REMARKS ON EMPLOYMENT OBJECTIVES IN RELATION TO MACRO-ECONOMIC PLANNING

by Philippe Carrê and Roger Messy*

Introduction

In spite of a wide use of planning, economic growth in the less developed countries (ldc's) during the 1960's resulted in high unemployment in most countries. This social cost induced several countries - and ILO with the World Employment Programme (WEP) - to consider high employment as a major objective of planning during the 1970's.

Indeed, this negative effect on employment has been implicitly accepted in most econometric models used in national planning, as their major objective is to maximise growth under the constraints of domestic savings and external resources, which impose severe limitations to capital accumulation. These models usually assume for each industry a complementarity of capital and labour, with a rigid relationship between capital stock and employment, and no alternative choices of imported technology. The two resource constraints determine employment and "technical" unemployment resulting from the shortage of capital. In the best case, corrective policies such as public works, help to absorb part of this unemployment.

The increasing concern about unemployment in ldc's calls for planning models maximizing both employment and growth, under the same constraints as above. So far, however, little progress has been made in this field of research. Compared with traditional models used in medium term planning, employment-oriented models must find ways to cope with qualitative changes in technology, manpower and management which all require a longer term approach. Research in this field is also impaired by the weakness of statistics in ldc's and by the lack of relevant historical cases.

---

* The authors are staff members of the United Nations Economic Commission for Europe. The opinions expressed in this article are their own views and will not necessarily coincide with those of the organization to which they belong.

Employment models

On the occasion of a recent meeting held in ILO on priorities in economic research for the WEP (Geneva, 3-7 November 1969), several employment models for growth were reviewed. The paper presented by J.C.H. Fei and G. Ranis, Technological Transfer, Employment and Development, which is very briefly summarized below, illustrates the difficulty of building up and testing an employment model.

Technologies imported by ldc's have been developed in the capital-rich and labour-scarce economies. The available help of technology reflects the historical growth experience of the developed countries, and implies a corresponding range of skills as well as many degrees of technological complexity. Transfer of technology to the ldc's cannot be efficient unless the level of imported technology is appropriate to the available skills.

If the standard technology of an industrial country is transplanted without adaptation to the conditions of the ldc, it will raise labour productivity, cause an increase of the capital-output ratio, and generally result in increased technical unemployment. This situation is prevailing in most ldc's, because the imported technology is too sophisticated in relation to the available skills. It results in a technological dualism which is costly in terms of employment as well as output objectives.

What is required are adaptations to the imported technology in order to correct its capital-using character and make use of the advantage of plentiful resources of unskilled labour in the ldc. This adaptation would involve an intensive effort of innovation in the importing country. Moreover, as technology in the developed countries continues to progress, the technology gap will be narrowed only if the ldc's are able to introduce new technology at a sufficiently fast rate.

In their formalized model, Fei and Ranis add behaviouristic equations on the growth of labour skills, the technology shelf, and the ability to innovate to the usual variables of population growth, savings, investment and employment. They have "... shown that the problem can only be understood as an integral part of the growth process as a whole, including as crucial components not only capital accumulation but also continuous technological change traced to human skill formation at home and technological transmission from abroad". Their conclusion is that combined goals

of employment and growth can be reached"... only if the domestic innovative capital stretching effort is sufficiently strong to compensate for the high capital stock associated with the modern technology".

Although the authors' empirical verification of their model with reference to Japanese economic development during the period 1878-1939 shows the usefulness of their approach, their model is still at an exploratory stage. Its merit is to relate employment and unemployment not only to the usual aggregated variables of a growth model, but also to alternative technologies that ldc's can import.

The model could be further refined by introducing explicitly the external resource constraint, perhaps a breakdown by main sectors of activity, and even a geographical breakdown if regional disparities are important in respect of growth and employment. Finally, the inclusion of policy variables allowing for an evaluation of the impact of policies would make the model more useful for policy makers.

As it stands, however, the utilization of the model for planning purposes would require research in various fields, as well as adequate statistical material. The main information gap in ldc statistics concerns skill levels and the size and characteristics of unemployment. There is also an obvious need for considerably more information on alternative technologies and on corresponding skill requirements. It would be useful, in particular, to know more about relatively labour intensive technologies in developed countries, such as Japan, where labour is still abundant.

All the requirements listed above make it extremely difficult at least at the present time, to make systematic use of an econometric model for the formulation of policies aimed at maximum employment.

Alternative technologies

The availability of alternative technologies differs widely between industries. There is only a very narrow range of efficient technologies in the heavy chemical, pulp and paper, and metallurgical industries, which are all of a capital-intensive nature and are characterized by fast technological change. In most cases these sectors do not absorb the kind of manpower which

is abundant in developing countries. In regard to them the choice would be between importing the latest technology, because its very high capital cost would be justified by other factors (such as natural resource endowment), and abandoning altogether the idea of creating an industry of this type.

Fortunately, for many industries there exists a variety of efficient technologies, with different grades of capital cost and skill and employment requirements. This is the case of textiles, clothing, footwear, metal-working and miscellaneous industries. The coexistence of several efficient technologies is often accompanied by a relatively slow change in techniques. The industries listed above are also rather promising for exports from developing countries, provided the trade and import policies of the developed countries can be gradually adjusted to this export need. Finally, a certain number of activities which have only a domestic market can also apply a variety of technologies with very diverging capital and labour contents. This is the case, for instance, of most food industries, construction, repairs, etc. This latter category presents a very clear cut case for choosing labour intensive technologies.

The problem of choice between alternative technologies is quite clear at the micro (enterprise) economic level. A study by Keith Marsden, 'Progressive Technologies for Developing Countries',[1] gives a series of case studies from which the following example is taken.

In a town of Nigeria where bread consumption amounts to 50,000 loaves per day, the traditional bakery (family enterprises operating locally-made equipment) has the following characteristics, shown as Technology A.

---

[1] International Labour Review, May 1970.

		Technology A		Technology B
		pennies per loaf		
Costs[1]:	materials	3.4		4.0
	labour	1.5		0.3
	fuel and power	0.3		0.5
	depreciation and interest	0.2		2.0
	total	5.4		6.8
Profits		0.6		-0.8
Selling price		6.0		6.0
Capital investment		62.5	ooo's £	600.0
Employment		625	ooo's persons	80
Output per worker		80	loaves per day	833

Under technology A many small bakeries jointly meet the demand for bread.

At the other extreme, with technology B, a single plant would supply the whole market. This plant, however, would not be able to compete with the traditional bakery as it would loose 0.8d. per loaf. In addition, there would be a considerable social cost, as nearly 90 per cent of employment would be dismissed while the traditional equipment would become useless.

An efficient intermediate technology would consist in introducing two innovations. A second-hand reciprocating T-arm mixer would replace the manual dough-kneading operations, with 25 per cent increase in productivity; and the installation of oil-fired fuel systems would reduce inputs of labour and materials. This would reduce the cost of labour and materials by 0.7d, with an increase in capital cost of 0.1d. The slight reduction in labour inputs could result in shorter hours of work for the same number of workers. The proposed intermediate technology could be introduced progressively, as it leaves the structure of the enterprise (small family firms) essentially unchanged.

---

[1] Including the cost of distribution.

This example is taken from actually existing market conditions, and demonstrates how modern technology can in fact be uneconomical.

Problems of environment

Assuming that the constraints constituted by the low levels of savings and more particularly the limited capacity to import cannot be made more flexible, we tried in the foregoing sections to explore to what extent new approaches to economic development might allow for a better use of the abundant reserves of unskilled labour available in developing countries. Imports of capital goods being the genuinely limiting factor, it is quite clear that a significant increase in overall production resulting from a larger input of labour could be obtained only if a decline in the capital output ratio would be achieved in sufficiently large sectors of the economy.

One way of improving the overall capital output ratio would be to expand capacity mainly in labour intensive industries with a view to exporting an increasing share of their production. This would correspond in many cases to a better international division of labour. For various reasons, however, the access to the developed countries' markets for products of the developing countries is likely to remain limited for a number of years. Even if the situation improves in the longer run, there is a need for reducing as far as possible the capital output ratio in each industry. The existence for many industrial activities (including construction) of a range of alternative technologies, in which the requirements of capital and labour (especially unskilled labour) vary substantially, is of course a factor of crucial significance in this respect.

It must be pointed out however that developing countries are faced with difficult problems when they have to make a choice among the existing technologies. As mentioned earlier, information on the alternative technologies available for a particular industry is not always easy to collect and analyse. Moreover the necessary research work to adapt those technologies to local conditions may appear costly and involves some degree of uncertainty

It may also prove difficult to get the corresponding equipment (including spare parts) especially if they are not currently produced in developed countries.[1] Because of the difficulties just mentioned, entrepreneurs may not give much consideration to the adoption of intermediate technologies despite the fact that they tend to increase profits. Among the reasons for such behaviour are the inclination of engineers to utilize preferably the most up to date technology, irrespective of cost considerations, as well as the feeling of administrators that increasing substantially the number of workers on the payroll is likely to complicate management problems.

Apart from the technical problems arising from the selection and implementation of adequate production processes, institutional factors frequently tend to encourage the use of capital-intensive technologies. First of all, industrial policies pursued in many countries include such incentives as tax and tariff exemptions, preferential exchanges rates, subsidies, low rates of interest, etc. for operations associated with the buying of equipment. Whatever the rationale of such policies, one of their effects is to render the cost of capital goods to the firms substantially lower than their real cost to the society. At the same time, the cost of labour (especially unskilled workers) to the firms is usually far higher than the cost to the society. As unemployed persons have to be supported by those gainfully occupied or by the Authorities, it is generally accepted that, especially where a large part of the labour force is unemployed, the social situation would be improved if more persons were in a position to work. In other words, the "social" cost of employing more persons may be considered as relatively low. But the situation is quite different for the firms: as it is indeed necessary that workers be protected by regulations on wages and working conditions, additional workers are to be paid at the normal rate.

---

[1] Such difficulties might become less serious if the problems were dealt with at the international and regional level, and the corresponding expenses shared to a certain extent among the interested countries.

Another difficulty of a general character lies in the appropriate linking of the internal with the world price system. Insofar as internal prices are affected by measures resulting from the implementation of an employment policy, it is essential that the level of the exchange rate, the tariff structure (and other barriers to trade) and the pattern of export taxes and subsidies be made consistent with the other policy measures decided. In this connection, it is worth mentioning that the international environment and the general agreements regulating world trade impose constraints which have to be taken into account. Some of them may complicate the task of implementing employment oriented development programmes.

Concluding remarks

Although the indications given above are only illustrative and fragmentary, they tend to show that a number of important questions in the economic, social and fiscal fields would have to be treated in a consistent way if entrepreneurs are to be induced to utilize technologies which maximise both employment and global production. In order to work out appropriate policies, macro-economic reasonings may of course be of considerable assistance not only to determine which level of production can be reached if all the resources including labour are utilised as fully as possible, but also to check the coherence between the measures envisaged to reach the desired targets.

Our purpose here was not to suggest any particular type of model, but only to point out some of the problems involved in integrating employment objectives in the framework of general planning. In this connection it seems that the classical macro-economic models could be progressively improved and made more comprehensive, by introducing concepts such as that of shadow prices and techniques such as cost benefit calculations. Among the shadow prices likely to be of particular interest are those relating to labour and wages, to exchange rates and to the cost of equipment (interest rates, depreciation periods, etc.). At any rate, given the nature of the problems to be solved it might be difficult to build immediately new comprehensive employment models: important factors such as the ability to innovate or the necessity to maintain certain social and regional equilibria cannot easily be put into equations.