Appendix VI

Method of estimating Capital Investment in Manufacturing Industries, 1929

The estimates of capital invested in manufacturing processes for the production of various types of consumption goods and capital equipment presented in Chapter II (Tables 2 and 4) are based upon capital assets reported by manufacturing corporations to the Bureau of Internal Revenue. A series of adjustments have been made in order to increase the comparability of these figures with Census of Manufactures data. In so doing, several rather broad assumptions have been made, which reduce the accuracy of the final estimates. It is believed, however, that despite these difficulties[1] the resulting estimates are fair approximations to the amount of capital invested in manufacturing industries in 1929.

Any definition of capital that provides usable figures for the measurement of the role of capital in manufacturing is subject to many limitations. The most serious defect in the figures drawn from corporation reports is their inadequate appraisal of the real significance of the factors they measure. Just as number of wage earners does not adequately measure the relative or absolute skill of labor, so capital values fail to reflect the vast accumulation of technical improvements that is our common heritage. Also, in relying on market values, as is in-

[1] For a discussion of the difficulties arising from the comparison of Census of Manufactures and Internal Revenue data, see the article by R. C. Epstein, 'A General-Purpose Classification for Manufacturing Industries', *Journal of the American Statistical Association,* March 1935, pp. 47–57. The difficulties arise chiefly because of differences in classification, industrial overlapping of corporation records, and the lumping of manufacturing and nonmanufacturing assets. The efforts made to combat these difficulties in preparing the present estimates will appear from the description of method in this Appendix.

evitable, care must be taken to avoid double counting. We have been led to exclude, where possible, accounts receivable from our capital figures, since in the aggregate duplication would result if they were included. Some duplication undoubtedly remains by the inclusion of investments reported in miscellaneous assets. For all corporations the inclusion of cash represents a duplication in that in large part it is a claim on other companies—banks. From the viewpoint of manufacturing alone, however, our definition of capital seems most informative.

Not all corporations report balance sheets to the Bureau of Internal Revenue, although the coverage, in terms of gross sales, is almost complete. Capital assets data for December 31, 1929, as reported for manufacturing corporations (i.e., those classed as predominantly manufacturing in character) were raised to cover all corporations of the same group on the basis of the 1931 coverage of gross sales, with a preliminary adjustment for the change in number of corporations between 1929 and 1931. In most instances the adjustment was quite minor. The same adjustment ratios were applied to all items of capital assets, divided into three groups: fixed assets (real estate, buildings, equipment less depreciation), circulating capital (cash and inventories), other capital assets (copyrights, formulas, goodwill, sinking funds, guaranty deposits, etc.). Accounts receivable have been excluded because they tend to be offset by accounts payable, and from the viewpoint of the entire manufacturing structure are not net additions to the capital stock.

The estimates of capital in manufacturing enterprises, corporate and non-corporate, were secured by multiplying the value of products reported by establishments in major industrial groups of the Census by the ratio of capital to gross sales of the corporations classed in the approximately equivalent manufacturing group. Certain combinations of classifications were necessary on the one hand; certain detailed divisions were made on the other. The major industrial groups were: foods, including tobacco, textiles and their products, leather and its manufactures, rubber products, forest products, paper and allied products, printing, publishing and allied industries, chemicals and allied products, including petroleum products, stone, clay and glass products, metal and its products, and miscellaneous. The value of product figures of the Census of Manufactures were first reduced by the extent of interplant transfers (as reported by the Bureau of the Census in *Sales of Manufacturing Plants, 1929*, pp. 52 ff.) since it is probable that such duplication does not appear in the corporate returns of gross sales.

The estimated capital investment in each major Census group was next allocated according to the various divisions of ultimate use as identified in Appendix I, Classification C. Since many of the industrial groups parallel that classification (e.g., foods), no great loss in accuracy results from the approximate character of the divisions. Estimates for certain groups were based on detailed figures on capital assets for the subgroups of the metal and its products group (which includes automobiles) and for the petroleum and other mineral oil refining, and the sawmill and planing mill products subgroups, secured through the courtesy of the Bureau of Internal Revenue, Division of Research and Statistics. Since these detailed figures were not available for any year prior to 1933, it was necessary to assume that there had been no disparate movements in the relative amounts of capital in the major groups covered between 1929 and 1933. Use of the fairly detailed industrial groups simplified considerably the allocation of total capital sums according to the ultimate product to which they were related. The allocations were actually made on the basis of the distribution, within each of the 20 industrial groups and subgroups of the item 'value added', as recorded, for all industries, in text Tables 2 and 3. The subdivisions of the metal and its products group used in these calculations were: (a) locomotives and railroad equipment, factory machinery, agricultural machinery and equipment, office equipment, miscellaneous machinery (all capital goods); (b) iron and steel; (c) motor vehicles; (d) electrical machinery and equipment; (e) metal building materials and supplies; (f) hardware, tools, etc; (g) precious metal products and processes; (h) other metals, products and processes; (i) household machinery and equipment.