

Roberto Scazzieri. A Theory of Production: Tasks, Processes, and Technical Practices. Oxford: Oxford University Press, 1993. ix + 308 pp., index. \$ 55.

In contrast to some books, this one's subject matter is described accurately by the title. It represents a very ambitious undertaking: namely, the development of an alternative framework to the standard neoclassical model for the analysis of productive activities.

It is organized into an introduction and three parts. The introduction takes one from the preclassicals to modern times, introduces some elementary concepts, and provides an overview of the book. The book begins in earnest in part I, which consists of two chapters. The first one presents the fundamental ideas in the author's framework at a very abstract level. The next chapter is a history-of-thought analysis of the concept of scale from Adam Smith to Gerard Debreu.

Instead of viewing production as a mapping of various input flows or services into output flows, the author views production as a network of primitive tasks and elementary processes arranged to attain certain objectives. Three implications immediately follow from this view that provide insight into how dramatically different this conceptualization is from the standard one. First, there is no unique way of associating tasks with inputs; second, time enters into the specification of productive processes in a fundamental way, because the precedence in time of processes and tasks is a defining characteristic of any network; third, there is no unique association between the scale of a productive process and output levels. Incidentally, scale is defined as "the number of tasks that are simultaneously performed in a given productive unit, regardless of input and output levels" (p.19).

Part II is the core of the book. It consists of five chapters. The first one defines with greater precision the main concepts underlying the author's view. Thus, a task is a completed operation. It is not further

divisible. It has a terminal node in the language of network theory. An elementary process is an arrangement of tasks leading to an output unit from the point of view of the productive unit, which need not coincide with a consumer's point of view. A production process is an arrangement of elementary processes operated within a productive unit during the working day. Production processes can be of the straight-line or job-shop variety, or a combination of the two. The former (latter) usually have workers and tools specialized (not specialized) by tasks, elementary processes with rigid (flexible) precedence patterns and joint inputs into elementary processes that usually are time reversible (irreversible). In the former case process scale can be related to the output of commodities; in the latter case process scale has no particular relationship to the output of commodities. Similar considerations apply to the continuous utilization of factors over the working day.

These concepts are used in the next four chapters to analyze various aspects of technical change. A search for the elimination of bottlenecks between elementary processes or for continuous input utilization in straight-line production processes leads to innovations or changes in technical practices that are labeled scale technology expansion. The "law" of diminishing returns is viewed as a mechanism that renders certain technical practices infeasible and it is relabeled as scale technology contraction in the narrower set of cases where it is now applicable. The last two chapters of this part provide a perspective on technical change as a bounded rationality process. Thus, technical invention enhances the number of tasks that are feasible as a result of a switch from the job-shop type to the straight-line type of production process, for example. Nevertheless this same switch can lead to technical loss if skills used in the job-shop type disappear and certain tasks can no longer be performed as a result.

Finally, part III examines the relationship between scale and productive size. At the most basic level the distinction between these two concepts is expressed as follows: size refers to the productive unit

and it is measured in terms of the input quantities assembled in a given place in order to carry out the production process. Scale is independent of size, at least in principle, and it is not tied to a particular concept of a productive unit. Indeed a discussion of scale can use the establishment, the firm, or the industrial district as the basis of analysis. Thus, the network view of production can determine scale but not size and the neoclassical view can determine size but not scale. By implication straight-line production becomes fairly rigid when its elementary processes are operated at large sizes. In these settings job-shop production is more flexible in adapting to the need for variety and this capability explains the resurgence of this form of organization as a result of electronic data processing.

Omissions are the main weaknesses in the book. The author could have profitably used one or more modern case studies to substantiate his view of production. None is provided. Similarly, the author's basic structure in Chapter 4 can provide the basis for a field of study in modern business schools: namely production management. Aside from a brief reference to this literature, there is no attempt to pursue the implications of his ideas for this obvious field of application. Given the emphasis on technical change, there is a remarkable absence of effort to integrate these ideas with modern streams of theoretical or empirical literature on the subject.

Who would benefit from this book? Most directly, economists and others interested in production theory and the economics of technical change; indirectly, those interested in the analysis of issues for which the above topics are important, for example development economists and economic historians. These benefits, however, would come in the form of stimulating ideas in a fairly coherent framework. Anything else would entail a considerable amount of effort by the readers, who would be well advised to master Chapter 4 first and then move to the rest of the book.

Roger R. Betancourt*

University of Maryland

* This review was written while the author was an IRIS Fellow.