M. Blaug: "Approaches to educational planning", in *Economic Journal* (London), Vol. LXXVII, June 1967, pp. 262-287.

facts have usually been examined, sometimes in considerable detail, but only as background material for, and quite independent from, forecasts of future occupational and training requirements. There are relatively few empirical studies incorporating the role of wages, for example, into these forecasts. The assumption implicit in this is that the supply of labour at the relevant wage rate is perfectly elastic, so that the volume of (future) employment is entirely determined by changes in the demand for labour. Accordingly, past manpower studies have typically dealt exclusively with demand conditions.

The celebrated " disguised unemployment hypothesis " may have been partly responsible for this situation. This hypothesis assumes that in the traditional (subsistence) sector of a developing country, a certain volume of labour will be employed at subsistence wages, the remainder of the total labour supply in this sector representing disguised unemployment. In the modern sector, the fact that wage rates are higher than the subsistence wages in the traditional sector enables employers to hire additional workers without raising wages. In fact, a profit-maximising employer can expand his workforce until the marginal product of labour falls to the level of the subsistence wage rate, but social pressures may prevent him from so doing.[1] As with a private employer, governments may also expand employment at the going wage rate by simply transferring excess labour from the traditional sector for utilisation in public works programmes and other types of income-generating activities (until, of course, the excess labour supply has been fully absorbed). Therefore what determines the volume of employment in the modern sector is simply the conditions of demand for labour in the modern sector, with wages playing no role in the process.

The above is an unrealistic picture of actual conditions in developing countries not only because it disregards the influence of supply conditions and wages on the volume of employment but also because it fails to take account of the institutional determinants of labour utilisation in developing countries. To cite just one example, it is highly damaging to the hypothesis presented above that the effects of seasonal variations in farming activities on labour demand in the traditional sector are left out entirely.[2] Thus when the demand for labour rises sharply with the onset

[1] For an extended discussion of these social pressures see P. T. Bauer and B. S. Yamey: *The economics of under-developed countries* (London, James Nisbet & Co.; Cambridge, University Press, 1957), particularly pp. 76-79.

[2] Another institutional limitation to the disguised unemployment hypothesis stems from the so-called extended family system, widely prevalent in Asian and African countries, which guarantees each member of the family a share of the family income regardless of his contribution to that income. This share may act as the minimum reservation price of disguised unemployed so that if the wage rate offered in the modern sector is not significantly higher than the reserve price, there will be little incentive for the individual to move. For more details on this point see Bauer and Yamey, op. cit., pp. 64-67.

of the peak season, workers who used to be disguised unemployed now become absorbed in productive employment earning wages above subsistence level. It is even possible that increased activity in the peak season might attract some workers away from wage employment in the modern sector. In this context the difficulty of organising labour transfers as suggested by the disguised unemployment hypothesis becomes readily apparent.

The implication of these remarks is that if manpower planning is to make a significant contribution to employment creation, it must substitute the detailed approach of micro-economic theory for the aggregative approach of macro-theory. Manpower planners in future should pay greater attention to case studies of individual projects than to projections of manpower requirements for the entire economy or major sectors thereof. For only in such specific case studies can the tools of economic analysis be most fruitfully utilised. This is particularly true of the benefit-cost techniques of evaluation which may be used by manpower planners, along the lines described in the next part of this article, to make an *ex ante* appraisal of labour-intensive and capital-intensive methods of production—with a view to furthering the employment objectives of development.

II. Benefit-cost analysis and manpower planning

Benefit-cost analysis is a well-known technique of project evaluation both *ex ante* and *ex post*.[1] In the past, it has been used primarily for promoting efficient capital utilisation. There is, however, no reason why it cannot be applied to manpower planning since manpower, like capital, is a factor of production requiring planned utilisation.

The suggested benefit-cost approach to manpower planning is analogous to its traditional usage in public expenditure programmes with one important difference. In manpower planning it can help to attain the objective of employment creation through comparisons of labour-intensive and capital-intensive production methods whereas in its traditional usage benefit-cost analysis aimed at determining conditions that would justify capital outlays. The manner in which benefit-cost analysis can promote employment creation will be demonstrated below.

[1] There is a large volume of literature on benefit-cost analysis. A comprehensive bibliography, somewhat dated now, is given in A. R. Prest and R. Turvey: " Cost-benefit analysis: a survey ", in *Economic Journal*, op. cit., Vol. LXXV, Dec. 1965, pp. 731-735. See also I. M. D. Little and J. A. Mirrlees: *Manual of industrial project analysis in developing countries*, Vol. II: *Social cost-benefit analysis* (Paris, OECD, 1968). A recent discussion of the application of benefit-cost analysis to manpower issues is given in G. G. Somers and W. D. Wood (eds.): *Cost-benefit analysis of manpower policies* (Kingston (Ontario), Industrial Relations Centre, Queen's University, 1969).

1. Manpower as human capital

In line with the so-called "generalised theory of capital"[1] manpower can be regarded as a form of capital, developed through schooling and specialised training and utilised, together with co-operant factors, in the production of goods and services. Just like physical capital, it is capable of generating a long-term income stream, measured in terms of annual or monthly earnings, which represents the return on investment incurred in developing it for specific tasks. Moreover, and again as with physical capital, manpower is subject to appreciation and depreciation over time. Although the owners of human capital are free agents, the services they offer in the employment market are susceptible to appraisal with the measuring rod of money. It is this fact which permits a fruitful application of the benefit-cost technique to manpower planning.

2. Labour intensity and the wage bill

Since manpower is a basic input in any production activity, each particular development project features a certain level of labour intensity. If its labour intensity is high, the project in question has a relatively high labour-output ratio, and vice versa. If the labour intensity as well as the structure of wages of a development project were known, the wage bill could then be calculated. Such a calculation might be done at different levels of disaggregation in order to reflect the occupational composition of the labour intensity of the project. At any rate, such a calculation would represent the first step in manpower benefit-cost analysis.

3. Cost of capital and other inputs

The cost of using land, machinery, fuel and other factors of production, besides labour, needs to be calculated as well in order to arrive at a comprehensive project cost figure. The main difficulty here is likely to arise in connection with estimating the cost of capital consumption. Typically, machinery and equipment come in a variety of forms, costs and working lives. This may necessitate detailed and time-consuming computations of the rates of depreciation of different kinds of equipment. A convenient short-cut method (used in the illustration presented later) is to use, where possible, a composite capital input representing the entire bundle of equipment necessary for the project in question. A simplified method of this sort is justified on the ground that the purpose of manpower

[1] An early source of the concept of human capital is T. W. Schultz: "Investment in human capital", in *American Economic Review* (Menasha (Wisconsin)), Vol. LI, No. 1, Mar. 1961, pp. 1-17. A valuable book of readings on the subject of human capital is M. Blaug (ed.): *Economics of education*, 2 vols. (Harmondsworth, Penguin Books, 1968). See in particular the article by H. G. Johnson: "Towards a generalized capital accumulation approach to economic development" reprinted on pp. 34-44 (Vol. 1).

benefit-cost analysis, as mentioned above, is to promote employment creation as well as the economic use of capital resources.

Rates of depreciation of equipment are calculated on the basis of the usual discounting procedures which require the selection of a specific rate of discount reflecting the opportunity cost of capital and the risk factor associated with actually realising the expected monetary reward of investment. As the literature on the subject indicates [1], selection of a discount rate as well as determination of the finite working life of a piece of equipment may be subject to significant margins of error, so that attempts at measuring the capital costs of a particular development project are virtually certain to be less than precise.

4. Benefits

The problems associated with measuring costs are indeed small compared with the complex difficulties involved in the measurement of benefits resulting from a development project. Benefit-cost analysis is far from a perfect tool. Any analyst using it needs to exercise considerable imaginative abilities provided only that he is at all times logically consistent.

Measurable benefits of a given project are typically identified and quantified, so far as this is feasible, on the basis of independent pre-investment studies. In using such studies, a manpower analyst will be particularly interested in the manner in which benefits have been defined. Typically, pre-investment or feasibility studies of such public expenditure programmes as highway construction or irrigation works include both the direct benefits immediately attributable to the project (e.g. additional production or commerce created) as well as spill-over benefits indirectly generated (e.g. in sectors of the economy benefiting from increased sales to primary users). What is likely to be a serious omission, and one that a manpower planner should attempt to rectify, is the multiplier effects of the recurrent expenditures of public projects. This is a fundamentally important matter and it will be discussed in some detail below along with other social elements of benefit-cost studies.

5. Benefit-cost ratios

Manpower benefit-cost analyses aim essentially at deriving a set of benefit-cost ratios, each ratio reflecting a particular kind of production technique such as labour-intensive or capital-intensive. These ratios can then be compared to find which particular production technique should be chosen on *social efficiency* grounds (see below). Whenever the benefit-

[1] A particularly useful reference on the problem of selecting an appropriate rate of discount for use in public projects is Otto Eckstein: *Water-resource development: the economics of project evaluation* (Cambridge (Massachusetts), Harvard University Press, 1958).

cost ratio of a labour-intensive technique exceeds that of alternative techniques, it should be the one selected for implementation.

Thus, by evaluating proposed public expenditure programmes along these lines, a manpower planner can determine their implications for employment creation with a view to promoting the employment objectives of economic development. At the same time such an approach will have the important advantage of making manpower planning and assessment an integral part of economic planning.

6. Social benefit-cost considerations

For a profit-maximising firm, the use of market prices and costs in project appraisals is perfectly valid. But not so in public projects which are concerned with the welfare of the entire community. Rather than maximising profits, public development projects aim at maximising social real income. Although difficult to measure quantitatively, social rather than market valuations are the relevant ones for manpower benefit-cost analyses. Indeed, the central argument of this article (that employment creation can be boosted through labour-intensive development strategies) rests on the hypothesis that social benefit-cost considerations, discussed below, strongly favour labour-intensive techniques of production in many developing countries. Unfortunately these social criteria have largely been ignored in the past, partly owing to excessive preoccupation with promoting efficient capital utilisation and partly because of inadequate appreciation on the part of government officials and planners of the social benefits of reduced unemployment.

Because of its great relevance for employment creation in less developed countries, it is worth while to elaborate on the relationship between unemployment and social benefit-cost analysis. A number of authorities [1] on benefit-cost analysis of public projects in economically *advanced* countries argue that the existence of national or regional unemployment does not warrant undertaking public expenditure programmes in order to promote full employment since governments of advanced countries can utilise expansionary monetary policies or tax cuts instead. Therefore, when there is unemployment the choice a government

[1] N. D. Baxter, E. P. Howrey and R. G. Penner: " Unemployment and cost-benefit analysis ", in *Public Finance* (The Hague), Vol. XXIV, No. 1, 1969, pp. 80-86. Roland N. McKean: *Efficiency in government through systems analysis* (New York, John Wiley & Sons, 1958) argues that, while unemployment warrants some adjustment of benefit-cost ratios, it is better not to make them because of practical measurement problems. Julius Margolis: " Public works and economic stability ", in *Journal of Political Economy* (Chicago), Vol. LVII, No. 4, Aug. 1949, pp. 293-303, argues that public works expenditures are poor anti-cyclical measures because, being subject to significant time lags, they may not be completed before the economy achieves full employment. On the other hand, some authorities feel that a downward adjustment of benefit-cost ratios is warranted on account of national or regional unemployment. For example Eckstein, op. cit., recommends the use of a lower rate of interest or factor prices to achieve this purpose or simply to implement a greater number of public projects in a period of unemployment than would be justified at other times.

has to make is not between undertaking or not undertaking a public project but rather between alternative expansionary policies. For this reason, the true social opportunity cost of a public project undertaken to create jobs is zero.

The argument of the preceding paragraph, however valid for advanced countries, is hardly applicable to the *developing* countries where, for structural reasons, monetary and fiscal stabilisation policies are far from effective. The monetised sector in most developing countries is relatively small and a modern money and banking system is usually in an early stage of development. Similarly, defects in tax collection and fiscal management are common. Accordingly, governments in many less developed countries may not have a mix of stabilisation policy tools to promote growth and employment as alternatives to public expenditure projects. A public project undertaken for these purposes can therefore be expected to reflect positive and significant social opportunity costs, and under such circumstances it would be justified and indeed essential to recognise the social benefits of reduced unemployment attributable to a given public project.

MULTIPLIER EFFECTS

A particularly useful method of measuring the social benefits of employment creation resulting from a public project is the well-known income-employment multiplier process. In countries where detailed input-output tables are available, the empirical task of tracing and measuring the direct and indirect inter-industry demands stemming from any particular public project undertaken in a period of unemployment would be feasible though laborious.[1] Since the typical less developed country lacks such detailed information, multiplier effects may have to be calculated using aggregative data. It is likely that the size of the aggregate multiplier will be at least 5 since more than 80 per cent of incomes in most developed countries are spent on current consumption with a national saving rate of less than 20 per cent.

The inclusion of multiplier effects on the benefits side is unique to public development projects inasmuch as these projects benefit the whole community. Although private investment projects also generate multiplier effects, these are incidental spill-over or external benefits and as such they are of no concern to the private investor. For this reason, they are excluded in project appraisals undertaken from the standpoint of private investors.

The inclusion of multiplier effects is likely to give labour-intensive production methods a considerable advantage over capital-intensive

[1] An empirical example of this kind of analysis is given in Robert Haveman and John Krutilla: " Unemployment, excess capacity, and benefit-cost investment criteria ", in *Review of Economics and Statistics* (Cambridge (Massachusetts)), Vol. XLIX, No. 3, Aug. 1967, pp. 382-392.

alternatives since the larger the degree of labour intensity and the wage bill the larger the percentage of project costs spent domestically, whereas capital goods generally have to be imported from abroad. However, this may not occur in the case of open economies with relatively heavy dependence on imported consumption goods, since there will be considerable foreign leakage of local consumption expenditures with a correspondingly reduced domestic multiplier.

OPPORTUNITY COST OF FOREIGN EXCHANGE SPENDING

Development projects with significant import requirements form a drain on the foreign exchange holdings of developing countries. This often represents a sizeable burden on such countries, which as a rule are short of foreign exchange. To the extent that there are alternative methods of production requiring few or smaller amounts of imports paid for in convertible currency, it would be in these countries' interest to adopt such alternative techniques (other things being equal). Hence it is necessary in evaluating the social costs and benefits of different techniques of production to take account of the implied social opportunity cost of the foreign exchange requirements.

The main difficulty in this connection lies in the calculation of the social opportunity cost of foreign exchange. While there are no established procedures, some ingenious methods have been devised. For example, Benjamin Higgins has constructed a simple method of measuring the imputed cost of imports on the basis of an " essentiality rating " which accords increasing social justification for development projects requiring greater reliance on domestic rather than foreign supplies of materials and resources.[1] Although such a procedure entails some arbitrariness, it is preferable to entirely ignoring the social opportunity cost of imported machinery and equipment paid for out of valuable foreign exchange funds.

TRANSFER PAYMENTS

Another difficulty in social benefit-cost analysis, of particular relevance to manpower planning, is the financing problem arising from transfer payments. In the public as opposed to the private sector, it is the social cost of a proposed project that must be computed. Theoretically, the social cost is measured on the basis of the so-called " with-without " comparison. In other words, a situation *with* the proposed project is compared with a situation *without* it, the difference in cost being the real cost to society of sustaining the project. It is important to realise that the " with-without " comparison will yield a measure of cost significantly different from conventional book-keeping accounting using market prices. This difference is largely due to the fact that transfers of income between

[1] Benjamin Higgins: *Economic development. Principles, problems and policies* (New York, W. W. Norton & Co., 1959), pp. 654-655.

private individuals or between citizens and tax authorities do not figure in social cost accounting since such transfers alter only the distribution, and not the level, of national income.[1] While from the standpoint of private investors transfer payments are real costs, for society as a whole they are not since the true social cost is the net additional burden reflected by the resultant increase in the total level of gross national expenditure.

While the theory of transfer payments is logical, in practice their measurement is by no means easy since it requires a very comprehensive inventory of the cost components of the proposed project as well as a detailed account of its financing. However, an attempt must be made to leave out of the estimated social cost of public development projects at least such obvious examples of transfer payments as forced saving, additional direct taxation and other similar measures designed to mobilise domestic savings for development finance. Similarly, foreign aid receipts, if any, should be excluded.

It is not possible to say, *a priori*, whether the exclusion of transfer payments in evaluating alternative techniques of production will tend to favour labour-intensive techniques. Much will depend on the particular circumstances of each case. Nevertheless, to the extent that wage bills of development projects are financed out of additional taxation or deficit financing (which implies social sacrifice in terms of current consumption) or through foreign aid (which implies no domestic sacrifice), social cost is bound to be smaller in the case of labour-intensive techniques.

NON-MONETARY BENEFITS [2]

As has already been implied, not all social benefits and costs of development projects are measurable. It would therefore be a serious mistake in planning to rely entirely on quantitative results or yardsticks. The effect of placing too much reliance on benefit-cost ratios or other statistical criteria could be economic distortions such as lopsided or unfair distribution of development projects between regions, and imbalances between the development of social and physical infrastructure or between heavy and light industries. In all cases of project appraisal the relevance of external benefits, too elusive to be measured in monetary terms, must be recognised. A workable arrangement to overcome this type of difficulty might be to regard measured benefit-cost ratios as *minimal estimates* of priorities assigned to the projects evaluated. As such, they need to be supplemented by other relevant socio-political considerations as expressed by administrators or policy makers as distinct from technicians and analysts.

[1] This is assuming that there are no significant effects arising from redistribution of income.

[2] A pioneering work on the non-monetary effects of public expenditures is R. H. Coase: "The problem of social cost", in *Journal of Law and Economics* (Chicago), Vol. 3, Oct. 1960, pp. 1-44.

III. A hypothetical illustration

The suggested use of benefit-cost analysis as a tool of manpower planning can be illustrated by means of a hypothetical example. Suppose that a proposed public highway can be constructed by employing more or less units of labour and capital per unit of output (i.e. miles of highway). Consider two alternative methods, A and B, the latter having a larger capital-output ratio. For the sake of simplicity, benefits and costs are calculated for a given amount of output: per 0.1 miles of highway. Furthermore, to gain a certain degree of realism labour inputs are disaggregated into three major occupational groups: supervisory, middle-level, and unskilled labourers. Disaggregating labour inputs in this fashion reflects the fact that substitution options between labour and capital are virtually certain to vary with the quality or type of manpower: capital can most easily be substituted for unskilled labour, but the rate of substitution will decline as the quality of labour increases.[1]

Another simplifying assumption concerns the utilisation of capital. In practice, different types of machinery, equipment and tools are likely to be employed in highway construction schemes. But since our main interest here is with labour utilisation, a composite capital input will be used.[2] Capital intensity is, therefore, measured in terms of annual (or monthly) rates of depreciation of a composite capital input. If, however, for some reason, disaggregation of capital inputs were required, the use of a composite capital unit could be abandoned with no great difficulty.

The hypothetical input costs of constructing 0.1 miles of public highway in an imaginary developing country which could adopt either of the two methods A and B are shown in table I. One important point to note in this table is the use of shadow factor prices. The shadow price of labour in a country with a large volume of unemployment will tend to be relatively low, particularly for unskilled labourers. On the other hand, the going wage rates will most likely approximate the social opportunity cost of skilled workers who generally are in short supply. In the case of capital inputs, which in the present illustration are assumed to be imports paid for in foreign exchange, the social opportunity cost per composite unit is assumed to be twice the market price—an arbitrary measure of the (inverse) es-

[1] An important problem relevant to this issue is that of imperfect substitution of labour for capital. While the argument presented here would still be valid, it should be realised that in some cases technical conditions of production or resource availabilities may permit only limited choice for factor substitution. This problem is discussed at considerable length in R. S. Eckaus: "The factor proportions problem in underdeveloped areas", in *American Economic Review*, op. cit., Vol. XLV, No. 4, Sep. 1955, pp. 539-565, also reprinted in A. N. Agarwala and S. P. Singh (eds.): *The economics of underdevelopment* (London, Oxford University Press, 1958), pp. 348-378.

[2] See section 3 above.

TABLE I. HYPOTHETICAL MONTHLY COSTS OF CONSTRUCTING 0.1 MILES OF PUBLIC HIGHWAY BY ALTERNATIVE METHODS

Inputs	Input requirements		Shadow factor price per unit (US$)	Total factor cost (US$)	
	Method A	Method B		Method A	Method B
Supervisory labour	10	1	50	500	50
Middle-level labour	20	2	40	800	80
Unskilled labour	100	10	30	3 000	300
Capital[1].	5/12%	11/12%	—	4 167	9 167
				(2 084)	(4 584)
Total . . .	—	—	—	8 467	9 597
				(6 384)	(5 014)

[1] Represents a composite capital stock consisting of different kinds of machinery and equipment required for highway construction work. Input requirements are shown in terms of monthly depreciation rates. Capital costs are shown first in terms of social opportunity cost and then (in parentheses) in market cost terms. The market cost per unit of composite capital is assumed to be US$500,000. This is converted into social opportunity cost terms by multiplying the market cost by a factor of 2, an arbitrary (inverse) essentiality rating explained in the text.

sentiality factor mentioned earlier.[1] The last two columns of table I indicate total factor costs per month. It will be observed that two sets of total costs are shown, one reflecting the social opportunity cost of foreign exchange used to pay for capital good imports, the other (in parentheses) reflecting only the market price of these imports. The significance of this distinction will be demonstrated presently.

Table II enumerates some of the measurable benefits and costs of the two alternative methods. In the first place, it is assumed that independent pre-investment studies have determined an economic value of US$60,000 per mile of highway, this amount including both the direct and indirect economic effects of the highway. The important point to note is that this figure does not include the multiplier effects of the wage bill to be paid during the construction of the highway. It is certain that the multiplier effects of the wage bill will be quite considerable in the case of labour-intensive methods. In the case of method A it is more than three times the estimated value of 0.1 miles of highway. A multiplier of 5 is assumed.

Turning to measurable costs, the wage bill will be smaller and the capital cost higher in the case of method B. If the recurrent costs of the project are financed out of transfer payments partially or exclusively,

[1] Note that the cost of capital in the present example has not been discounted to present value since this procedure would not materially affect the argument of the text. In practice, however, it would be necessary to use discounting methods.

TABLE II. BENEFIT-COST ANALYSIS OF ALTERNATIVE METHODS

Item	Method A (US$)	Method B (US$)
Measurable benefits		
1. Economic value of 0.1 miles of highway	6 000	6 000
2. Multiplier effects of the wage bill	21 500	2 150
3. Total measurable benefits	27 500	8 150
Measurable costs		
4. Wage bill	4 300	4 30
5. Capital (social opportunity cost)	4 167	9 167
6. Capital (market cost)	(2 084)	(4 584)
7. Total measurable cost (items 4 and 5)	8 467	9 597
8. Total measurable cost (items 4 and 6)	(6 384)	(5 014)
Social benefit-cost ratio (item 3 divided by item 7) . . .	3.25:1	0.85:1
Accounting benefit-cost ratio (item 1 divided by item 8)	0.94:1	1.20:1

such payments will have to be excluded as argued above.[1] In the present example, for the sake of simplicity, it is assumed that recurrent expenses are financed out of existing budgetary sources with no recourse to new taxation or other forms of transfer payments. No such adjustments will be required so far as capital costs are concerned since they are assumed to be financed out of foreign exchange reserves. In general, to the extent they are provided through foreign aid receipts, similar adjustments will be required.

Two kinds of total costs are shown in table II in order to highlight the crucial difference that social benefit-cost analyses make for employment creation. If the multiplier effects of the wage bill plus the social opportunity cost of imported capital goods were ignored, the benefit-cost ratio for method B would be 1.20:1 and that for method A 0.94:1. The capital-intensive method of building the public highway would then appear justified on efficiency grounds. On the other hand, if social benefit-cost analysis is utilised, a completely different result emerges: method A has a ratio of 3.25:1 and method B becomes unacceptable with a ratio of 0.85:1. The labour-intensive technique, which was rejected on the basis of market valuations, is then seen to be socially justifiable.

These results are, needless to say, deliberately preconceived. They nevertheless illustrate a point of fundamental importance so far as

[1] See the section entitled " Transfer payments " above.

employment promotion and manpower planning in developing countries are concerned: that by utilising social benefit-cost criteria in project evaluation studies manpower planners can make a significant contribution to the objective of employment generation. This is all the more necessary because the conventional manner of project evaluation uses market valuations which understate the social benefits of labour-intensive methods of production. It is time this unfortunate bias was rectified.