

in the developing countries. We quote from R. Bird and O. Oldman on this point:²³

... The large literature and many laws on tax incentives for development have no empirical basis.... What evidence there is indicates not only that existing income tax incentives for industrial development have not been very successful -- ✓ customs exemptions for inputs and tariff protection of outputs {...} appear to be much more powerful instruments -- but also that businessmen in making investment decisions pay little attention to the availability of tax incentives.

Of the relationship between tax incentives to investment decisions,²⁴ we have this appraisal directed in particular to Panama, but perhaps having wider validity:

Tax incentives cannot be viewed as substitutes for well-conceived promotional programs, the availability of low-cost financing, the development of economic infrastructure in the form of highways, water supply, and power, and the training of labor. * Given these and other basic prerequisites for development, the most that can be said for tax incentives is that they may demonstrate a government's determination to promote and encourage private enterprises, and they may be used to offset certain deterrents to investment. They may also have, to some degree, a psychological appeal to businessmen that outweighs their real significance.

The effectiveness of tax incentives such as accelerated depreciation and tax credits for investments have better empirical basis in industrial countries. Some evidence of the success of such policies in stimulating investment behavior have

²³Bird and Oldman, op. cit., p. 118.

²⁴Milton C. Taylor and Associates, "Fiscal Incentives for Development in Panama," excerpted from Joint Tax Program, Organization of American States and Inter-American Develop-

recently been reported.²⁵ CUB incentives are commendable for economies where (relative to other economies) labor costs are high and labor unemployment rates are low, where unemployment is due to inadequacies of training or to a deficiency of aggregate demand rather than to a general surplus of labor, and where an encouragement of domestic economic growth is related to the expansion of the domestic capital goods sector, which in turn has high linkage structure with the rest of the economy. One reason for the success of the tax credits and accelerated depreciation policies given to investments in inducing American economic growth in the early sixties is the sensitivity of activity within the capital goods sector on the rest of the American economy.

But the relevance of these investment incentive schemes to growth policies in the advanced industrial economies does not make them applicable to the less developed. The factor mix prevalent among many developing countries is one in which labor is more abundant relative to capital. The appellation of "labor surplus" economies is probably descriptive of a great many developing economies, especially those in Asia. Even where it is conceded that labor surplus is not a major characteristic

ment Bank, Fiscal Survey of Panama (Baltimore, Johns Hopkins Press, 1964), reprinted in Bird and Oldman, op. cit., p. 220.

²⁵See, for instance, R.E. Hall and D.W. Jorgensen, "Tax Policy and Investment Behavior," American Economic Review (vol. LVII, no. 3, June, 1967), pp. 391-413.

of the labor market, it is generally agreed that there exists enormous underutilization of the manpower resources. In both these situations, labor is the socially cheaper economic resource. By reason of its abundance or insufficient utilization, greater attention of development policy on employment expansion should issue simply from mere social and economic criteria. There is the additional danger that CUB incentives will encourage industries to utilize relatively more complex machinery. From the standpoint of import substitution through backward integration in the capital goods sector, this tendency precludes some hope of further internal economic advance. In effect, CUB incentives have some bias for a greater import leakage, on a short run as well as long run basis. A development policy powered by CUB incentives may work itself against the development of an indigenous capital goods sector.²⁶ The investment demand which arises out of CUB incentives gets translated into a potential strain on the balance of payments.

✓ We should next tackle the question of productivity and the often heard, but fallacious argument, that capital-intensive techniques are more efficient because they imply higher labor-productivity. Along an isoquant, a high capital-labor ratio implies high labor productivity. ✓ The input mix chosen

²⁶We have mentioned that Power's research (op. cit.) on Philippine protection show a bias against export and backward integration, but economic Review just one phase of the problem.

The above remarks lead us to the views of Galenson and Leibenstein, which were set forth in a well-known paper.²⁸ To maximize output per capita, they suggest the choice of techniques that require high capital-labor ratios. In terms of terminology we have introduced in this paper, the Galenson-Leibenstein criterion would call for the use of CUB incentives.

The peculiarity of the Galenson-Leibenstein position on factor use is starkly dramatized by their policy position when confronted by situations in which, as they themselves admit, "the employment of as large a number of workers as possible appears not only to make good economic sense, but to be socially desirable as well."²⁹ But in order to make the economy conform with their criterion, they recommend policies that will make labor artificially scarce!

"... by legislation establishing relatively high minimum wages and working conditions; by direct governmental control of manpower; or, in the case of state industry, by imposing high labor productivity targets upon management. None of these prescriptions is an easy one to follow. The islands of favored employment will have to be protected by the government in some manner, for individual entrepreneurs will find it difficult to resist the constant temptation of cheap labor."³⁰

²⁸Walter Galenson & Harvey Leibenstein, "Investment Criteria, Productivity, and Economic Development," Quarterly Journal of Economics (vol. LXIX, no. 3, August 1955), pp. 343-69.

²⁹Ibid., p. 368.

³⁰Ibid.

This is very poor advice. We have a succession of writers who have shown that the conclusion upon which their criterion is based is extreme and depends sensitively on the specialized assumptions of the Galenson-Leibenstein analysis.³¹ Arthur Lewis sufficiently disposes of this advice by showing its fallacy.

"... It is stated that an increase in wages will stimulate investment in improved cost-reducing technology, and so increase productivity per head. The argument confuses output per person at work with total output; maximizing the first does not maximize the second unless employment remains the same. Investing a given amount in industry A may employ 100 men with average productivity of fifty (total output 5,000). In industry B the same investment may yield average productivity of only forty, but if it provides employment for 150 men, both employment and output will be larger If the degree of capital-intensity will determine the amount of employment, high productivity per person employed is not a sufficient goal."³²

³¹See especially the succession of papers in 1957 by O. Eckstein, "Investment Criteria for Economic Development and the Theory of Intertemporal Welfare Economics," Quarterly Journal of Economics (vol. LXXI, no. 1, February, 1957), pp. 56-85; F.M. Bator, "On Capital Productivity, Input Allocation, and Growth," Quarterly Journal of Economics (vol. XXI, no. 1, February, 1967), pp. 86-106; and A.K. Sen, "Some Notes on the Choice of Capital-Intensity in Development Planning," Quarterly Journal of Economics (vol. LXXI, no. 4, November, 1957), pp. 561-84. In a recent paper utilizing a simple model of an economy with unlimited labor supplies in which a utility function embodying per capita consumption over time is maximized, Stephen Marglin shows among his results that the Galenson-Leibenstein solution is indeed an extreme solution. See S.A. Marglin, "The Interest Rate and the Value of Capital with Unlimited Supplies of Labor," in Karl Shell (ed.), Essays on the Theory of Optional Economic Growth (Cambridge, Mass., The M.I.T. Press, 1967), pp. 141-163.

³²Development Planning (London: George Allen & Unwin Ltd., 1966), p. 67.

We have so far described the extreme nature of the policy suggestions of Galenson and Leibenstein. Yet, if we but review the policies adopted by the developing countries, as we have in the previous section, most of them have adopted this extreme policy as a means of industrial growth promotion, since the mix of economic incentives are capital-use biased! Our quotes from Alfred Marshall and Arthur Lewis at the beginning of this paper dramatize the point that we shall take up in the next section.

V. EMPLOYMENT, CAPITAL-LABOR SUBSTITUTION AND ECONOMIC INCENTIVES

We are now able to assess the evidence presented by Baer and Hervé³³ concerning the inability of industrialization in the less developed countries to absorb labor into industry. As they point out in their concluding paragraph, they tried "to show that the lack of labor absorption in the manufacturing sector of developing countries is not necessarily due to conscious or wrong policy choices, but has several partial explanations which should be combined with the more general explanation of effective factor endowments."³⁴ Their argument appears to rest on the assumption (1) that adjustment problems are shortrun so that it is possible to think of the factor supplies as inelas-

³³Baer & Hervé, op. cit.

³⁴Underline supplied.

tic³⁵ and (2) there are fixed coefficients between skilled and unskilled labor. Given these assumptions they are able to say that the effective demand for unskilled labor is determined by the supply of skilled labor and in view of skilled labor being a bottleneck,³⁶ more capital-intensive techniques will be chosen. So, they reduce their discussion of factor endowment to "effective" rather than actual.

This explanation is unsatisfactory. There is no reason to presuppose that entrepreneurs decide on the basis of short-run factor supplies. This is a very strange assumption, and it is untenable to support it with the statistics they report which are rates of growth over time of employment. Moreover, there is also no reason to believe that there are no possibilities of substitution between skilled and unskilled labor, or for that matter between capital and labor. The possibility of input substitution can be used to explain the evidence they report:

"... although new industries developed were of a more capital-intensive type and older industries were changing technology in a more capital-using direction, there was no drastic

³⁵"Since when talking about development problems and their solutions we are concerned about the shortrun, one will have to consider skilled labor as a separate factor." Ibid., p. 100.

³⁶The term "skill" is ambiguous. Certain skills are labor-using, such as "craftsmanship." Apparently, the skills referred to by Baer & Hervé are related to the knowledge about the operation of sophisticated machinery, which is thus related to capital-using activities. Criticisms of the reference to skilled labor, though not along identical lines, is

rush to introduce the very latest labor-saving technology of the advanced industrial nations." (p. 104)

It is suggested that the factor endowment and the relevant policy determined factor prices, no matter how biased in favor of capital use, have tended to forestall movements into greater capital-intensity.

It is more plausible, however, to explain the capital-intensity of manufacturing technologies and the consequent lack of labor absorption as the result of a response to the net structure of economic incentives which favor capital use. If the incentives were labor-use biased (LUB) or simply neutral with respect to factor use, the same amount of capital resources would have definitely led to more employment absorption, because the techniques as well as industries that would have been chosen will tend to be less capital-intensive.

The above statement depends on evidence concerning the possibilities of capital-labor substitution. We were told, in the midfifties, of the problems of factor proportions, the relatively fixed techniques of production and the limitations of

made by David F. Ross, "Employment and Industrialization in Developing Countries: Comment," Quarterly Journal of Economics (vol. LXXXI, No. 2, May 1967), pp. 338-42.

substitution possibilities between capital and labor.³⁷ The results of recent empirical production function studies will help us to support the contrary, that elasticities of substitution between capital and labor are in fact strong in these countries.

Studies based on Cobb-Douglas production functions have assumed that the elasticity of capital-labor substitution is unity. The emergence of the constant elasticity of substitution (CES) production function has allowed a more direct estimation of this elasticity.³⁸ Estimates of this elasticity have been the subject of intensive research among the more developed countries, and it is only recently that some parallel work on the developing economies is being carried out. International studies of this production function tend to report that its value is less than one.³⁹ Studies of two-digit Philippine manufacturing indus-

³⁷R.S. Eckaus, "The Factor Proportions Problem in Underdeveloped Areas," The American Economic Review (vol. LXV, no. 3, September, 1955).

³⁸K.J. Arrow, H.B. Chenery, B.S. Minhas, and R.M. Solow, "Capital-Labor Substitution and Economic Efficiency," Review of Economics and Statistics (vol. XLVIII, no. 3, August 1961), pp. 225-250.

³⁹Ibid. See also M. Nerlove, "Recent Empirical Studies of the CES and Related Production Functions," M. Brown (ed.), The Theory and Empirical Analysis of Production (New York and London, Columbia University for the National Bureau of Economic Research, 1967, pp. 55-122. {Proceedings of the 1965 Conference on Research in Income and Wealth.})

tries⁴⁰ yield on the average higher values than some of the estimates made independently for US manufacturing industries. A summary of these results is given in Table 1. These estimates rest on the assumption of marginal factor pricing and pure competition, assumptions which have been questioned by many,⁴¹ especially for developing economies. But if we grant that these estimates reflect some rough values of the elasticities of substitution, then we have direct evidence of the elasticities of substitution between capital and labor. At least [in the case of the Philippines again, evidence is now available that the increase in the degree of capital-labor substitution in the sense of actual displacement of labor by capital appears to be related to the estimates of the constant elasticity of substitution]⁴² ✓ While we cannot say as much for all the other countries, this evidence suggests future directions of research for scholars in the studies of industrialization in the developing economies.

⁴⁰G.P. Sicat, Industrial Production Functions in the Philippines (forthcoming monograph), Institute of Economic Development and Research, University of the Philippines.

⁴¹Michael Bruno has attempted to get rid of these assumptions in a very interesting paper. See his "Estimation of Factor Contribution to Growth Under Structural Disequilibrium," International Economic Review (vol. IX, no. 1, February, 1968), pp. 49-62.

⁴²Williamson and Sicat, op. cit.

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Table 1. CROSS-SECTION ESTIMATES OF THE ELASTICITY OF
SUBSTITUTION BETWEEN CAPITAL AND LABOR IN
MANUFACTURING INDUSTRIES

ISIC Code	Industry	US (1957) Solow	US (1957) Griliches	Philippine Average (1960) Sicat
20	Food	0.69	0.98	1.37
21	Beverages	-		1.11
22	Tobacco	1.96		1.57
23	Textile mill products	1.27	0.94	0.44
24	Apparel & related products	1.01	1.06	0.60
25	Lumber & wood products	0.99	1.07	0.86
26	Furniture & fixtures	1.12	1.04	1.43
27	Pulp, paper & products	1.77	1.67	1.25
28	Printing & publishing	1.02	0.83	0.79
29	Leather products	0.89	0.84	1.01
30	Rubber products	1.48	1.28	1.58
31	Chemicals & products	0.14	0.71	1.09
32	Petroleum & coal	1.45	-	-
33	Nonmetallic products (stone, clay, glass)	0.32	0.91	1.35
34	Primary metal products	1.87	1.41	0.94
35	Fabricated metal products	0.80	0.85	1.36
36	Non-electrical machinery	0.64	1.24	1.06
37	Electrical machinery	0.37	0.66	0.87
38	Transportation equipment	0.06	0.91	0.75
39	Instruments & related products	1.59	0.75	-

Sources: R.M. Solow, "Capital, Labor, and Income Manufacturing," The Theory of Income Shares (Princeton University Press for the National Bureau of Economic Research, 1964), pp. 101-128, and Z. Griliches, "Production Functions in Manufacturing: Some Preliminary Results," in Brown ed., op. cit. G.P. Sicat, Industrial Production Functions in the Philippines (Discussion Paper No. 68-18, May 23, 1968, Institute of Economic Development & Research, University of the Philippines), forthcoming monograph. Griliches' estimates correspond to those which were derived from the instantaneous version of the CES equation. Philippine estimates are an average of different estimates.

The crux of the Baer-Hervé explanation of the failure of manufacturing to absorb sufficient labor is tied to skilled labor which is assumed as a bottleneck factor. The alternative suggestion I have offered is that the force of CUB economic policies has led to the growth of capital-intensity of manufacturing. If incentives were either LUB or factor-neutral, the industry mix would have been more compatible to the factor endowment and choice of techniques within specific industries would have required relatively less capital intensity through the operation of capital-labor elasticities of substitution. The observation, not uncommon, that as capital-intensity increases the demand for skills grows is but a natural consequence of the CUB economic policies and of economic development.

VI. A NOTE ON ECONOMIC INCENTIVES AND INDUCED INNOVATION IN THE DEVELOPING ECONOMIES

The choice of technologies of the "late-late" comers in industrialization, as Hirschman calls these countries, depends on existing technological knowledge in the advanced industrial economies, since they have to import their machinery to set up their initial plants or to expand their operations. Of course, one major reason for this conclusion is that import substitution policies have been directed largely in imitation of the imports from the industrially advanced nations. Hirschman says:⁴³

⁴³A.O. Hirschman, op. cit.