$500,000. This procedure avoids the difficulty, noted by Stigler, of profit withdrawals in the form of executive salaries in small and closely held corporations.[16] Profit rates are also averaged for the period 1954–1967, which covers a complete business cycle.

Although the profit rate on stockholders' equity is viewed as a more appropriate variable than the rate of return (including interest) on total assets,[17] we examined whether the empirical results would be sensitive to this decision. The simple correlation between the profit rate on stockholders' equity and the rate of return on total assets is 0.93. In addition, the correlation coefficients between each of these variables and the 1954 four-firm concentration ratio[18] are, respectively, 0.36 and 0.33. These results suggest that our empirical findings are unlikely to be sensitive to the choice of a specific profit rate valuable.

Advertising

In light of the discussion in the preceding section, it is useful to examine the absolute volume of advertising expenditures by existing firms as well as the advertising-sales ratio. The latter variable probably provides a good indication of the absolute cost disadvantage of the new entrant at small scales of entry, but is likely to be a less accurate index of the economies of scale and absolute capital requirements effects of advertising.

We have, therefore, calculated two measures of advertising intensity: advertising outlays per dollar of sales for firms with assets greater than $500,000, and average advertising expenditures per firm among firms which account for 50 per cent of industry output.[19] Both advertising variables are averages for the years 1954 through 1957.

Seller Concentration

Concentration is a sufficiently prominent variable in the literature to warrant introducing it in three alternative formulations. First, a trichotomous classification based on Kaysen and Turner's classification of market groups is used.[20] Second, the average four-firm concentration ratios published by Stigler are introduced.[21] Finally, a dichotomous classification is constructed on the basis of Bain's finding that a critical point is reached when the eight-firm concentration ratio exceeds 70 per cent.[22]

Economies of Scale in Production

Economies of scale in production presumably exist primarily at the level of the plant rather than the firm. In the absence of better estimates for most of the industries in the sample, a measure is derived from the size distribution of plants within the relevant industries. Since cost minimization is an element of profit maximization, large multi-plant firms should operate plants which are sufficiently large to realize available scale economies. Where demand is not a limiting factor, moreover, competition among firms should lead directly to plants which equal or exceed minimum efficient scale.[23] At the same time, however, small plants may exist. These may have been built in an earlier period, before demand had expanded or a technology which required large scale had been developed, or

[16] George J. Stigler, *Capital and Rates of Return in Manufacturing Industries* (Princeton University Press) 125–127.

[17] This is because firms presumably maximize profits, rather than the sum of profits plus interest payments. The rate of return on stockholders' equity will therefore be a more sensitive indicator of the extent of freedom from competitive constraints.

[18] In two cases out of 41, our industry classifications differed from those presented by Stigler. In both of these cases, "Screens and Venetian Blinds," and "Radio, T.V., and Phonograph," it appeared that Stigler had combined these industries with smaller, miscellaneous industries. In these calculations, therefore, we used data for the more aggregated industry to stand for its major component.

[19] The procedure used was to select successive asset size classes of firms until 50 percent or more of industry sales was covered. The proportion of sales in the boundary size class required to reach this degree of coverage was used to determine the amount of advertising and the number of firms from that size class included in both the numerator and denominator of the measure of advertising per firm. For some industries, the largest size class accounted for more than 50 per cent of sales. In such cases, the measure is simply advertising per firm in the largest size class.

[20] Carl Kaysen and Donald F. Turner, *Antitrust Policy*, 27.

[21] Stigler, *op. cit.*, 214–215.

[22] Bain, "Relation of Profit Rates to Industry Concentration," 314.

[23] Since the bulk of the evidence suggests that cost curves in manufacturing are "L shaped" rather than "U shaped," plants which exceed minimal efficient scale will typically be efficient plants. See J. Johnston, *Statistical Cost Analysis* (New York: McGraw-Hill, 1960) 44–168.