

Used Machinery and Economic Development. By Dilmus D. James. East Lansing, Michigan: Michigan State University. 1974.

This is a straightforward, scholarly, and fairly complete treatment of the case for adopting used machinery in economic development. As Pakistan does not at present officially encourage the import of used machinery it is worthwhile to state James's case in summary form.

James presents his argument in two parts. First, he considers the reasons—which, he notes, were originally derived by Amartya Sen—for the transfer of functioning machinery between users and concludes that economic conditions warrant such a transfer from developed countries to developing countries. Second, he considers the reasons for the choice of used machinery over new machinery and concludes that used machinery is better suited for developing countries. His methodological treatment of both issues is micro

and his conclusions follow in both instances from the assumption that developing countries possess labour-abundant factor endowments.

The gist of the first part of his argument centres on the distinction between the economic and physical obsolescence of a machine. Simply (and ignoring the intricacies of Sen's and James's complex formulas), the latter occurs when a machine is fully depreciated, while the former occurs when the quasi-rent of a machine (which is the surplus of revenues over wage payments) falls to zero. The quasi-rent falls for two reasons: (1) as a machine ages its maintenance costs increase so that annual wage payments also increase which lowers the quasi-rent, and (2) despite maintenance efforts, the productivity of a machine still falls due to physical depreciation so that revenues decline with age which also lowers the quasi-rent. The effect of both trends on economic obsolescence depends of course on the wage rate; the higher is the wage rate the earlier is economic obsolescence relative to physical obsolescence. Now, if factor endowment differences between countries are reflected in wage rate differences, then a machine reaches economic obsolescence earlier in developed countries. Hence, as the machine is still physically functioning, it can be profitably transferred to developing countries to operate until such time as it reaches economic or physical obsolescence there.

A similar reasoning applies if countries have differential rates of increase in technology or wages; but so much for the argument. James does not stress the fact that physical obsolescence may well precede economic obsolescence in developing countries due to the poor availability of spare parts and skilled maintenance labour. Consequently, if the life span of a used machine is very short, its utility may not be attractive in view of the extensive search costs involved in locating it and the high risk implicit in owning a used item.

James considers these points in the second part of his argument. He contends that, due to factor endowments, technological change in developed countries is labour-augmenting (i.e. Harrod neutral) so that used machinery embodies an older, more labour-intensive vintage of technology. The latter is therefore more appropriate for developing countries. Furthermore, new machinery embodies technical progress geared to economies of scale and integrated production processes which are inappropriate for developing countries. Economies of scale are unnecessary when a country possesses a small market and faces frequent raw material shortages. Also, economies of scale are actually realized only for specifically selected output levels: if output fluctuates at that level the overall average cost is substantially higher. Integrated production processes (which yield smaller plants and economize on space) are unnecessary in a country with relatively abundant land and inadequate air conditioning and humidity control facilities; also, these processes utilize more extensive and sophisticated machine components which are difficult to maintain and which, individually, can cripple an entire production system should they malfunction.

There are other reasons as well for the preference of used machinery. The most obvious one is that used machinery is cheap: the purchase price normally ranges between 25 and 75 percent of the list price of new machinery. Markdowns as high as 80 percent are not unusual, though. Once a machine is purchased, it can usually be made operational within a shorter gestation period

than that needed for a new machine as there are no prototype problems to handle. If certain technological improvements are considered desirable, they can frequently be added on to a used machine (with retrofit attachments) at a lower overall machine cost than the cost of a comparable new machine with the embodied improvement.

In most instances, the disadvantages associated with the employment of used machinery also lead to indirect benefits. When a machine does need repair, there is a "learning by doing" process under way which upgrades the level of maintenance skills in a country. If a machine produces an outdated product, the latter is frequently more durable and simpler to manufacture than the current version of the product; in some cases, firms have decided to "invent backwards" by reintroducing the earlier version. Even if the final product is not superior, a used machine may require simpler and more readily available raw materials than a new machine: a vintage rubber manufacturing process requires only simple ethyl alcohol instead of the refinery gases needed in modern processes. Finally, the short life span of a used machine does not bind a country to a simple technology; should the country develop rapidly, a more advanced technology can be readily adopted.

It is difficult to deny the truth in each of these points. Only the hardened skeptic would not agree with James's contention that a good used machine is as good as a new machine and is a lot cheaper; as such, it is a bargain. But here lies the difficulty: locating a good used machine is not an easy matter. Purchasing a used machine with expensive, unavailable spare parts and a poor finished product is the buyer's nightmare. James does note that the used machinery market abounds with imperfections; *caveat emptor*. This is to be expected, however; after all, bargains are not possible in perfect competition.

It takes an expert to spot a bargain and James suggests that developing countries should become experts. This is a difficult policy prescription for government bureaucrats, though; they have neither the time nor the skill to shop for their extensive investment plans. Realizing that, at best, the purchase of used machinery could only amount to a margin of total investment, perhaps a less demanding policy measure is called for. Such a measure would recognize that only small firms and not large or public enterprises are interested in used machinery, and would concentrate on providing a system of incentives which would bring the small, money-conscious businessman closer to the international used machinery market. Given proper government backing, surely Marshall's entrepreneur could spot the bargain.

It is appropriate to conclude by considering the applicability of this policy measure for Pakistan. Since the 1972 devaluation, the Government has considerably simplified its foreign exchange regulations. Regarding the import of used machinery, though, a general ban is still in effect but specific exceptions are permitted. An exception is granted by the Office of the Chief Controller of Imports and Exports if an importer submits a third party Survey Report which substantiates the utility of the desired used machinery, and if the Department of Investment Promotion and Supplies favourably evaluates the Survey Report. The reason for this two-step procedure is simple and essential: it provides evidence that the machinery is useable, that its use is necessary, that spare parts are available, and that its price is not overinvoiced.

James notes that such practical inspection and appraisal considerations are important in the selection of used machinery. Still, the procedure is expensive and time consuming for small firms, and is therefore a disincentive for that group which is likely to be most interested in used machinery. In order to counterbalance this disincentive, a system of positive incentives intended for the small businessman is needed; the system might include the provision of: technical and legal information, a list of reliable and economical third party equipment appraisers, credit, and tax holidays. The latter should provide a net incentive to small firms to adopt used machinery.

Pakistan Institute of
Development Economics,
Islamabad.

Khalil A. Hamdani