

{The} "late late" industrializers will import, rather than make, their clothes until such time as they are able to set up a tailor in business all by himself. This situation forecloses, of course, for a considerable time any fundamental adaptation of technology to the characteristics of the importing countries, such as the relative abundance of labor in relation to capital. Whether and to what extent such an adaptation is desirable is an idle question under these circumstances; given the sequential pattern of industrialization, there is remarkably little choice. {Import-substituting industrialization} thus brings in complex technology, but without the sustained technological experimentation and concomitant training in innovation which are characteristic of the pioneer industrial countries.

But if indeed entrepreneurs respond correctly to incentives, as we have stressed, an economic policy which is LUB or factor-neutral would make it attractive for the less developed countries to achieve an output- and input-mix in industry which is more compatible with the country's factor endowment. Rational entrepreneurs should behave correctly in accordance with factor prices, whatever may be the policies which create or affect these prices. It is also reasonable for them to welcome productivity-raising innovations that reduce their costs.

Thus there arises the question of direction of technological change in addition to the possibilities of factor substitution. Emphasizing a specific policy bias in favor of the use of the abundant factor may induce innovations which may be in the direction of the more abundant factor. To put this differently, the presence of LUB incentives in a labor surplus economy may prevent the rapid adoption of technology which have capital-using bias if prices exert their influence such as to

make a relatively capital-intensive technique economically less attractive from the standpoint of the firm's operations.

Thus, development policies aimed at utilizing labor, which are at the same time supplemented by policy incentives which encourage labor productivity, may be helpful in attracting innovating energy which have larger labor-use implications. Certainly, the probability of adoption of labor-used biased technology and inventions will be greater if economic incentives were LUB rather than CUB. This may even be true still for factor-neutral incentives compared to CUB, especially in "labor surplus" economies.

The literature on the theory of induced innovations becomes relevant at this point. Two important papers by Kennedy and Samuelson amply summarize the theory.⁴⁴ For many years, especially following J.R. Hicks, it has been stated that high wage rates tend to encourage labor-augmenting (i.e., labor-saving) innovations. W.E.G. Salter in his important book Productivity and Technical Change (1960) challenged this view in a quotation now made famous by Kennedy and Samuelson:

✓ The entrepreneur is interested in reducing costs in total, not particular costs such as labour costs or capital costs. When

⁴⁴See Charles Kennedy, "Induced Bias in Innovation and the Theory of Distribution," The Economic Journal (vol. LXXIV, No. 295, September, 1964), pp. 541-7; more especially, P.A. Samuelson, "A Theory of Induced Innovation Along Kennedy-Weizsacker Lines," Review of Economics and Statistics (vol. XLVII, No. 4, November 1965), pp. 343-56.

labour costs rise any advance that reduces total cost is welcome, and whether this is achieved by saving labour or capital is irrelevant. There is no reason to assume that attention should be concentrated on labour-saving techniques.

.....

The above arguments make it difficult to accept any a priori reason for labour-saving biases.... (pp. 43-44).

Kennedy, like Hicks (but unlike the latter, basing his arguments separately from factor prices), argued that there is indeed a tendency for labor-saving technical progress. Samuelson's support of the Salter view not only stems from reasoning through the traditional production theory view that all inputs are marginally dear and productive when least cost equilibrium holds so that "each dollar of cost tends to merit an equal effort toward cost reduction, with no implied bias of innovation." (p. 356). Samuelson develops an essentially neoclassical theory of induced innovation and derives conditions for longrun economic equilibrium which determines the direction of bias of technical change.⁴⁵

What this theory suggests is that there is no reason certainly to assume that given a change in relative costs of labor, technical progress will proceed in a labor-saving bias. Neither then can we assert that if LUB instead of CUB policies

⁴⁵We shall not go into the basic results of Samuelson's analysis, for it is quite intricate. He derives, with the use of the concept of the time-variant trade-off frontier between capital- and labor-biased technical change, certain results in distribution theory which affirms the constancy of relative shares even with changes in capital-intensity. Samuelson, op. cit.

are adopted, technical change will be a priori in the direction of a capital-saving bias.

Since the developing economies import their machinery first and thus depend on the state of technological advance in the industrialized countries, Richard Eckaus has suggested that some bias may in fact exist. The thesis is advanced that the technological choices open to the developing economies carry the factor bias of the country manufacturing the equipment.⁴⁶

"...{W}hatever the factor bias in the invention which created the technology, the relatively capital intensive factor combinations resulting from input substitution are 'frozen' into the design of standard equipment. In turn, the less developed countries may face the alternative of either buying the standard equipment or paying higher prices for equipment especially designed for their own factor intensities."⁴⁷

While this may exert some bias in factor use, it simply follows, too, that when supplemented by CUB incentives, such bias becomes stronger and induces the economy to adopt the latest equipment.

There are, however, areas of factory management where greater degrees of freedom in factor-use becomes available and

⁴⁶See R.S. Eckaus, "Notes on Invention and Innovation in Less Developed Countries," American Economic Review (vol. LVI, No. 2, May 1966), pp. 98-109. This section was already finished when Eckaus' interesting work came to my attention. Consequently, the Eckaus argument is inserted here where it seems most pertinent.

⁴⁷Ibid., p. 106.

where, given the relevant factor prices, it is possible to make a factory operation on the average to be relatively labor-intensive despite the use of a major manufacturing process which is generally capital-intensive. For instance, in such areas as packaging, moving, carrying, greater degrees of labor intensity can be achieved. This is because in the set up of a firm, a single manufacturing process is just one aspect of the total operations. Within the constraints of a process, which is imported from another country, innovation can proceed in the ancillary activities. Managerial and labor productivity improvements of a "learning-by-doing" source or from purely innovational sparks can take place within different areas of factory activity, not necessarily confined to the manufacturing process. Definitely, more should be known about this point.⁴⁸

Moreover, it is probably not solely up-to-date technological design which is relevant to entrepreneurs in the developing countries in their choice of techniques. ✓ Factor prices, which may be affected by the force of economic incentives are important. The developing countries do not necessarily adopt the latest techniques available in the West. The rate of obsolescence of techniques in the industrial countries is prob-

⁴⁸Visits by this author to some industries in the Philippines and in Thailand have yielded the impression, for instance, that the machine shops of small and relatively large factories alike are able to take care of maintenance and replacement needs for plant equipment. The fact that these adaptations exist is

ably the more important determinant of the rate of adoption of techniques in the developing countries. Obsolescence of a technique, say, in the United States, cheapens the value of the obsolescent plant considerably from the standpoint of the probable buyer in second hand plants. The U.S. entrepreneur who computes that modernization pays off will discard his old plant (perhaps a completely depreciated one from a tax viewpoint) in favor of a modern one. A corresponding entrepreneur in the developing country will make his relevant computations between the modern plant and the considerably cheapened but "obsolete" equipment. It hardly needs to be said that input prices are the major weights in these cost computations. If labor is cheaply priced because of relative factor endowments and the price of the "obsolescent" equipment is also made much cheaper relative to the modern alternative technique, the obsolescent equipment may indeed prove to be more economical. Thus, what may be regarded as "obsolete" may just be ideal and economically most reasonable for a country with a different factor endowment.⁴⁹ This is a very simple explanation of why

an indication of the ability of these plants to learn to make adjustments to their plant operations.

⁴⁹Of course, there is the likelihood that the "obsolescent" plant may still be capital-intensive for the country's factor endowment. The point, however, is that if the industry is to be established to begin with, the "modern" plant, if it is more capital-intensive than the machinery it supplants, may not be more economical from a factor endowment view. There is however the alternative possibility of a new machinery which is more capital-saving, in which case the choice of technique appears obvious. An example in agriculture is the hand tractor compared to the heavy, highly mechanized tractor.

the developing countries tend to have longer lasting capital equipment in their industrial structure and sometimes to import "obsolete" plants when setting up new industries.

The agents of this transfer of "obsolete" technology may be principally subsidiaries of the multinational companies, joint ventures and indigenous entrepreneurs. This is at least my personal impression of the Philippine experience. Substantial research in this area is needed, however. Obviously, one reason why subsidiaries of multinational corporations may become natural agents of this transfer is that the obsolete plants are often already depreciated from a tax viewpoint. When transferred to new country settings, the equipment is given a chance to perform further economic service not only because of a still useful life but also because it can be revalued and re-depreciated. However, there has been some amount of pessimism about the effectiveness of technological adaptation in the less developed countries, even in the case of the multinational corporation subsidiaries.⁵⁰ One suspects that the reason for this, although perhaps not the only one, is that the incentive forces which propel the attraction of investments by these corporations are CUB policies rather than LUB.⁵¹ The extent of foreign entrepreneurship in labor-intensive productive processes is in part discouraged by CUB policies.

⁵⁰For this viewpoint, see J. Baranson, "Transfer of Technical Knowledge by International Corporations to Developing Economies," American Economic Review (vol. LVI, No. 2, May 1966), pp. 259-67.

⁵¹I have heard the argument from some businessmen that new machinery is easier to buy than second hand, because sup-

Induced innovation is dependent on factor prices (as Samuelson's neoclassical theory confirms) but we cannot determine the direction of the bias of this innovational change a priori. Despite the dependence of the developing countries on the rate of technical obsolescence of equipment of the advanced countries and on the nature of innovations whatever is their factor bias in the advanced countries, a LUB policy, in contrast to CUB policy, appears to have a better chance of success in stimulating innovating energy which has more labor (and therefore, more employment) content. The greater is the labor surplus within the economy, the more will such LUB policy be more predisposed towards employment absorption even in technical change.⁵² This statement supports the findings of Baer & Hervé that the industrializing countries have not been in a hurry to adopt the latest technologies.⁵³ If policies in these countries had been LUB, this rate of adoption of more capital-intensive techniques, however, could have been slower, without necessarily causing a slower rate of growth.

plier's credit is oftentimes more easy (e.g., deferred payments) than in the case of buying second hand machinery. While this may be true, it does not necessarily mean that purchasers of second hand plants are not able to secure credit either from the old owners or from other banking institutions.

⁵²Note here that we do not necessarily say that technical change will be capital-saving, although this can very well be the result in the context of the firm's economic operations. We are simply stating that as between policy packages which are either CUB or LUB, the employment absorption implications of technological change are greater for LUB policies. This statement may be tautological, yet it has vast implications for policy related to the developing countries.

⁵³Reported in the previous section.

VII. POLICY IMPLICATIONS AND CONCLUSIONS

By and large, the industrializing developing economies have paid more attention to CUB than to LUB incentives, even when their economies were essentially characterized by labor surplus. This bias of economic policy with respect to factor use has invited greater capital-intensity than would have been justified and as a result caused less employment creation and perhaps even a misallocation of capital resources. This provides an alternative explanation for the lack of employment absorption of industrialization in the developing economies.

The policy implications emanating from the above statement is that more consideration should be given to factor-neutral and LUB policies. If indeed entrepreneurs respond correctly to economic incentives (and disincentives), a stress on LUB incentives would not be in any sense inferior to CUB incentives. If LUB incentives present some problems, at least economic incentives which have factor-neutral effects will have a larger employment absorption effect than the CUB incentives which have gained special emphasis in the investment attraction laws of many countries. This stress of policy would help to produce a capital-labor mix in industry which will be nearer to the capital-labor endowment, largely from three forces: (a) a choice of an industry mix by entrepreneurs which is relatively more labor-intensive, (b) the prevention of rapid labor-displacement in favor of capital in already existing industries, and (c) at least giving greater probability for capital-saving

or neutral technical change to take place in contrast to labor-saving, in view of the effects exercised by factor prices on the direction of innovation.

But what can be done if the economy, to begin with, is already deeply committed to CUB policies? One possibility is to offer an entirely different policy package, based on a LUB bias, which will enable entrepreneurs to make a choice, at the beginning, which incentive policies they will wish to adopt. This solution will give initial flexibility of decision-making to an enterprise. One problem of this setup is that some industries that discover, after some amount of time, that an incentive package chosen at the beginning might prove to be inferior to the available alternative when the decision is made may wish to change the incentive package they use. This gives rise to administrative and conceptual complications. Considering the very generous nature of some of these provisions among many countries, adding LUB incentives without cutting down on CUB incentives is giving away too much subsidies unnecessarily.

Another possibility is to offer a totally different set of policies with respect to a specific area of development. At least in the case of the Philippines, this author has suggested a redirection of policies in connection with the recent official interest in export promotion.⁵⁴ The proposals

⁵⁴G.P. Sicat, "Towards Industrial Expansion: Alternative Proposals for Economic Incentive Legislation Applied to Export and Industrial Promotion" (Discussion Paper

are a combination of the following: a double deduction (it can be less, of course) of wage costs related to export production and of labor training expenses incurred for below-the-foremen level production-workers, both of which are LUB incentives. To induce performance in the specific area of export sales, progressive exemption rates in the corporate income tax depending on the marginal export ratio is also suggested. This incentive is essentially factor-neutral, but it has a strong relationship to the objective of export promotion. The definition of production for export is tied to an export ratio of the firm which can be defined on a historical basis. The LUB incentives are further connected to the administrative machinery for the social security system so as to expand the coverage and membership of this system. (In view of minimum wage legislation and other social legislation both of which work against labor absorption into industry,) these proposed incentives, at least in the area of export promotion, would be very helpful in redirecting attention away from CUB incentives.

Another direction of industrial policy is to give encouragements to subcontracting relationships between large, capital intensive enterprises with smaller scale enterprises, which approximates the pattern of Japanese industrial development. One positive step in this direction would be a policy on industrial estates, coupled with training and credit assist-

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ance. One other step is to reconsider policies which tend to encourage integration of activities within the firm. Economic forces would determine whether integration of activities within the firm will be desirable or not, but there would be no need to encourage explicitly by legal incentives the demand for integration within the firm. This issue is entirely different from the recognition that greater growth will ensue with an economy in which backward and forward integration of activities is strong, for here the context of integration is by industries or sectors, in short through interindustrial trade not through intrafirm vertical or horizontal integration.

(This paper has concentrated on the factor-use implications of economic policies in explaining the poor labor absorption of industrialization in the less developed countries. The CUB policies led to the establishment of industries and of factor combinations which departed from optimal use of the abundant resources.) We have not touched on policies that accelerate the expansion of aggregate demand because this is largely a separate issue of development policy.