AN ESTIMATION OF THE "WELFARE LOSSES" FROM MONOPLY IN THE AMERICAN ECONOMY

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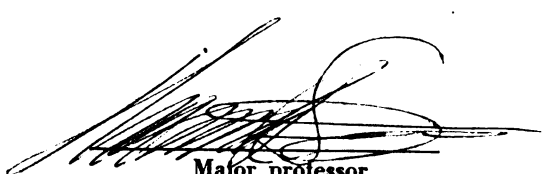

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ABSTRACT

AN ESTIMATION OF THE "WELFARE LOSSES" FROM MONOPOLY IN THE AMERICAN ECONOMY

by David Roy Kamerschen

For a long time there has been substantial analytical agreement among economists upon what are the unfavorable consequences of monopoly positions. The monopolies are said to misallocate resources and to redistribute income toward the monopolist. However, until quite recently, the empirical efforts have been meager. Harberger's attempt to get some quantitative notion of the magnitude of the misallocation of resources and the consequent loss of "welfare" has been, perhaps, the best and most widely discussed of these recent efforts.

In that study, he found the allocative loss from monopolies quite small--less than one-tenth of one per cent of national income. However, the study was based on but a sample of manufacturing corporations for the 1924-1928 period. It has also been suggested that he employed some "heroic" assumptions and questionable statistical procedures. In this thesis, we have continued the work started by Harberger, et al., by tracing a more complete and realistic picture of the malallocative effects of monopoly. The exact hypothesis that was tested concerned our belief that our proposed theoretical and statistical modifications of the first approximation model would yield "welfare loss" estimates of a significantly higher order of magnitude than had been found in previous studies.

Since the malallocative effects stem from the difference between price and marginal cost, we estimated misallocations by assuming constant costs and investigating profit data. By assuming high profits are monopoly profits--subject to a number of qualifications, many of which can be eliminated by a proper choice of data and periods--we estimated the loss by computing the divergence of industry profit rates from the overall average. These estimates were based upon IRS Statistics of Income data for corporations, partnerships, and sole proprietorships for the entire economy, i.e., not for just manufacturing. Since the 1956-1957 to 1960-1961 period was one reasonably close to "long-run equilibrium" and one in which accounting values were not too distorted, we used it.

We refined the obviously inadequate raw accounting data in a number of ways: (1) by attempting to eliminate capitalized monopoly profits through adjustments for intangibles, royalties and advertising; (2) by figuring rates of return on average assets rather than on end-of-year assets; (3) by computing returns on before-tax and after-tax incomes and for equity and total capital bases.

The actual "welfare loss" was computed by finding the ratio of "excess" profits to business receipts and converting this into the Hotelling formula of $\frac{1}{2}\sum r_i^2 q_i k_i$, where r_i is the percentage divergence of actual price from cost, q_i the output, and k_i the demand elasticity--all of the ith commodity. We computed the losses based upon an elasticity of unity (Harberger's assumption), of two (Schwartzman's assumption) and, perhaps, more realistic of all, we estimated the actual

elasticities for each industry. We tested most of our findings by regression and/or correlation analysis as we proceeded.

Although our research uncovered a number of interesting secondary findings and conclusions, our most significant disclosure was the acceptance of our hypothesis. The most realistic and complete of our several estimates put the total "welfare losses" at roughly six per cent of national income. We may conclude from this that the problem of monopoly now acquires aggregative significance in addition to its importance in studying particular industries. In short, we found that monopoly does affect aggregate "welfare" in a significant way through its effect on resource allocation.

AN ESTIMATION OF THE "WELFARE LOSSES" FROM MONOPOLY IN THE AMERICAN ECONOMY

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INTRODUCTION

The "welfare" effect of monopoly positions has captured the attention of economists, at least, since the time of Adam Smith. Over this time, there has come to be substantial agreement among economists upon what the unfavorable consequences of these monopoly positions might be. The monopolies are said to misallocate resources and to redistribute income toward the monopolist--all of which may result in a reduction of aggregate "welfare." Given agreement on principle, it seems only natural that the next step would be a quantitative study of the magnitude of the loss. Surprisingly enough, until quite recently, the empirical efforts have been meager. Fortunately, quantitative studies of the monopoly problem in the United States have been made in recent years by Harberger,[1] Schwartzman,[2] Kaplan,[3] and Weston.[4]

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[1]Arnold C. Harberger, "Monopoly and Resource Allocation," Proceedings of American Economic Review (May, 1954), pp. 77-87; "The Measurement of Waste," Proceedings of American Economic Review (May, 1964).

[2]David Schwartzman, "The Effects of Monopoly on Price," Journal of Political Economy (August, 1959), pp. 352-362; "The Burden of Monopoly," Journal of Political Economy (December, 1960), pp. 627-630; "The Effect of Monopoly: A Correction," Journal of Political Economy (October, 1961), p. 494; "The Economics of Antitrust Policy," The Antitrust Bulletin, VI, No. 3 (May-June, 1961), pp. 235-244.

[3]A. H. D. Kaplan, Big Enterprise in a Competitive System (Washington: Brookings Institution, 1954).

[4]J. Fred Weston, The Role of Mergers in the Growth of Large Firms (Berkeley: University of California Press, 1953).

Harberger's attempt to get some quantitative notion of the magnitude of the misallocation of resources and the consequent loss of "welfare" was perhaps, the best and most widely discussed of these efforts. In that study, he found the allocative loss from monopolies quite small (less than a tenth of one per cent of national income).[1] However, the study was based on but a sample of manufacturing corporations in the 1924-1928 period. It has also been suggested that he employed some "heroic" assumptions and questionable statistical procedures.[2] In this paper, we have continued the work started by Harberger, et al. by tracing a more complete and realistic picture of the malallocative effects of monopoly. This has been done by modifying the basic theoretical model and by utilizing more recent and improved data. To be sure, even with our proposed modifications, it should be kept clearly in mind that this is not the kind of task that one can do with great precision.

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[1]Schwartzman, while employing a similar technique, and Kaplan, an entirely different one based on the extent of instability in the relative fortunes of the leading firms, reach the same conclusions.

[2]The most important critiques on the above findings are by George J. Stigler, "The Statistics of Monopoly and Merger," Journal of Political Economy (February, 1956), pp. 33-40, who examined Kaplan's and Harberger's results, as we shall discuss in detail below; Ruth P. Mack, "Discussion," Proceedings of American Economic Review (May, 1954), pp. 88-89, who examined Harberger's results and argued mainly that the loss must be small since total profits constitute only a small proportion of total income; Walter Adams, "Consumer Needs and Consumer Sovereignty in the American Economy," Journal of Business (July, 1962), pp. 264-277, esp. 265-266, who examined both Harberger's and Schwartzman's work and argued that they only had "negative" value and they should have looked at the "total" optimality conditions from the producer's side. Hicks' "total" conditions say that, if welfare is to be maximized, it must not be possible to increase welfare by producing a new product; or using a factor not otherwise used. See Melvin Reder, Studies in the Theory of Welfare Economies (New York: Columbia University Press, 1947), pp. 37-38.

However, in a great many problems, such as the social control of industry, a feeling for the general order of magnitude would be helpful.

We have reason to believe that a study of this type can be more than an "intellectual exercise" since, rightly or wrongly, the findings of Harberger, et al., seem to have had a profound impact on both the general public and the economics profession. This is best attested to by the recent (November-December, 1963) Chase Manhattan Bank Survey of college and university economists in which one of the questions and its tabulated reply was the following:[1]

Does monopoly on the part of U.S. business now constitute:
A minor problem? 70%
A major problem? 23%
No problem at all? 7%

This appears to be but another example supporting the famous Keynes quotation at the close of his controversial classic concerning the underrating of the power of ideas of economists and political philosophers. Thus, we think that any proposition that has as many widespread ramifications as the "welfare" problem of imperfectly competitive markets is deserving of more up-to-date and detailed analytical and empirical study. The exact hypothesis that will be tested in this study concerns our belief that our theoretical and statistical modifications should yield a "welfare loss" estimate of a significantly larger order of magnitude than has been found previously.

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[1]It should be mentioned that although this was not based on a strictly scientific sample, the survey of academic economists did cover a broad, unbiased cross-section of American college and university economics teachers. It is interesting to note that if the term "U.S. labor unions" is substituted for "U. S. Business" the proportions become 50%, 44%, and 6%, respectively. We shall have more to say on this later. The above mentioned survey was reported in Business in Brief, Economic Research Department, The Chase Manhattan Bank, New York 15, N.Y.

The empirical efforts in this study shall rely on the theoretical proposition that the undesirable impact of monopoly on the allocation of resources may be measured by the divergence of price from marginal cost in different industries. Unfortunately, marginal cost data are especially difficult to obtain. However, by assuming constant costs in the relevant range, for the industry, we can utilize the more accessible profit data to estimate the losses. In fact, under this assumption Lerner's measure of monopoly power, $Z_m = \frac{P - MC}{P}$ (or 1-MC/P) exactly coincides with the ratio of "excess" profits to total revenue (sales). In other words, this latter figure now tells us by what percentage prices in each industry are too "high" or too "low" compared with those that generate an optimal resource allocation.

Our central argument is that we may pick out the places where resources are misallocated by looking at profit rates. Industries which have higher than average rates have too few resources and those with lower than average returns have too many resources. To know exactly how big a shift it would take to equalize profit rates in all industries, we have to know something about the elasticities of demand for the goods in question. For in this model, the "welfare losses" go up when the elasticity of demand increases.

Of course, our central thesis that high profits are monopoly profits is subject to a number of qualifications. However, by making certain adjustments in our data, we are able to estimate "excess" profit rates that reflect primarily the monopolistic elements. Assuming the desired resource reallocation from "low" to "high" profit industries is effected, we then measure the net gains to society.

We shall be basing the "welfare loss" estimates upon profit rate data for all types of industry (not just manufacturing) and for all types of business establishments (not just corporations). These rates shall be computed for both before-tax and after-tax income and for both total capital and equity bases. Furthermore, estimated industry-by-industry elasticity estimates shall be employed rather than assuming the same elasticity, of one or two, for all industries as some others have done.

This brief sketch indicates the general approach we shall be taking in the pages that follow. More specifically our format for the rest of this study is as follows:

In chapter I, we briefly review the general nature of the "welfare loss" due to monopolies and the efficacy of our index to measure this loss. Chapter II describes the first approximation "welfare loss" model and the results of its application by Harberger. Chapter III indicates the modifications we shall make to render the model more useful. Included in these modifications are some pregnant suggestions of Stigler. To avoid undue misinterpretation, the exact content of the assumptions employed in both models are spelled out in detail. In Chapter IV, we make an actual application of the modified model discussed in Chapter III and analyze the results. Our method in this chapter is one involving successive approximations as we proceed from a simplified model to one as realistic as the data permit. In Chapter V, our concluding chapter, besides reviewing what has already been done, we shall speculate on the direction of some of the factors we were not able to quantify into our analysis. Finally, in the appendices,

we have discussed our measurement and estimation procedures as well as including heretofore unpublished data on profit rates, rankings of industries by Lerner's measure of the degree of monopoly power, elasticity estimates, concentration ratios and our estimated "welfare losses."

CHAPTER I

A BRIEF REVIEW OF THE MALALLOCATIVE EFFECTS OF MONOPOLY

Before discussing, in detail, our model for estimating the "welfare losses" due to monopoly, we first want to review something of the general nature of these "losses." At least since A. P. Lerner's interesting paper in the early 1930's, most economists have discussed the undesirable impact of monopoly on the allocation of resources in terms of the divergence of product price from the marginal (incremental) costs of production.[1] Without going into the rigorous proofs employed in welfare treatises, we shall sketch the line of reasoning needed to establish the optimality condition of price (P) equals marginal cost (MC). The reasoning proceeds as follows: We know that society will

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[1] Abba P. Lerner, "Monopoly and the Measurement of Monopoly Power," Review of Economic Studies, Vol. I (June, 1934), pp. 157-175. Strictly speaking, the P = MC formulation is wrong or, at least, misleading. The actual requirement for optimality is that P = vmf (value of the marginal quantity of factor which is the physical increment of the factor multiplied by the price per unit paid for it and received by the owner of the service--if this increment is exactly one unit of factor, vmf will equal the price of the factor, pf). The concept of mf, the quantity of factor that must be added to produce one more unit of product, being symmetrical to the mp, the quantity of product that results from applying one more unit of the factor. The usual implied assumption of perfect competition in buying factors (so that MC = vmf) is what makes it only misleading. Alternatively, the optimality "Rule" can be stated as vmp = pf instead of p = vmf form. But we are neglecting all these refinements, as well as, the subtle distinction between proportionality vs. equality of P and MC. The authority on all these points being A. P. Lerner, The Economics of Control (New York: Macmillan Company, 1944). For a review of the other requirements necessary to make P = MC a "good" thing (given value judgments) see I. M. D. Little, A Critique of Welfare Economics (London: Oxford University Press, 1950, 2d ed.), p. 45.

maximize its social economic value from the use of its productive resources only if it is unable, by re-allocating its resources, to add more social value, however defined, than it destroys (this result is automatically brought about in a perfectly-functioning competitive economy, at least, in the Pareto sense which we shall be concerned with here). Since the only objective method of measuring the relative want-satisfying power of a good or service is in terms of the price which consumers are willing to pay for it, we conclude that free-market equilibrium consumer prices reflect consumers' marginal evaluation of the goods. If Px = $1 and Py = $2, each consumer adjusts his expenditure so that a unit of Y is worth to him twice as much at the margin as one unit of X--, i.e., MUy = 2 MUx (MU is the marginal utility of the given commodity). In equilibrium, Px = MCx, and Py = MCy; hence, in the above example MCx = $1, MCy = $2. But marginal money costs are a reflection of marginal social economic costs. Hence, to produce one unit of Y, society must give up, at the margin, two units of X (Marginal costs equal the sum of additional outlay by the firm on the extra productive services required to increase output by one unit. This is the sum of additional wages, interest, rents, and "normal" profits required to be paid per extra unit of output. But the amount of wages, interest, etc., a firm must pay for productive services is the amount these services are worth in other uses, i.e., the vmp--mp times the unit price of the product.) Hence if Px = $1 = MCx and Py = $2 = MCy, society's relative evaluation of X and Y is the same as the social costs of producing X and Y. In this case, there is an optimum allocation of

resources,[1] for there is no re-allocation which adds more social value than it would destroy. Unfortunately, in practice, the selling price may be higher than MC in many industries and firms--but to varying degrees. Where the gap is small, the deviations of actual output from the "ideal" output are likely to be small. A wide gap would indicate that output must be increased considerably before the gap would disappear.

In summary, monopoly leads to non-optimal resource allocation because the money price of any product, which is society's index or measure of relative worth, benefit, satisfaction of a product at the margin, is not equated to the marginal costs of production, which measures the sacrifice, cost, disutility which was foregone in sacrificed alternative commodities to produce another unit of this commodity. When Px exceeds MCx, this indicates that society values additional units of X more than the alternative products which the appropriate resources could otherwise produce. Thus, there is an <u>underallocation</u> of resources to this product from society's point-of-view. When Px is less than the MCx the reverse holds--an <u>overallocation</u> of resources to X. This must be qualified to the extent P does not measure <u>all</u> the benefits and MC does not measure <u>all</u> the sacrifices involved. Therefore, when social revenues, such as chest X-rays and polio shots, and social costs, such as smoke and pollution, exist, P and MC are no longer accurate indices

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[1]Actually to measure all the deviations from the optimum allocation of resources, the Lerner measure of the "degree of monopoly," (P-MC)/P discussed in detail below, must be supplemented by the formula for the "degree of monopsony." The relative gap between average cost (AC) and marginal revenue (MR) is the measure of this latter force.

of satisfactions and sacrifices.[1] In other words, when there are external effects in production or consumption,[2] P = MC does not lead to an efficient allocation of resources. However, we shall neglect this qualification in our discussion.

A further refinement which we shall touch but lightly is the so-called theory of "second best."[3] The general theorem revolves around situations in which the Paretian optimum, which requires the simultaneous fulfillment of all the optimum conditions, cannot be met. The theorem states in a general equilibrium system with a constraint on one or more of the Paretian conditions, the other conditions, although still attainable, are, in general, no longer desirable. In other words, non-fulfillment of one optimal condition means optimum now requires departure from all the other Paretian conditions. Similarly, it is not true that a situation in which more, but not all, of the optimum conditions are fulfilled is necessarily (indeed, even likely) superior to a

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[1]There are, of course, other Schumpeterian-type arguments emphasizing the "dynamic" over these "static" conditions also. Furthermore, Reder, op. cit., argues this optimal only as viewed from the consumers' side--given existing products. We should examine the producers' side to see if there are any new products that consumers would like newly produced or old products they would like at new prices. We shall neglect all these arguments because of their nonoperationality. In other words, it is virtually impossible to quantify these things. Of course, A. Smith, Pigou, and Kahn were also important contributors and criticizers of "welfare" economics.

[2]I.e., "that the utility level of a consumer does ··· depend upon the consumption levels of others, and that the total cost of an entrepreneur does ... depend upon the output level of others," James M. Henderson and Richard E. Quandt, Microeconomic Theory (New York: McGraw-Hill Book Company, Inc., 1958), p. 212.

[3]See James E. Meade, Trade and Welfare (London: Oxford University Press, 1955), esp. Chapter VII, pp. 102-118, and R. G. Lipsey and Kelvin Lancaster, "The General Theory of Second Best," Review of Economic Studies, Vol. 24 (1956-1957), pp. 11-32, and the ensuing comments.

state where fewer conditions are fulfilled. Furthermore, it is not true that a situation in which the optimal departures are of the same direction and magnitude is superior to one in which they vary. This latter fact means that there is no reason to believe a situation in which there is the same degree of monopoly in all industries is necessarily superior to one in which the degree varies between industries. However, if MR $\neq$ MC in one firm, the "second best" conditions require that the equality be departed from in all firms. Here, as in the case of the other refinements, we shall be forced to neglect this "second best" argument except for a very brief extension in Chapter III.

Returning to the "welfare losses" due to monopoly, we should mention that misallocated resources may not be the whole of this loss. If there are "excess" (supernormal) profits earned, there may be an undesirable or desirable impact on the distribution of income. The deleterious effect would result if a larger share of the national income went to people who are less deserving--however defined. However, this criticism is on an entirely different level from the previously mentioned distortion due to the misallocation of resources. This is because it is entirely possible that the recipients of the enlarged share of income might be people more deserving, as defined by our cultural standards--whether they be poorer, nicer, whiter, etc. As Lerner has repeatedly emphasized, it is better to separate the distribution from the allocation problem. It is also true that we can have P $\neq$ MC and have no "excess" profits to redistribute in the first place--the so-called Chamberlin "tangency solution." Perhaps a better example that monopoly profits are not the greatest evil of monopoly is when a monopoly firm with

horizontal AC and MC curves sets its price above MC. If the state charges a franchise tax equal to the profit, the misallocation of resources would persist as the lump sum tax does not affect quantity and hence MR or MC. The government would reap the gain instead of the firm; but, the consumers would still get underproduction and overpricing on this product. We shall neglect any possible redistributional effects of monopoly and concentrate on the more tangible and more important area of resource allocation.[1]

Perhaps the exact nature of monopoly distortion can be better visualized with a diagram. In the figure, we shall assume constant (horizontal) AC and MC as we do in our model. In competitive equilibrium G, society would be receiving the Marshallian consumer's surplus equal to the area of the triangle CGA. As the monopolist raises his price to E in order to maximize profits (i.e., where MC = MR), the consumer loses to the monopolist that part of his consumer's surplus represented by the profit rectangle CDEB and is left with but BEA. The little triangle HGE represents the "dead-weight loss" that goes to no one

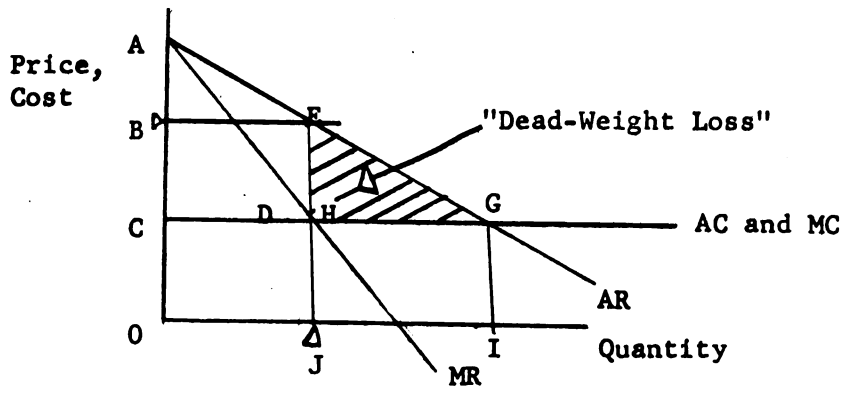

Figure 1.--"Dead-Weight Loss" from Monopoly

[1]This means that when we speak of "welfare losses" we are using the word "welfare" loosely to denote economic efficiency.

for the consumer loses more than the monopolist gains in profit. Even if the profit were recaptured by lump-sum taxation, inefficiency would still claim the "dead-weight triangle," HGE.

The nature of this monopoly loss being indicated, we might now turn to the problem of trying to measure the degree of monopoly. The chief difficulty of doing this lies in the fact that monopoly is only perceptible by its causes or effects. For as is power, strength, capacity, potential, force, etc., it is not directly measurable. Therefore, it is not surprising that there have been a number of proposed indices suggested to measure the degree of monopoly. They include: (1) the relative gap between MC and P, i.e., $Z_m = \frac{P - MC}{P}$, for a profit maximizing firm in equilibrium this reduces to the reciprocal of the price elasticity of demand (Lerner); (2) an adjusted rate of profit (Bain); (3) indices of concentration and numbers (Monopoly Subcommittee); (4) the amount of price inflexibility--including frequency and amplitude of change (Means, Neal, Dunlop); (5) the ratio of total gross profit to total gross receipts or the ratio of gross profit margin to price (Kalecki); (6) the ratio of the slope of firm demand, "species" demand curve, to the slope of industry demand, "genus" demand curve, (Rothschild); (7) the cross elasticity of demand, which is the ratio between relative changes in the quantity demanded of the product considered and the relative changes in the price of another firm's product (Triffin); (8) the coefficients of penetration and insulation, or the firm's capacity to penetrate rival markets and its capacity to withstand attacks on their own share (Papandreou).

Since these are all critically reviewed, in detail, by Professor Machlup,[1] we shall restrict ourselves to a brief discussion of the ones utilized here viz., (1) and (2). The Lerner formulation of the monopoly power in force (actual) not potential ("intentional"), (P-MC)/P or 1 - MC/P, is probably the most sensible (Zm = 0 in perfect competition since MC = P, the other pole being Zm = unity [1] if P is infinite or MC = 0 , thus, Zm shows the relative deviation from pure competition). To be sure, it is far from perfect. It has been criticized for failing to take account of the "degree of monopsony," for ignoring the non-price dimension of imperfect competition, and for not taking account of the existence of substitutes (this objection presumably led to the Triffin formula). It has been further criticized for applying only to a single firm and only with many qualifications to the whole economy (if all suppliers had the same degree of monopoly power, Lerner feels there would be no deviation from the optimum--subject to two qualifications concerning the "degree of monopsony" and the "production of leisure"), for lack of data and difficulties of measurement, and for failing to take into account output restrictions not due to imperfect elasticity of demand.[2] This latter point means that there might be pure competition

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[1]Fritz Machlup, The Political Economy of Monopoly (Baltimore: The John Hopkins Press, 1952), Chapter xii, pp. 469-528. For a brief review of the main ones see H. H. Liebhafsky, The Nature of Price Theory (Homewood, Illinois: The Dorsey Press, Inc., 1963), pp. 296-297, or G. Malanos, Intermediate Economic Theory (Chicago: J. B. Lippincott Co., 1962), Chapter xx, pp. 501-533, especially pp. 514-533.

[2]Joel Dean, Managerial Economics (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1951), p. 108, n. 94, also contends that it is not a complete measure of the social cost of monopoly ". . . since it did not include the size of the losses of output and distortions of income that would result, nor did it allow for the pure profits that appear with a new and growing product."

in a certain market while entry into the industry is restricted by some artificial barrier. Thus there might be no gap between MC and P but a margin between AC and P, i.e., "excess" profits. Although this is not too important since imperfect elasticity is often connected with imperfect entry, the measure of the relative P, MC gap should be supplemented with knowledge of adjusted profit rates. In essence, as we shall see below, we have done this. All in all, we feel that the main difficulty of the price, incremental cost comparison is one of impracticality. The notion of MC being an especially difficult concept to quantify. This is attested to by the protracted controversy in the literature, especially since the 1930's, over its alleged shape. Furthermore, one might find two different degrees of monopoly for the same firm depending upon whether one refers to long-run or short-run considerations. Lerner regards the short-period as appropriate for his formula.

To avoid most of the difficulties, we may assume constant costs (horizontal AC and MC). In such cases, the ratio of monopoly profits to total revenue (sales) coincides with the Lerner index, since pq = total revenue and we have assumed constant costs (AC = MC), profit per unit, P - AC, may be expressed as P - MC--therefore $\frac{(P-AC)q}{q}$ reduces to the Lerner formula (taking out the common factor q and substituting MC for AC), coincides with the Lerner index. Data of this first kind, dealing with profits and sales, are much easier to secure. However, it is only under our very special assumptions that the monopoly revenue to total receipts ratio exactly coincides with the theoretically more acceptable Lerner formula. In cases, similar to the "tangency solution," etc., mentioned above, where

there is a divergence between the approaches--in this case there are no "excess" profits but $P \neq MC$--it is the Lerner approach which is valid. By using the ratio of economic or "excess" profits to sales revenue, we may find out how much prices are too "high" or "low" relative to the competitive positions, if we first find which industries are earning higher than average rates of return on capital. For example, if the "excess" profit rate of sales was equal to 25 per cent of sales, this means that average costs are 75 per cent of the average price at which sales are being made. Hence, this ratio effectively measures the ratio of average price to average cost, which is assumed equal to MC here.[1]

By adopting this approach, we do not mean to imply an outright condemnation of all "excess" profits. Short-term "excess" profits, as are losses, are justifiable and therapeutic if the economy has booms which alternate with slumps (at least enough to counterbalance depression losses); as an incentive for an industry to enlarge the output of a product in short supply; for the firm which is superior or exceptionally efficient vis-a-vis its rivals.[2]

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[1] For larger accounting profits on equity to indicate larger excesses of price over AC, it is also necessary to assume roughly equal capital turnover.

[2] For a detailed discussion of this see Joe S. Bain, Industrial Organization (New York: John Wiley and Sons, Inc., 1959), pp. 371 ff. Of course, persistent, prolonged, or chronic "excess" profits, over a long period of years, must be judged somewhat differently. "Excess" profits refer to any return greater than "normal." "Normal" profits being defined as equal to what the entreprenuer could obtain with his capital if he used it in some other way, less an allowance for the inconveniences of transferring it, and plus (or minus, if risk preferences prevails in the community over risk aversion) allowances for any non-monetary advantages. Of course, the shorter the period of time considered, and the less mobile the capital in process, the less will be the "normal" profits (and "total costs").

It is for this reason that in our empirical search we shall attempt to find periods which roughly represent "long-period equilibrium." But even doing this may not be enough. Some would argue that divergent profit rates also occur from the dynamics of growth and development and would be forthcoming even under competitive conditions. A complete model would take all these things into consideration.[1]

The fact is that we can think of a number of causes of supernormal profits besides monopolistic or monopsonistic restriction of output: (1) windfalls from misestimation of future demand or cost or lagging adjustment to changing demand or cost--in more general terms, Knightian uncertainty; (2) the fact that reported profit statistics often contain elements of return which are really implicit factor returns due to the natural scaracity of specific resources, e.g., the accounting profit which is really rent from the superior ability of expert management; (3) the riskiness of enterprise investment in various lines resulting in the payment of "risk rewards" to successful risk-takers, losses to unsuccessful gamblers; (4) the rewards of Schumpeterian type innovation or enterprise.[2]

Despite all these qualifications, we can still roughly identify monopoly power with high rates of profit.[3] Although it is empirically

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[1]Harberger used 1924-1928 as an approximation to "long-period equilibrium" and arbitrarily allocated one-third of profits to monopoly profits.

[2]Although some schools of thought would put all of these sources under one category, e.g., under Knightian uncertainty, we have here shown the more traditional breakdown.

[3]And as we shall see below, the "welfare loss" increases as the square of its greater-than-normal profits--given the elasticity of

difficult to separate "contrived" from "natural" scarcities, we shall make some attempt in this direction. Actually, by taking a reasonable choice of periods to investigate we can eliminate many of the above causes of surplus not attributable to monopoly power. By finding a long-term average profit rate, we can expect to eliminate windfalls which are, by definition, sporadic or intermittent. A weighted average profit rate for all firms in the economy or in the industry should, under certain assumptions, also eliminate risk as an explanation of group-average "excess" profits (losers offsetting winners giving a zero net return). For not all firms in the economy or industry can earn "excess" profits which can be described as risk rewards--the existence of risk being rewarded should be proved by losses to other, less successful firms. If all firms persistently earn 10 per cent p. a. "excess" profits, it is difficult to describe these earnings as risk rewards, or to call the industry a "risky" one for investment. However, if the economy suffers from risk aversion, or a "systematic overestimation of risk", this return may persist in the long run.[1]

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demand, Harberger, op. cit., p. 85. For an excellent short defense of identifying "excess" profits with monopoly profit see Joe S. Bain, "The Profit Rate as a Measure of Monopoly Power," Quarterly Journal of Economics, Vol. 55 (1940-1941). Any subsequent references to Bain, unless otherwise indicated, will be to his book, Industrial Organization, and not to this article. We should also mention that Bain further found that profit rates did not vary continously with the degree of concentration, although he did, in general, confirm the monopoly-competition distinction in his "Relation of Profit Rate to Industry Concentration," Quarterly Journal of Economics, LXV (August, 1951), pp. 313-314. This position was confirmed by D. Schwartzman, "The Effect of Monopoly on Price," op. cit., pp. 360-361.

[1]George J. Stigler, Capital and Rates of Return in Manufacturing Industries (National Bureau of Economic Research, 1963), pp. 62-64, found no evidence of a risk premium in manufacturing, although it was admittedly a restricted investigation.

Long-run considerations should also neutralize most of innovational profits which are presumed to be removed in the long-period by the march of successive and successful imitators. Similarly, the returns erroneously attributed to profit which are actually due to a specific resource, say naturally scarce land, may be eliminated by taking a longer view. The alleged profit due to innovations and varying rates of growth (under the Schumpeterian schema) and not to monopoly restrictions, even if not completely eliminated by taking the long-view, does not appear to be a serious problem. For instance, in the U. S., in the 1950's, there was no special tendency for either the more or less concentrated industries to grow more rapidly.[1] Incidentally, there are monopoly gains that accrue to other factors that should be adjusted for in estimating total "welfare losses." Monopoly elements are in rents, royalties, executive compensation, wages, etc. For instance, it has been suggested that there are wage differentials in favor of concentrated industries which are a reflection of this concentration and not of divergent skills.[2]

There are, of course, a number of other adjustments which can be made along these lines. However, the important point that we want to stress now is that the possibility of adjustments of the bare profit rate makes our position that "excess" profits are entirely caused by monopoly more tenable. Bain goes so far as to say,

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[1]Leonard W. Weiss, Economics and American Industry (New York: John Wiley and Sons, Inc., 1961), pp. 500-504; also see pp. 511-518.

[2]Stigler, op. cit., p. 35; Weiss, op. cit., pp. 505-507; Joseph W. Garbarino, "A Theory of Interindustry Wage Structure Variation," Quarterly Journal of Economics, LVIV (May, 1950), 300 ff. Below we shall cite contrary studies.

> . . . the only sort of excess profits which might be expected to be reflected in long-term average excess profits of entire industries are monopolistic excess profits. All other types of excess profits are likely to occur sporadically and irregularly, or to be confined to only part of the firms of an industry . . . Chronic excess profits are at least prima facie suspect of resulting from simple monopolistic restriction, and if so are undesirable.[1]

We hope that even a brief and incomplete sketch of the theoretical and empirical difficulties of isolating monopoly-caused "welfare losses" as this will give the reader some flavor for the problems we shall be encountering.[2] What we want to do next is discuss the first approximation "welfare loss" model for evaluating this loss. Also in Chapter II we shall discuss Harberger's results from the application of this model. This will be a prelude to our own extended and revised model which incorporates Stigler's criticisms as well as other needed modifications.

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[1] Bain, op. cit., pp. 377-378.

[2] It should be mentioned that within the economics profession, quantitative monopoly studies have not been too favorably received. Even with some very competent studies that have pointed out clearly the monopoly-competition dichotomy, the fact that it was necessary to use such "theoretically imperfect instruments as census industry classifications, interindustry comparisons, and accounting profit rates," has caused some reluctance by economists. In other words, the squeamishness stems from the fact that (1) the degree of monopoly being presumed to be high where economies of scale are important, we obtain a small difference in P and AC at low outputs in monopolistic industries. The bias is reversed at large outputs; (2) large errors may result from census industries that are not the same as theoretical industries so that small monopolistic industries may be submerged in large, apparently competitive census industries reducing the observed effects. A similar (same direction) bias results from the division of large competitive industries into small, apparently monopolistic census industries; (3) monopoly profits may be capitalized under various titles; (4) no adjustment for costs which are really profits may lead to an understatement of profits in competitive industries since concealment of profits is probably more important in small than in large firms. See David Schwartzman, "The Effect of Monopoly on Price," op. cit., pp. 352-353 including note 7.

In the discussion in Chapter III of our model we shall be careful to spell out our working assumptions.

CHAPTER II

THE FIRST APPROXIMATION "WELFARE LOSS" MODEL AND ITS APPLICATION BY HARBERGER

A. C. Harberger's ingenious attempt to evaluate the social losses from concentration is simple, yet revealing. However, he did not use a "complete" model in the sense that it considers only the effect of "excess" profits and neglects any redistributional effects (alternatively, we can say he assumes them equal to zero). It is also limited by the fact that resource misallocation might arise from causes foreign to the model--"tariffs, excise taxes, subsidies, trade-union practices, and the devices of agricultural policy."[1] What we shall do in this chapter is explain the first approximation schema for estimating the allocative loss from monopoly positions and describe the empirical results obtained by Harberger from its application to American manufacturing from 1924-1928. Thus, this chapter will serve as more than the traditional "review of the literature." By surveying the basic theoretical framework here we may reserve the next chapter for our theoretical and statistical modifications without having to reconstruct the first approximation model.

To estimate the "welfare loss," the Lerner-Bain approach discussed above is particularly useful. By assuming a constant long-run AC curve, and a constant MC curve, for both the firm and the industry, difficulty

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[1] Harberger, op. cit., p. 87.

of obtaining MC figures is circumvented. Under the constant costs assumption, the ratio "excess" profits to sales exactly coincides with the otherwise superior Lerner approach. The former ratio now tells us by what percentage prices are too "high" or "low" compared to the optimum. In order to compute the numerator of the sales approach, it is necessary to find the rate of return on capital (investment) and subtract it from the economy-wide average rate of return and finally multiply the resulting figure by the absolute capital base. We shall discuss this in greater detail below and illustrate it with a few examples. However, before moving on, we want to emphasize that the assumption of constant costs is a rather important "wedge" to get the needed information from the accountant's ledgers.[1] There are other important assumptions, e.g., unitary elasticity, "long-run equilibrium," etc., that we shall note as we proceed. So that we do not lose the proper perspective concerning our findings, we shall list all of these assumptions at the end of the next chapter.

The central argument for what we shall be doing empirically and what Harberger did may be succinctly summarized as follows:

> . . . conjure up an idealized picture of an economy in equilibrium. In this picture all firms are operating on their long-run cost curves, the cost curves are so defined to yield

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[1]It has been pointed out that the conditions necessary for constant costs may have been realized in many branches of American industry as a result of the development of "an economy of expensive labor and cheap capital and of industry accustomed to business fluctuations." To generalize this assumption to the whole economy assumes, not proves, that monopoly exists everywhere. For MC must be rising in the relevant range of output if there is optimum utilization of capacity --minimum AC--as there is if competition is pure. Malchlup, op. cit., pp. 514-517.

each firm an equal return on its invested capital, and markets are cleared. I think it is fair to say that this is a picture of optimal resource allocation. Now, we never see this idyllic picture in the real world, but if long-run costs are in fact close to constant and markets are cleared, we can pick out the places where resources are misallocated by looking at the rates of return on capital. Those industries which are returning higher than average rates have too few resources; and those yielding lower than average rates have too many resources. To get an idea of how big a shift of resource it would take to equalize profit rates in all industries, we have to know something about the elasticities of demand for the goods in question. In Figure 1 [Figure 2], I illustrate a hypothetical case. The industry in question is earning 20 per cent on a capital of 10 million dollars, while the average return to capital is only 10 per cent. We therefore build a 10 per cent return into the cost curve, which leaves the industry with 1 million in excess profits. If the elasticity of demand for the industry's product is unity, it will take a shift of 1 million in resources in order to expand supply enough to wipe out the excess profit.[1]

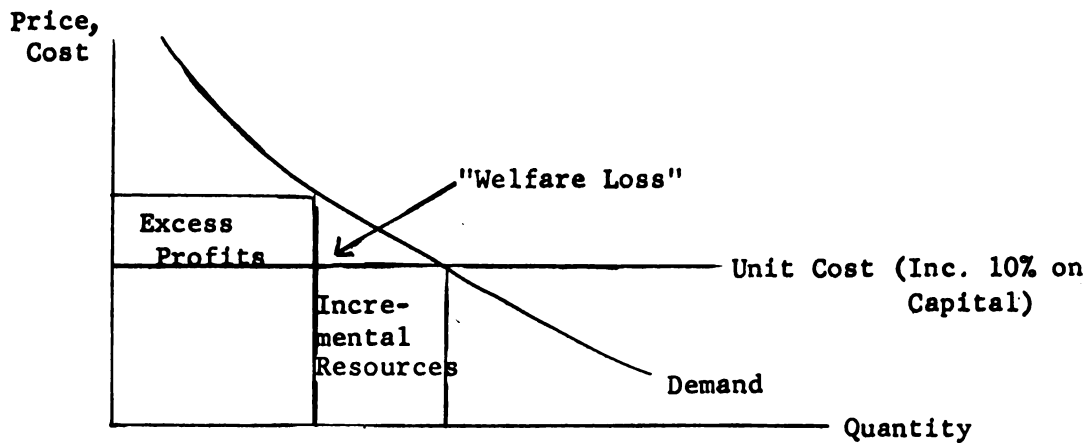

Figure 2.--Harberger's "Welfare Loss" Diagram

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[1]Harberger, op. cit., pp. 77-78 (italics supplied). For the reader who is accustomed to thinking in algebraic terms, Stigler restated the above argument in "primitive symbols" in op. cit., pp. 34-35 as follows: "Cost of production per unit are a of labor and ic of capital (where i is the competitive interest rate), and a and c are constants if the industry has constant costs. The demand function has unitary elasticity, so pq = S (where S is sales). The monopolist obtains a rate of return of mi on his investment. Then if the price is to fall to the competitive level, output will raise in the ratio $\frac{S/(a+ic) - S/(a+mic)}{S/(a+mic)}$. This expression simplifies to (m-1)/Rc [apparently a typographical

The first thing to be noted in connection with this theoretical approach is the pivotal position played by constant costs. If we had the, perhaps, more typical situation of rising MC, we would get the following result.

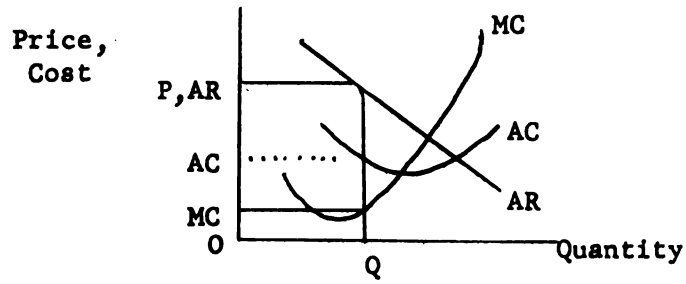

Figure 3.--Profit Rates under Rising Versus Constant Costs

Now profit data [profit per unit being P,(AR)-(AC)] would not give us the information we desire on the difference between P and MC--our measure of the "welfare loss." It should be observed that, if costs in American industry are increasing rather than constant, less reallocation of resources would be necessary to equalize profit rates. This means that the assumption of constant costs, probably, overstates the "welfare loss" due to monopoly. This is illustrated in Figure 4, where the "welfare loss" from the constant cost case, MCo(=ACo), is the whole area in the triangle ABC. Under conditions of rising MC, MC_1, it would be the shaded triangle ADB.

It should also be noted that it is something of a simplification to regard the average profit rate as the competitive rate. Surely,

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error made this (m-1)Rc in the J.P.E.] , where Rc is the ratio of all competitive costs to competitive capital costs (that is, Rc = [(a+ic)/ic] ."

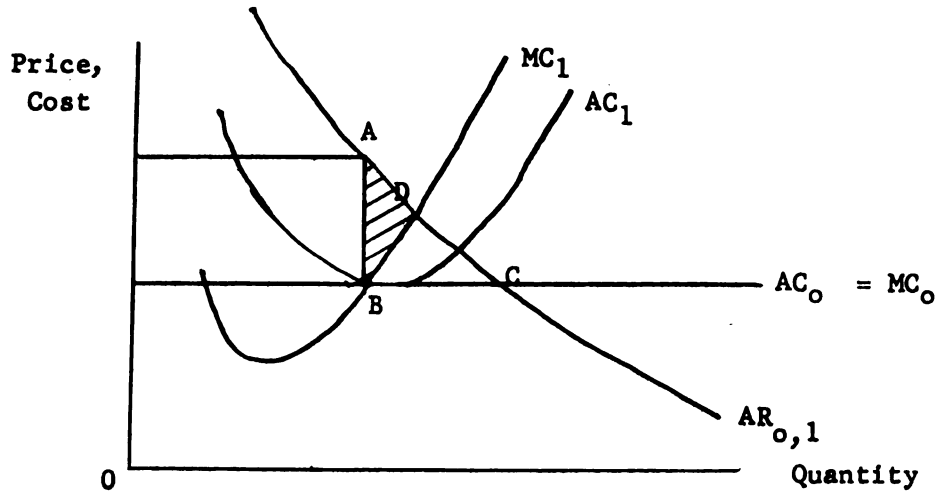

Figure 4.--"Welfare Losses" under Rising Cost Conditions

this need not be the case, e.g., in an industry with one competitive firm and the rest monopolistic, the average rate would undoubtedly be much greater than the competitive rate. In most cases, this should not lead to any large-order errors.

Also, the portrait of an economy tending toward equality of profit rates is subject to several qualifications:[1] (1) In the short run, imperfect knowledge of returns on alternative investments or a lack of desire for profits would cause some dispersion among profit rates; similarly, unexpected developments and events which call for transfers of resources requiring considerable time to be completed would lead to dispersion, but presumably would be eliminated in the long run as knowledge is transmitted. (2) Persistent, long-run differentials can be anticipated if there are differences among industries in monetary and nonmonetary supplements to the average

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[1]Stigler, Capital, op. cit., Chapter 3, pp. 54-71.

rate of return, e.g., the reputed psychic income associated with the "good life" of farming, as well as teaching, would lead to below average returns while risk premiums[1] and tax considerations may require higher than average returns. (3) Finally, in any empirical study, the difference between the income concepts used in compiling the data and the income concepts relevant to the allocation of resources is a third source of dispersion--perhaps the three most important defects being: (a) the concept of income appropriate to resource allocation differs markedly from the notion underlying income tax data; (b) there may be "excess" salary withdrawals made by the officers of small corporations who own most of the stock and have a great deal of discretion in taking income as salaries or as returns on capital--the difficulty being that only the second-mentioned form of income goes into our rates of return;[2] (c) the asset values used in computing rates of return have not been adjusted for price changes.

Perhaps a word of explanation would be helpful on how the quantity of resources that must be shifted in a function of the elasticity of demand. More precisely, the value of the misallocated resources is equal to "excess" profits times the estimated arc elasticity of demand

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[1]If lenders accurately estimate future risks on average, it is reasonable that they demand a nominally higher rate when assuming larger risks. However, if the rate is higher only by the actuarial value of future risks, we should maintain there is no risk aversion.

[2]McConnell's procedure for this contention rested upon the assumption that differing marginal productivities of capital (mpk) among companies of a given size explain any difference in income. It seems more reasonable to assume mpk's are the same and entrepreneurial skills differ. See ibid., pp. 125-127.

between the monopoly and competitive positions on the demand curve. If you express the amount of "excess" profit, $1 million in the above example, as a per cent of sales in the industry, $10 million here, we would obtain the percentage that price in that industry is too "high" ("low" if the rate is less than average) compared to the ideal allocation of resources, 10 per cent in this case. Since this ratio effectively measures the ratio of average price to AC, and MC under our assumption, a 10 per cent "excess" profit rate on sales indicates that average costs are 90 per cent of the average price at which sales were made.

The above short discussion gives us a general picture of what has to be done empirically. It is then necessary to find a period that, at least, roughly meets two conditions. First, it is desirable to find a period approximating "long-run equilibrium" with no drastic shifts of demand or economic structure in process. Otherwise, we could get cases such as an increase in demand for farm products (agriculture reputedly being our least monopolistically-dominated sector) leading to a short-run rise of returns on capital until new productive resources flowed into the industry in the long-run. Of course, this higher return is not due to monopoly power but is merely a high economic rent due to accounting procedures and the natural scarcity of land. However, by taking long-term profit rates, the sporadic and irregular components, risk, uncertainty, perhaps innovations, would be mainly removed leaving "excess" profits due only to monopolistic restriction. Of course, this is just the element we want to separate to estimate "welfare losses." Secondly, a period for

which accounting values were near actual values is desirable. We know that the accounting profit is biased upward if the price level has been rising, and downward if it has been falling. This follows from the fact that accountants typically "measure in terms of dollars of different purchasing power." They measure current revenues and costs in current dollars and past costs and investments in past dollars. In other words, they do not make price level adjustments in stating dollar values.[1]

Harberger took the 1924-28 period as a reasonable approximation to the above mentioned conditions. This period had the additional advantage of being able to employ Professor Ralph C. Epstein's fine

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[1]For a numerical example of this see Bain, op. cit., pp. 380-381. If a researcher is not able to find such an ideal period, adjustments can be made. Although Stigler, Capital, op. cit., pp. 34-37, 49-53, shows, by rank correlation analysis, deflation of book values to get "real" assets did not change things significantly; in fact, the rate of return (after taxes) on all manufacturing was 7.2 per cent a year in both current and stable prices from 1938-1956. Bain, op. cit., pp. 381-382, using Statistics of Income data, which we shall also rely on so heavily later, feels although 1936-1940 all-corporations profit rate as a percentage on equity (after income tax) can be accepted more or less at face value; the 1949-1953 period, with a rather sharp price inflation over the preceding eight or nine years along with its own slower inflation during the period itself, should include a reduction of one to two percentage points in the stated rates.

Part of the spurious profit of the above sort is caught in the Department of Commerce figures in the "corporate profit before taxes ('adjusted')" account. The "adjusted" refers to an inventory valuation adjustment. Thus, in 1959 rising prices led to a $0.5 billion deduction (-$0.5 billion) from the reported corporate profits of $47.1 (adjusted = $46.6) billion while in 1953 falling prices necessitated a $1.0 billion addition +$1.0) to reported profits (similar adjustments being made for unincorporated incomes). A similar difficulty, which we shall not be able to do much about, is the fact that the value of the common stock will capitalize "excess" profits so as to leave a yield that is apparently "normal." Adjustment of income data will, at least, partially make up for this.

work, Industrial Profits in the United States.[1] Then, to approximate a "long-period equilibrium," void of factors causing short-rate variations, the industry profit rates for the five-year period, 1924-1928, were averaged. The computed differences among these profit rates, as between industries, gave a broad indication of the extent of the resource misallocation in American manufacturing in the late twenties.[2]

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[1](National Bureau of Economic Research, 1934). In this book, Epstein gives rates of total profit to total capital for seventy-three manufacturing industries. He defines total capital (pp. 595-596) as capitalization (invested capital of a corporation as measured by the sum of its preferred stock, common stock, surplus and undistributed profits with special reserves in most instances excluded), plus funded debt (capital borrowed from the general public and lending institutions through the sales of bonds, debentures, notes and other forms of indebtedness). In general terms, total capital = book capital + bonded indebtedness. Total profit refers to net income (net earnings after all business expenses and fixed charges including interest payments on funded debt have been deducted), plus interest payments on funded debt. Again, in general terms, total profit = book profit + interest indebtedness. The reason that the returns are computed to include funded debt is that these borrowed dollars perform much the same economic function as invested capital. If we add interest to the earnings and funded debt to the capital base, the profit rate on all capital employed will be lower for most companies since earnings usually exceed the interest rate charged to the firm, according to Claude Robinson, Understanding Profits (Princeton, New Jersey: D. Van Nostrand Company, Inc., 1961), p. 73. Another reason for preferring this computation over the return on equity is that this latter figure "might be quite different for two economically identical firms, depending on how they were financed. The firm with the larger debt outstanding will show higher earnings on equity so long as its interest charge per dollar borrowed is less than it earns on its total assets. Of course, the debt-financed firm also is in greater danger of turning in a loss in bad years since the interest has to be paid regardless of what the firm earns. In other words, the profits on equity will fluctuate more widely from year to year for the company with large debts, even if the economic performance of the two firms is the same." The quoted writer qualifies his endorsement of our approach when he says, ". . . when public utilities are discussed . . . the return on total assets cannot be compared very easily with those of other industries. At any rate, it is the return on 'owners' equity that businessmen presumably are trying to maximize." Weiss, op. cit., p. 144 including note *.

[2]Of course, a lack of desire for profits or a lack of knowledge of returns in alternative ventures, etc., could render any tendency toward

To better understand the theoretical approach that is employed in calculating the "welfare losses" by this first approximation model, we want to carry through the calculations for a particular industry. Rather than use a hypothetical example we shall use an industry that Harberger utilized in his estimates. In the process of obtaining the final results we shall want to elaborate upon some theoretical points that we touched upon before. The interested reader may then verify the result by consulting Harberger's tabled estimates.

If the bakery products industry was earning 17.5% return on its total capital, it would be earning more than the overall average rate for all industries of 10.4%. In order to obtain the absolute amount of "excess" profits in this industry we would multiply the above profit rate differential of 7.1% times the capital base of $242.62 (capitalization = $236.00, funded debt = $6.62) million. This gives "excess" profits of approximately $17 million. We then can express "excess" profits as a per cent of sales to determine by what percentage the price diverges from the optimum. Since (P-AC)/P = (P-MC)/P = 1-kP, under our constant cost assumption, the ratio of profits to sales will give the desired information as to how "high" or "low" prices are.

To determine how much of a reallocation of resources from high profit to low profit industries would be necessary to eliminate the observed divergences in profit rates, it is necessary to know something about the industry demand elasticities. This may be illustrated in Figure 5.

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equality of rates negligible. But, persistently high profits indicate the industry is not competitive.

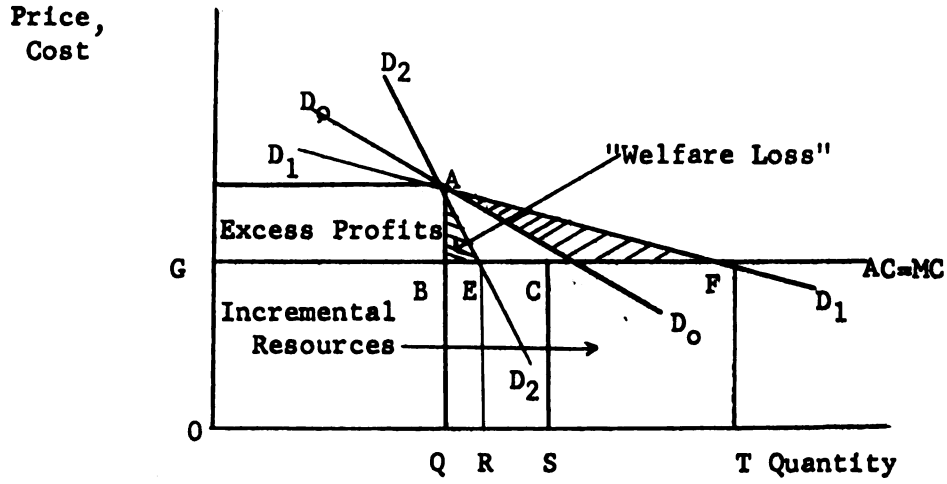

Figure 5.--Resource Transfers and "Welfare Losses" as a Function of Elasticity

This diagram illustrates that both the required amount of resource transfer and the "welfare losses" rise as the elasticity gets larger. As compared with the resource reallocation indicated by the rectangle BCQS, resulting with the original demand function D_0, the reallocation rectangle grows to BFTQ with the demand function D_1 with the higher elasticity and falls to BQER under the smaller elasticity associated with demand function D_2.[1] Similarly, the "welfare losses" increase from triangle ABC to triangle ABF for higher elasticity

[1]In other words, the extent of the misallocation is the value of the resources that must be brought into the industry for the price to fall to the competitive level. This value is the competitive price (OC), times the difference between competitive and monopolistic outputs, IJ, or the rectangle DGIJ in Figure 1. Elasticity comes into the picture by affecting the size of IJ.

and fall to triangle ABE for the smaller elasticity case.[1] Thus, we can see that elasticity is quite important in our study. Harberger felt that unity elasticity was a reasonable assumption since the analysis involves the substitution of one great aggregate of products yielding high rates of return for another yielding low rates and not the substitution of one industry's products against all other products. Since we shall return to this point later, we shall only mention here that we think industry-by-industry estimates of elasticity are more realistic for determining the relevant magnitudes involved in this type of analysis.

This brings us to the question of what do we mean by "resources" when we talk about transferring resources?

> . . . resources here . . . mean the services of labor and capital plus the materials bought by the industry from other industries. In many ways it seems preferable to define resources as simply the services of labor and capital. This could be done by applying to the value added in that industry the percentage of excess profits to sales. The trouble here is that adding to the output of industry X calls resources not only into that industry but also into the industries that supply it. And by the time we take all the increments in value added of all these supplying industries that would be generated

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[1] The "welfare loss" may be thought of as the sum of the producers' and consumers' surplus which approximately equals $\frac{\text{Increase in price x reduction in quantity}}{2}$. If the unit of output is defined so that the competitive price, OC (again using Figure 1), is \$1.00, the reduction in quantity, JI, equals DGIJ, and the "welfare loss" equals $\frac{\text{Increase in price x elasticity (monopoly profits)}}{2}$. To obtain the monopolist's increase in price per unit of output, or the monopoly effect on price, as a proportion of the competitive output price, Schwartzman, "The Burden of Monopoly," op. cit., pp. 627-628, uses the formula $\frac{TR}{TR-E} - 1$ (which $= \frac{E}{TR-E}$), where TR = total revenue, E = "excess" profits.

> by the initial increase in output of industry X, we come pretty close to the incremental value of sales in industry X. Of course, the movement to an optimal resource allocation entails some industries expanding their output, like X, and others, say Y, contracting their output. If we really traced through the increments to value added which are required in their supplying industries, say Z, we would often find that there was some cancellation of the required changes in the output of Z. Hence by using sales rather than value added as our measure of resource transfer, we rather overstate the necessary movement.[1]

Under the unity elasticity assumption, we may add up all the plus and minus "excess" profits in all industries to estimate the magnitude of the "desired" resource reallocation. In Harberger's case, to attain equilibrium would require the transfer of roughly $550 million in resources from low-profit to high-profit industries. Since Epstein's sample accounts for 45 per cent of sales and capital in manufacturing, the extrapolated figure becomes $1.2 billion (using 550/45 = X/100 yields X ≐ 1.2222 billion). The tentative conclusion is that manufacturing misallocation in 1924-1928 could have been eliminated by a net transfer of roughly 4 per cent of the resources in manufacturing or 1½ per cent of the total resources in the economy.

We now want to estimate how much better off people would be if the desired resource reallocation was effected. To calculate this, we may use a formula suggested by Hotelling in 1938 for an analagous problem.[2]

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[1] Harberger, op. cit., pp. 80-81 (italics supplied). For a defense of partial-equilibrium analysis, e.g., against the charge of neglecting the fact that as prices decline in monopolistic industries, the demand and cost curves may shift, see Schartzman, "The Burden of Monopoly," op. cit., p. 630.

[2] Since Hotelling's formulation is not immediately obvious, we have reproduced Harberger's note on it, ibid., pp. 81-82, in toto. "Harold

Hotelling's original expression for the total "welfare loss," $\frac{1}{2}\sum dp_i\ dq_i$ can be obtained by a simple application of the formula for the area of a right triangle, i.e., the area is equal to one-half the product of the two legs, A = ½ leg AB x leg BC. We shall show it on a per unit basis, i.e., $\frac{1}{2}\ dp_i\ dq_i$. Since we know from the previous discussion that the triangle ABC measures the "welfare loss," we can estimate this loss by the above formula. We get A = (AB) (BC) /2 = $dp_i\ dq_i/2$, since AB is, in fact, dp and BC is dq. (See Figure 6 on the following page.)

Hotelling, 'The General Welfare in Relation to Problems of Taxation and of Railway and Utility Rates,' Econometrica (July, 1938), pp. 242-269. The applicability of Hotelling's proof to the present problem can be seen by referring to p. 252 ff. He there indicates that he hypothecates a transformation locus which is a hyperplane. This is given us by our assumption of constant costs. He then inquires what will be the loss in moving from a point Q on the hyperplane, at which the marginal conditions of competitive equilibrium are met, to a point Q' at which these conditions of competitive equilibrium are not met. At Q' a non-optimal set of prices prevails. These are, in our example, actual prices, while the equilibrium price-vector P is given by costs, defined to include normal profits. Hotelling's expression for the welfare loss in shifting from Q to Q' is $\frac{1}{2}\sum dp_i\ dq_i$, where p_i and q_i are the price and quantity of the i-th commodity. We obtain this by defining our units so that the cost of each commodity is $1.00. The equilibrium quantity of each commodity under the assumption of unit elasticities is then equal to the value of sales of that commodity. If we call r_i, the percentage divergence of actual price from cost, we may write the total welfare loss due to monopoly as $\frac{1}{2}\sum r_i^2\ q_i$ if the elasticities of demand are unity, and as $\frac{1}{2}\sum r_i^2\ q_i\ k_i$, if the elasticities of demand are k_i. In column 4 of Table I, I attribute to each commodity a welfare loss equal to $\frac{1}{2}\ r_i^2\ q_i$. This measure of the welfare loss due to monopoly abstracts from the distributional considerations. Essentially it assumes that the marginal utility of money is the same for all individuals. Alternatively, it may be viewed as measuring the welfare gain which would occur if resources were shifted from producing Q' to producing Q, and at the same time the necessary fiscal adjustments were made to keep everybody's money income the same."

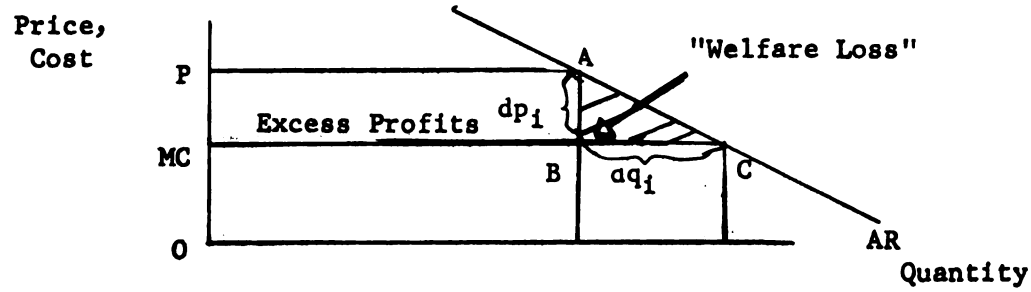

Figure 6.--Graphical Derivation of the Hotelling "Welfare Loss" Formula

From this form, one can get to the alternative formulation, $\frac{1}{2} \leq r_i^2 \, q_i \, k_i$. With r_i, the percentage divergence of actual price from cost, the $\frac{\text{amount of excess profits}}{\text{total sales}}$, the formula becomes $(r_i^2 \, q_i)/2$. By defining units so the cost of each good is \$1.00, we can use sales for quantity figures. We do this manipulation so that we can compare a \$1,000 car with a \$10 radio by saying we have 100 units of car and 10 units of radio, at the defined cost of \$1.00. We may prove this in the following way:

(1) $dp_i = r_i \, p_i$ and $dq_i = r_i \, k_i \, q_i$, i.e., we turned r_i percentages into absolute figures.

(2) $dp_i \, dq_i = (r_i \, p_i) \, (r_i \, q_i) \, (k_i)$

(3) $dp_i \, dq_i = r_i^2 \, (pq) \, k_i = r_i^2 \, q_i \, k_i$

(4) if the elasticity of demand is unity, this becomes $r_i^2 \, q_i$.[1]

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[1]In other words, when prices are equal to unity then $dp_i/p_i = dp_i/1 = r_i$ is equal to the percentage change from that price as a result of the deviation of profits from their normal level. Now the percentage change in quantity will be r_i X k_i, where k_i is the price elasticity of

Unfortunately, Hotelling's formula is not quite accurate.

> His general formula would be strictly applicable here if all our industries were producing products for direct consumption. The question thus arises, how to treat industries producing intermediate products. If we neglect them altogether, we would be overlooking the fact that their resource shifts and price changes do ultimately change the prices and amounts of consumer goods. If, on the other hand, we pretend that these intermediate industries face the consumer directly and thus directly affect consumer welfare, we neglect the fact that some of the resource shifts in the intermediate sector will have opposing influences on the prices and quantities of consumer goods. Obviously, this second possibility is the safer of the two, in the sense that it can only overestimate, not underestimate, the improvement in welfare that will take place. We can, therefore, follow this course in applying the Hotelling formula to our data.[1]

Returning to our bakery products example, we take the $17 million of of absolute "excess" profits we previously found and divide it by industry sales of $320 million to get an r_i of 5.3125%. Substituting into the "welfare loss" formula of $(r_i^2\, q_i)/2$ yields $[(.053125)^2 \times 320]/2 = (.002822) \times 160 \approx .4515616$. Less rounding error is involved if $r_i^2 = \frac{(\text{amount of "excess" profits})^2}{(\text{industry sales})^2}$ is used. This gives $\frac{(17)^2(320)}{(320)^2(2)} = \frac{(17)^2}{(320)(2)} = \frac{289}{640} \approx .4512$.[2]

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demand for the ith product. In the case of unity elasticity $dq_i / q_i = r_i$. Since $k_i = 1$ this means $\frac{dq_i}{q_i} / \frac{dp_i}{p_i}$; in general, $dq_i/q_i = k_i\, dp_i/p_i$ or since $dp_i/p_i = r_i$, $= k_i\, r_i$. To get the absolute change in quantity, i.e., dq_i, we must multiply the percentage change in quantity times the absolute quantity. Thus, $r_i q_i k_i$ is equal to the absolute change in quantity. Since the absolute change in price, starting from an initial situation where the price is equal to one, is r_i, we have an expression for $dp_i\, dq_i$, namely, $r_i\, q_i\, k_i$.

[1] Harberger, op. cit., pp. 82-83.

[2] To review our understanding of exactly how to compute these "welfare losses" as well as to gain some fresh insight into more of the economics--at the expense of computational efficiency--of the problem,

Using this same basic "welfare loss" formula, Harberger found the total "welfare losses" over all manufacturing industries to be $59 million, $26.5 million unadjusted for sample size, or $225 million in 1953 present value terms. In other words, his estimate of the aggregate loss amounted to less than one-tenth of one per cent of national income or $1.50 per person in the United States in the 1924-1928 period.

The above discussion covers the main arsenal of this type of attack on the efficiency problem, as well as some of Harberger's results from its application. However, there may be flaws in the data operating to make any estimate too low--remember the constant cost assumption works in the other direction, if there is increasing costs. For instance, intangibles, such as goodwill and patents, by being assigned a book value may capitalize monopoly profits. The reported

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we want to repeat Stigler's explanation. He explains the theory through an example of the toilet preparations industry as contained in Harberger's estimates.

> "In Epstein's sample this industry earned an average of 30.4 per cent on capital in 1924-28, while the 'competitive' rate (that is, the average rate in all manufacturing) was 10.4 per cent. Hence monopoly profits were 20.0 per cent of capital, and, since capital was $16 million in 1928, monopoly profits were 0.20 x $16 million = $3.2 million. The competitive costs of the industry's output were therefore its $20 million sales minus $3.2 million, or $16.8 million, and we may choose such a unit of output that the industry was producing 16,800,000 units at a cost of $1.00 each. The monopoly price of these units was $20,000,000/16,800,000 = $1.19. With competition, the output would be 20,000,000 units and the price $1.00. Since the loss of welfare due to monopoly is taken as
>
> $\frac{\text{Increase in output x reduction in price}}{2}$, we may substitute
>
> our numbers,
>
> $\frac{3{,}200{,}000 \times \$0.19}{2} = \$304{,}000$."

profit rate thus understates the actual profit on real capital.[1] Of course, even the elimination of intangibles is not enough for monopoly profits can be capitalized under many asset titles. For example, Weston found mergers and acquisitions accounted for one-fourth of the total growth of assets of seventy-odd corporations in the last half-century. Harberger, for one, discounts this factor on the grounds that any over-valuation would be off the books by the 1924-1928 period as much of Weston's merger growth occurred right after the turn of the century.

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[1] Epstein investigated this somewhat and found excluding intangibles from the total capital bases made a significant difference in the earnings rates in only eight of the seventy-three industries. Recomputing the figures for these industries' changes Harberger's estimated amount of resource transfer from 1½ per cent to 1 3/4 per cent of the national income and changes the welfare loss to $81 million (just over a tenth of one per cent of national income). To illustrate how this adjustment was carried out let us take the toilet preparations industry--again a real rather than hypothetical example which was taken from Harberger's study. We may find the amount of "excess" profits by subtracting the new adjusted profit rate from the old overall rate of 10.4%. Note, although the average would now be higher with the new higher adjusted profit rates figured in, it is not so computed. This is because you want not only the "relative" "welfare losses," i.e., divergent profit rates among industries, but also the "absolute" "welfare loss," figured as the divergence of reported profit rates, with intangibles in the base spuriously lowering profit rates, from the "ideal" profit rate excluding intangibles. In other words, if we figure a new average profit rate excluding intangibles, and it was, say 11 per cent, this would catch only the "welfare losses" from among industry's profit rate divergences. We would also like to catch the "absolute" "welfare loss" by keeping the average at 10.4% for the economy, but allowing the industries to use new higher profit figures. It should also be noted that the new higher industry profit rates are multiplied by the new lower capital base. However, the adjusted amount of "excess" profits can not be smaller than before the adjustment.

A simple proof for this can be formulated as follows: Let K = original capital base, I = intangibles which are ≥ 0, TP = total profit, and 10.4 be the average profit rate before and after the transformation. The old profit rate = TP/K, the new profit rate = TP/(K-I), the old amount "excess" profits = (TP/K - 10.4) K which can be written $\frac{(TP)K}{K}$ - 10.4 K = TP - 10.4 K = π, the new amount of "excess" profits = $(\frac{TP}{K-I} - 10.4)(K-I)$ = TP-10.4 (K-I) = π'. Since $K \geq K-I$, $\pi \geq \pi'$. Q.E.D.

Another difficulty with the data is that frequent discounter of economic analysis: overaggregation. Too broad an industrial classification makes our assumed high substitutability among the products produced by different firms within any industry and relatively low substitutability among the products of different industries less tenable. The trouble is that in some industrial classifications (e.g., Epstein's) remote substitutes produced by quite distinct groups of firms are lumped together, i.e., the industries are aggregates of subindustries. Since it is more appropriate to deal with the subindustries directly, the use of aggregates biases estimated "welfare loss" downward; but, probably, this error is slight.[1]

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[1] Ibid., p. 84. "The extent of the bias is proportional to the difference between the average of the squares of a set of numbers and the square of the average, the numbers in question being the rates of excess profit in the subindustries. Consider an industry composed of three subindustries, each of equal weight. Assume, for an extreme example, that the rates of excess profit (excess profit expressed as a per cent of sales) are 10 per cent, 20 per cent, and 30 per cent in the three subindustries. The average rate of excess profit of the aggregate industry would then be 20 per cent, and, by our procedure, the estimate of the welfare loss due to that industry would be 2 per cent of the sales. If we had been able to deal with the hypothetical subindustry directly, we would have estimated the welfare loss associated with them at 2 1/3 per cent of the aggregate sales." He obtains these figures in the following manner:

Using $\frac{1}{2} r_i^2 q_i$, $\frac{1}{2} (.20)^2 = \frac{1}{2} .04 = .02$ or 2% for the aggregate industry; separately, (where q_i = sales) it would be:

$\frac{1}{2}(.10)^2 = \frac{1}{2} .01 = .005$
$\frac{1}{2}(.20)^2 = \frac{1}{2} .04 = .02$
$\frac{1}{2}(.30)^2 = \frac{1}{2} .09 = .045$

Total .070 $\frac{.070}{3} = .02333$ or 2 1/3% for subindustries if computed directly.

Epstein's data are further complicated by the fact his sample had an average profit rate of 10.4 per cent while manufacturing activity as a whole had one of 8 per cent. A correct weighting procedure would adjust for this apparent overweighting of high profit industries by raising the estimated "welfare cost" by no more than 10 million dollars. However,

The analysis is still not complete in that there may be extra-monopolistic misallocations arising out of the dynamics of growth, development, etc., that are disentangled with the monopolistic misallocations. Although this is not the sort of thing that one can do with any great precision, Harberger trys to get his estimate a little closer to reality on the basis of two props: (1) it is reasonable to equate monopoly profits with high rates of profit; (2) no more than a third of manufacturing profits should be monopoly profits. Since capital is a highly productive resource, he feels this second premise requires little defense. The first premise is justified on the basis of (a) observation of the high-profit industries--cosmetics, drugs, soaps, autoes, cereals, etc.; (b) the fact given the elasticity of demand for an industry's product, the "welfare loss" increases with the square of its greater-than-normal profits--he feels this is an even stronger reason than (a). Thus, granted (2) the biggest "welfare" effect is obtained by distributing this monopoly profit first to the highest profit industries, then to the next highest, and so on.[1]

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this estimate neglects part of the overweighting and this results in an overstatement of the actual amount of the "welfare loss." This brings his losses to $2.00 per head or more than a tenth of one per cent of national income.

[1]In other words, the idea is this. Suppose we say that we have a certain amount of monopoly profits, but do not tell in what industries those profits belong. We can make the "welfare costs" associated with monopoly very low by spreading these monopoly profits over all industries, and making the "degree of monopoly" the same in every industry. In fact, if we were able to do this for all the economy, we could make the "welfare costs" equal to zero. Different ways of distributing the monopoly profits obviously will lead to different measures of the "welfare costs." We get the biggest "welfare cost" by putting the monopoly profits all in one place, that is, making the degree of distortion very high in one single area (for remember, given elasticity,

After this is done, he concludes the present value "welfare loss" is no more than a thirteenth of a per cent of the national income or $1.40 per capita.

Finally, another limitation of the analysis is in neglecting selling costs, especially advertising expenditures. The difficulty is that accounts call these expenditures costs, while to an economist they are a type of "quasi-monopoly profit," i.e., in the perfectly competitive world these expenditures are zero. One way to allow for this is to make the strong assumption that all advertising is persuasive (manipulative) and none informational. Since there is no way to separate these diverse expenditures, given data in their present form, this assumption is probably the most useful empirically. Although Harberger did not make any systematic industry-by-industry examination of these expenses, he utilized the fact these disbursements ran a little under 2 per cent of sales for his industries. Even allowing for the maximal distorting effect makes only a slight

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the welfare loss increases with the square of its greater-than-normal profits). But we have to be consistent with the facts and to be consistent with the facts we cannot assign as monopoly profits any more than the difference between actual observed profits and the normal profits on the invested capital in that place. We distribute our given amount of monopoly profits first to that area where the divergence is greatest, than to where it is next greatest, and so on. In this way, for any given amount of monopoly profits that we want to distribute, we are getting the biggest "welfare cost" that we can, consistently with the observed data.

difference raising his estimate of the "welfare cost" to $1.50 per person.[1]

This completes our discussion of the first approximation model for estimating "welfare losses." In an actual application of this type of model, Harberger found the estimated "welfare losses" in our economy (assumed to be entirely composed of manufacturing) to be quite small. Moreover, Harberger felt his treatment of intermediate products, his assumption of constant costs and unity elasticity, and his attributing to monopoly an implausibly large share, one-third, of manufacturing profits, all tended to overstate the "welfare losses!" Therefore, he was quite surprised to find that the total

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[1] Ibid., p. 86, note 6, is again worth footnote space. " . . . It should be pointed out, also, that the general conclusions reached in this paper are not closely dependent on the precise data used. Suppose, for example, that we had observed the following situation: industries accounting for half the output of American manufacturing were charging prices which yielded them a 10 per cent 'monopoly profit' on sales while the remainder of industries earned a constant rate of return of profit on capital (here called normal profit) but no more. If we were, in this situation, to reallocate resources so as to equalize profit rates in all industries, the prices of competitive products would rise and those of monopolistic products would fall. If demand for the product of each sector were assumed to be of unit elasticity, we would estimate the gain in welfare incident upon the reallocation of resources at .125 per cent of total industrial sales. This would be just about a tenth of a per cent of the national income if the ratio of manufacturing sales to national income approximated the 1924-28 figure. The estimated welfare gain is obtained as follows: Under our elasticity assumption, prices would rise by 5 per cent in the competitive sector and fall by 5 per cent in the monopolistic sector, and quantities would change inversely by an equal percentage. Taking 100 as the aggregate sales of manufacturing, the change in output in each sector will be 2.5, and taking 1 as the index of initial prices in each sector, the change in price in each sector will be .05. According to the Hotelling formula, the welfare gain coming from each sector will be ½ (2.5) (.05) and when these gains are added together the aggregate again turns out to be .125." (Italics supplied.)

figure was less than a tenth of a per cent of the national income. To be sure, he recognized this is not a trival figure--over $300 million--especially in light of neglect of redistributional effects, other malallocative effects, other selling costs, etc. However, his final conclusion tended to minimize the importance of the monopoly element in the American economy.

> Our economy emphatically does not seem to be monopoly capitalism in big red letters. We can neglect monopoly elements and still gain a very good understanding of how our resources are allocated. When we are interested in the big picture of our manufacturing economy, we need not apologize for treating it as competitive, for in fact it is awfully close to being so. On the other hand, when we are interested in the doings of particular industries, it may often be wise to take monopoly elements into account. Even though monopoly elements in cosmetics are a drop in the bucket in the big picture of American manufacturing, they still mean a lot when we are studying the behavior of this particular industry.[1]

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[1] Ibid., p. 87. Cf. Bain, op. cit., p. 384, who, while admitting the 2, 3, or 4 per cent share of the national income going to "excess" profits may be small and that their total elimination would not change the national distribution of income or average relation of P to AC(= MC) much, is inclined to regard these "excess" profits as important for their micro significance despite their relative aggregative unimportance.

CHAPTER III

MODIFICATIONS ON THE FIRST APPROXIMATION MODEL

To any serious and objective researcher of monopoly problems, the dangers of attempting to wring economic information out of raw accounting data are obvious. This is especially unfortunate if one is attempting to measure monopoly power by "excess" profit rates, as we are. One scholar has gone so far as to remark:

> The unadjusted accounting rate of profit, as computed by the usual methods from balance sheets and income statements, is prima facie an absolutely unreliable indicator of the presence or absence either of monopoly or excess profits in the sense defined. The relationship between price and accounting average cost tells us nothing about the degree of monopoly power and little about the extent of excess profits. . . . If accounting profit rates are unreliable as absolute magnitudes, they should be even less reliable for purposes of comparison.[1]

Fortunately, there is a way out of this academic dilemma--adjustment of the data.[2] In Chapter II, we investigated Harberger's efforts in this direction. We feel, for the most part, he did an

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[1] Joe S. Bain, "The Profit Rate as a Measure of Monopoly Power," Quarterly Journal of Economics, Vol. 55 (1940-1941), pp. 291-292.

[2] Even ibid., p. 292, is willing to admit "As unadjusted accounting rates are unreliable for our purposes, so a proper scheme of adjustment of accounting data may provide an approximate measure of monopoly profits. From any set of accounting data it is conceptually possible to compute a theoretical profit rate of the sort defined above, and is a feasible statistical task actually to produce a fair approximation to such a rate."

excellent job in eliciting the desired kind of economic information. Unfortunately, we are not completely satisfied with the approach. This is unfortunate for, if we were, our job would be merely one of bringing more recent and extensive data on the topic. In this chapter, we shall describe the variants we shall make on the basic model. Particularly important in this connection are the fruitful avenues suggested by Stigler in his review article.

We shall be modifying the accountant's data considerably in our estimation of the resource misallocation attributable to monopoly elements in our company. For in the estimation of "welfare losses," we are interested only in counting that quantity of assets that would be held by purely competitive firms in "long-run equilibrium." Obviously, then, we want to exclude such intangibles as patents, trademarks, franchises, goodwill, etc., from our capital base or we would, in effect, be capitalizing monopoly profits. It is only fair to mention that the statistical modification we shall be making from Harberger's approach are not a result of his neglect, but, because the data were not available to him in the form needed. For instance, detailed information on advertising expenditures is now available on an industry-by-industry basis. He used a figure estimated for all of manufacturing and not for specific industries (2 per cent of sales). On the other hand, some of our other changes will be of a more substantive nature.

To illustrate the general nature of the kind of adjustments that are necessary in moving from an accounting to a theoretical rate of profit we have included a rather lengthy passage from Bain. This can serve as a "jumping-off point" into this difficult terrain. Bain's comments should

also serve to heighten our admiration for Harberger's study--for he has, through one avenue or another, covered many of these points in his remarkably brief paper. The portions not so covered are, with our presently imperfect data, still in the "unreachable" stage of economic analysis or require such an intimate knowledge of every American industry as to be virtually impossible to any single researcher.

> On the one hand, it is necessary to examine the annual net income figure (inclusive of interest) shown by the accounts, and to ascertain from an examination of past records any important over-or-understatement of theoretical costs resulting from the original valuation or the method of revaluation of depreciable or depletable assets. The performance of this task seems to imply a general examination of the conditions of acquisition of important blocks of assets, a thorough understanding of the operations of the firm, and an appraisal of the current competitive valuation of assets in use. Cognizance should also be taken of the apparent affect of arbitrary anticipations of loss in the form of writedowns of assets from time to time. Particular attention should be given to (1) the relationship of depreciation charges to the theoretical norm, and (2) the costing of resources used, to ascertain whether the costs listed approximate the current competitive rent of these resources. Such an adjustment procedure could obviously have meaning only if pursued for a considerable series of consecutive years.
>
> On the other hand, the asset total should be examined to ascertain what assets are excludable <u>in toto</u> from the theoretical rate base, what assets are held in amounts in excess of the theoretical norm, what assets have original valuations which seem to include monopoly profits, and what assets have been revalued in a manner which understates their probable current competitive value. Intangibles of most kinds, idle land, and holdings of depletable natural resources, for example, are excludable <u>in toto</u> from the competitive rate base, the last item on the condition that currently used resources are entered as costs at their competitive rents. . . . Original asset valuations should be closely examined for the possible inclusion of capitalized monopoly profits whenever the items involved are included in plants of firms acquired <u>in toto</u> by purchase, or through merger or reorganization, and particularly when large capital stock rather than small cash transactions have been involved. In these cases "original cost" is most likely to lose touch with value in a competitive market, and adjustments are most likely to be required. . . . A rough check for the presence in the asset total of

> obviously eliminable items (like long redundant or obsolete capacity) is possible . . .[1]

Keeping these general suggestions in mind, let us investigate some more specific modifications we might make on the previously described model. An excellent place to begin our reformulation is with the Stiglerian critique mentioned above.[2] Two suggestions that he has made are particularly important. In fact, any possible modifications of the general order of magnitude from Harberger's estimations are likely to stem from these changes. The first of these concerns the scope of his coverage and the second concerns his unitary

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[1] Ibid., pp. 292-293. The difficulty of profit figures is also discussed in Weiss, op. cit., pp. 144-146, 501-508.

[2] For the first point see Stigler, op. cit., p. 35. It should be added that Ruth F. Mack's discussion, op. cit., p. 89, of Harberger's paper covers some of the same ground. She feels the three most important doubtful aspects are: "First, the notion that profits are an adequate measure of monopoly due to maldistribution of capital has often been called into question. More damaging is the second problem: neglect of maldistribution of other factors of production that might be a function of monopoly. Monopoly certainly can yield inefficient use of labor and materials as well as of capital. This would mean, in effect, a departure from some proper figure for value added, or perhaps even total costs, rather than simply for profits. I ask, in other words, whether the horizontal cost curve to which Harberger adds the 10 per cent profits may itself be too high, from the point of view of consumer welfare, because of monopoly elements in labor or material costs, because costs are included that consumers under truly competitive conditions would not elect to pay for (high marketing, advertising and packaging costs, for example), because of restrictions on a potential rate of technological change. Finally, toward what other less than optimal results does monopoly contribute: maldistribution of income, inflexibility in all sorts of adjustments including prices to changes in economic conditions--to pick two at random."

elasticity assumption. First of all, the competitive rate of return on capital should be computed for the entire economy, not just for the manufacturing sector. The "welfare loss" in manufacturing would swell if the competitive rate of return were lower. However, since monopoly is presumably more important in manufacturing than in the remainder of the economy taken together this would tend to exaggerate the monopoly loss. The understatement of "welfare losses" can be interpreted in terms of "absolute" and "relative" "welfare losses." In Harberger's case, if he had used the 6.2 per cent (after the deduction of Federal taxes) return on capital for all corporations engaged in manufacturing, trade, finance, and mining, in 1924-1928, found by Epstein from official income tax data,[1] instead of the 10.4 per cent figure for the manufacturing sample, Harberger would not have affected the "relative" "welfare loss" among industries as all "excess" profit rates would have been raised from X% - 10.4% to X%-6.2% or 4.2% (where X = rate of profit on capital). However, the "absolute" losses would have gone up for manufacturing as a result of this new lower average profit rate.

The possible overstatement of loss from using manufacturing data refers to the fact that, since monopoly is presumed more important in manufacturing, any simple "blow-up" of its loss, say doubling it if manufacturing accounts for half the sales and assets in the economy, would surely overstate the case.

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[1] Epstein, op. cit., pp. 24-25, 49-51.

Ideally what we want is profit rate figures for all types of business establishments, sole (single) proprietorships (SP), partnerships (P), and corporations (C), for all the various industries. This we have tried to do for the five-year period, 1956-1957 period to the 1960-1961 period. The data for these years were obtained from the Statistics of Income--for our purposes, undoubtedly, the best available.[1] The period and source were selected for a number of reasons. First of all, in comparison to earlier years, the data are better and more reliable as time goes on,i.e., the data for 1960 are superior to the 1950 data, the 1950 are superior to the 1940, etc. It is better than other data because the IRS gives income statements in some cases and balance sheets--which allows us to segregate specific accounts, e.g., advertising. It is more reliable, as time goes on, with advancing sampling techniques and larger samples available. Secondly, we wanted years not too near Harberger's period so,after some attempt at standardization of techniques is made, we can get a rough idea if the estimated "welfare loss" is rising over time. Finally, after the proper adjustments are made, it is probably as close to a "long-run equilibrium period" and accounting values are probably as close to actual values as any of the intervening years since 1924-1928.[2]

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[1]Stigler, Capital, op. cit., p. 7, says "Aside from presumably minor problems of nonreporting and postaudit revisions, this material is comprehensive in scope, if not always in detail."

[2]We originally intended to compute profit rates for a longer period, say 10 years, but, figures showing unadjusted rates for such length periods convinced us that the results would not differ significantly. It is also important to know that the dispersion of profit rates is relatively greater in years of depression; industries cannot adjust to sudden decreases in demand as well as they can to increases--apparently, because fixed capital is easier to increase than to decrease in the short run. See, Stigler, Capital, op. cit., p. 6.

To be quite honest, the data for these years are not entirely satisfactory. First, there is no complete income statement and balance sheet information for all types of establishments for all five years. All show, at least partial, income statements for most of the years (P and SP for four of the five years, C for all five); but, only C have virtually complete balance sheets for the five years. The P only have their balance sheets for the 1959-1960 period. Even here only 44.5 per cent of the firms that filed income statements did the same for balance sheets--though the figure went over 90 per cent in some particular industries. As a result, to use these data we had to blow them up to represent all P, as well as, assuming this one period was representative of all four periods. Worst of all, SP only show income statements. We computed the rates of return on capital for P on the basis of the "partners capital" account and then assumed rates of return for each industry of SP was the same as it was in P. This allowed us to get back to total capital estimates since we have net profit figures. However, fragmentary evidence of "excess" salary withdrawals in small companies warns us that the P account, "partners' capital," may be a bias estimate of the "real" capital investment.[1] Alternatively, we have adopted the procedure used by Stigler to estimate the capital of noncorporate enterprises--once annual data on receipts (sales) are available.[2] His estimate of the noncorporate

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[1]E.g., see Joseph L. McConnell, "1942 Corporate Profits by Size of Firms," Survey of Current Business (January, 1946), p. 11.

[2]Stigler, Capital, op. cit., pp. 7-8, 114-118, 221.

sector is based upon the ratio of capital to receipts in small corporations (which resemble noncorporate enterprises more closely than they resemble all corporations). It would be undesirable simply to use the ratio found in the entire corporate sector because: (1) most noncorporate enterprises are small; (2) small corporations typically have relatively low ratios of capital to receipts or sales. The second fact is documented in Table 1, from Stigler, where it is shown that the ratio of assets to sales is almost twice as large in the asset class over $100 million as it is in the total asset class under $50,000--a similar pattern was observed within two-digit industries. In our estimates, we also tried the $0-25,000 total asset class ratios. Incidentally, a minor technical departure from Harberger and Stigler is undertaken when we used the more easily obtainable business receipts (gross sales plus gross receipts from operations) in place of sales. The interested reader may find all the details of the problems we encountered and their proposed resolution in Appendix A.

We also utilized the balance sheet information of P for estimating intangible assets and royalties. However, since advertising data are not shown for noncorporate industries, we had to use the percentages prevailing in C--this will probably lead to an overstatement of the "welfare losses" since in retailing, which is more important in SP and P than C, wasteful advertising is less significant than in the manufacturing.[1] A further difficulty, which we shall not

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[1] Weiss, op. cit., p. 511.

TABLE 1

RATIO OF ASSETS TO SALES IN MANUFACTURING CORPORATIONS, 1947

Asset Class ($000's)	Ratio Assets to Sales
Under 50	.357
50 - 100	.394
100 - 250	.411
250 - 500	.432
500 -1,000	.447
1,000 -5,000	.508
5,000 -10,000	.592
10,000 -50,000	.647
50,000 -100,000	.642
100,000 - and over	.625
All	.625

SOURCE: George J. Stigler, Capital and Rates of Return in Manufacturing Industries (National Bureau of Economic Research, 1963), p. 116. His figures were based on Statistics of Income for 1947.

be able to go into because of data difficulties, is the bias resulting from the fact commodities differ much less with respect to total selling costs than with respect to advertising expenditures. Unfortunately, we do not have a breakdown of selling expenses other than the advertising budget. √

Another difficulty is the problem of comparing the three forms of enterprises on an industry-by-industry basis. In general, there are more industry divisions for SP than P which itself has more than C (there are more service industry classifications for SP than C., e.g.,). This means, for comparison purposes, it is necessary to lump together various industries. All of which means we are often comparing non-homogeneous entities among the three types of business enterprises. Furthermore, the modified SIC classification used by the IRS is so aggregative that the loss of detail in industries results in the sub-industry bias mentioned above. Finally, the changes in the Standard Industrial Classification make year-to-year comparisons more hazardous (especially the rather significant changes in 1958-1959).

There are a few other general things which, while making our analysis more valid, make comparisons with the Harberger-Epstein findings less reliable. In finding rates of return on capital, in place of Epstein's "capitalization" (defined above), which in most cases excluded special reserves, we have used the roughly analagous concept of net worth. This latter concept includes preferred and common stock, paid-in or capital surplus, surplus reserves, and earned surplus and undivided profits. Also, in figuring total profit, we have used the available data in the account "interest paid." Epstein had to adopt

a 5½ per cent average interest rate since a breakdown was not available (interest computed as 5½ per cent of funded debt was added to income to determine profit earned on total capital).[1] Another change is that in computing "excess" profit as a per cent of sales, the Lerner-Bain index, we used business receipts for sales and did it on the basis of the five-year average for business receipts. Harberger did not average the sales but used the 1928 figure instead--and, of course, used sales instead of business receipts. There are a number of other accounting changes we have adopted that we shall discuss below.

We have also computed the rates of return using both an average total capital base and an average equity base. Our position is that one should be free to choose the approach he feels most appropriate for the problem being dealt with. Some feel when dealing with problems of resource misallocation in general, an attempt should be made to get the total return to capital in an industrial segment, relative to the total amount of capital in that sector. However, when dealing with the problem of monopoly, some feel we should be concerned with the amount of greater-than-normal profits and to get at this we should look at equity capital only, determine the amount of greater-than-normal profits and the percentage that this bears to the value of production. One can then use the estimated elasticity of demand to determine the size of the "welfare cost" associated with the distortion.

In the final analysis, Harberger's restriction to only the manufacturing sector may contain even a more fundamental error than

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[1]Epstein, op. cit., p. 601. In "funded debt," we have included loans from stockholders and both long-term and short-term bonds, notes, and mortgages.

indicated above if viewed in terms of the "second best" conditions.[1] These conditions tell us: (1) if the Paretian optimum is unattainable a "second best" optimum requires a general departure from all the Paretian optimum conditions; (2) there are unlikely any simple sufficient conditions for an increase in "welfare" when a maximum can not be obtained. Put more simply, this means if there are a number of existing divergences, the reduction of one of these--the others all remaining constant--will not necessarily lead to an increase in economic welfare (perhaps even diminishing it). All of this means that "piecemeal welfare economics" which applies "welfare" rules, which spell Paretian optimum if ubiquitous, to only a small part of the economy may move the economy away from not toward a "second best" optimum. This means Harberger's estimation of the "welfare gain" by applying the Lerner-Lange "Rule" to manufacturing alone may be spurious, i.e., its application may diminish the general productive efficiency of the economy and the welfare of its members. This gives us even a more important reason to heed Stigler's suggestion for a more complete analysis.

The assumption of unity elasticity is also of questionable validity. Stigler, for one, feels this is an important explanation of Harberger's low figure for the total "welfare loss."

> A monopolist does not operate where his marginal revenue is zero. A loosely coordinate set of oligopolists might

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[1] See Lipsey and Lancaster, op. cit., as well as the previous references mentioned above. Incidentally, the appellation "second best" is derived from the above mentioned fact that the optimum is achieved subject to the constraint(s) preventing the Pareian optimum.

> operate where industry marginal revenue is zero, but only because their monopoly power was very weak--and it seems undesirable to assume that oligopolies are competitive. In any event, the assumption seems empirically objectionable: most industries have long-run demand curves which are elastic. And in Harberger's model, welfare losses go up when the elasticity of demand increases.[1]

In order to get a feel for the kind of changes different elasticities would yield, we have computed the "welfare losses" using elasticities of 1 and 2.[2] Perhaps more realistically, we would like to estimate the losses on the basis of actual industry-by-industry elasticity estimates.

Since k_i, the price elasticity of product demand, in Hotelling's formula for measuring "welfare losses," $\frac{1}{2} \sum r_i^2 q_i k_i$ (where r_i is the percentage divergence of price from cost and q_i the quantity--all of the ith commodity) plays a rather pivotal part in our estimates, it is worth spending a moment on the details of our estimates.

Our first thought of collecting existing elasticity data for industries was thwarted when we discovered that most of these data were in the wrong form--firm instead of industry estimates--or for the wrong time periods--not for the 1956-1957 to 1960-1961 period--or more importantly in most cases the data just did not exist in any form.

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[1]Stigler, op. cit., p. 34.

[2]Schwartzman, "The Burden of Monopoly," op. cit., pp. 628-629, says that "k [elasticity] is unlikely to have a numerical value greater than 2" for it "refers to the industry demand curve rather than to that of the individual firm; the demand elasticity of General Motors is greater than unity, but that of the entire industry may not be. Harberger's estimates of resource allocation are for whole industries. Moreover, if we are interested in the value of resource misallocation by monopolistic industries as a group, the relevant demand elasticity is less than the average of the individual industry demand elasticities." We did not show these latter estimates since the reader may merely multiply the first by 2 to obtain it.

Since any rigorous, detailed investigation of the relevant elasticities would be a thesis in itself, we searched for some relatively efficient but computationally easy estimation procedure. We were fortunate in finding two methods which roughly satisfied these requirements.

The first of these we shall refer to as the Dorfman-Steiner-Telser proposition. This proposition states that:

> if average variable cost is nearly independent of scale then the reciprocal of the advertising intensity is an upper bound to the price elasticity. Thus, for example, if advertising outlay is one-half of total sales, the price elasticity at the optimal output is between one and two. Or, if the advertising intensity is one per cent then the price elasticity is less than 100. . . . This analysis leads us to predict that heavily advertised products should exhibit lower price elasticities than little advertised products . . . considering what products are heavily advertised lends it credence. Judging from the Statistics of Income the most heavily advertised products are perfumes, cosmetics, other toilet preparations, drugs, and patent medicines. It seems plausible that the firms making these products face demand schedules of rather low elasticity.[1]

Unfortunately, the estimates obtained in this manner, while perhaps useful for relative dispersions among industry elasticities are almost worthless for absolute purposes. The main difficulty is that the rationale is developed for the firm; but, we must apply

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[1]Lester G. Telser, "How Much Does It Pay Whom to Advertise," Proceedings of American Economic Review (May, 1961), pp. 197-199. It should be noted that ibid., p. 198, says ". . . the advertising intensity is probably closer to the marginal advertising intensity assuming increasing average variable cost than assuming constant average variable cost. Hence the easily measurable number--the ratio of sales to advertising outlay--may be even closer to the price elasticity (though it is no longer an upper bound to the elasticity) for increasing than for constant marginal production cost." See R. Dorfman and P. O. Steiner, "Optimal Advertising and Optimal Quality," American Economic Review (December, 1954), pp. 826-836, as well as the first source, for the theoretical defense of this proposition.

it to the industry. This means the more competitive the industry (i.e., the less the firm blends into the industry) the less reliable are our estimates. Thus, in industries such as agriculture we get relatively elastic industry estimates which in reality should be firm estimates. However, since the estimates may be useful for, at least, getting relative relationships, we have included the theoretical proof for this proposition (as it is short and straightforward) as well as the estimates we obtained in Appendix C.

Fortunately, we have another computationally easy and analytically reasonable method of estimating elasticity. This formulation follows right from the definition of elasticity, i.e., elasticity $(\eta) = \frac{\text{average value (A)}}{\text{average value (A) - marginal value (M)}}$ (similarly, it is true that $A = M \frac{\eta}{\eta - 1}$, $M = A \frac{\eta - 1}{\eta}$).[1] Analytically we can say that since the difference between A and M is the force operating to pull A up or down, we may measure the degree of this force by the elasticity--a pure number independent of units and dependent on proportionate and not absolute changes. We may easily prove that $\eta = A/(A-M)$ or $\eta = P/(P-M)$ in the following manner:

For any demand law $p = \varphi(q)$, we may obtain total revenue (R) = quantity (q) times price (p), i.e., $R = qp = q\,\varphi(q)$; and average revenue (AR) = $(pq)/q = p$. Differentiating R with respect to quantity gives us a marginal revenue (MR) = $\frac{dR}{dq} = \frac{d(qp)}{dq} = p + q\frac{dp}{dq}$.

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[1] E.G., see Joan Robinson, The Economics of Imperfect Competition (London: Macmillan Company, 1933), p. 36. Since for a rising curve $M > A$, the elasticity of a rising curve is negative here--which is fine so long as we are consistent.

Substituting these average and marginal values in the purported elasticity measure gives

$$\eta L = A/(A-M) = p/(P-M) = p/\left[p-(p+q\,\frac{dp}{dq})\right] = p/(p-p-q\,\frac{dp}{dq}) = \frac{-p}{q}\,\frac{dq}{dp} \quad .$$

Of course, this last expression is, by definition, the elasticity of demand.[1]

This approach, which for convenience we may call the Lerner-Robinson proposition or elasticity estimate ηL [since we shall utilize the fact that for a maximizing firm in equilibrium Lerner's index of monopoly power, $(p-mc)/p, = 1/(\eta_L)$] is vastly superior to the other in that it is an estimate of the actual elasticity while the other estimate, (ηa), merely relates to upper bounds. Indeed, as will be shown mathematically in Appendix C, ηL is always less than ηa --provided the same data are used (which we did not do for the reasons enumerated below). Since the sum of the firm elasticities is presumably greater than the actual industry elasticity, (ηI), and since we have used summed firm data, our estimate is again probably subject to a slight upward bias, i.e., $\eta I < \eta L < \eta a$.[2]

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[1]Alternatively, we may show that this relationship holds by using the above derivative: $\frac{dR}{dq} = p + q\,\frac{dp}{dq} = p(1 + q/p\ dp/dq)$; but the elasticity of demand is $\eta = -p/q\ dp/dq$ and so $MR = dR/dq = p(1-1/\eta)$; therefore, $MR = p-p/\eta$, $MR-p = -p/\eta$, $p-MR = p/\eta$ $\therefore \eta = p/(p-MR)$ or $\eta = A/(A-M)$. Q.E.D.

[2]The basic difficulty is that the sum (and difference) of elasticities is complicated by the fact that an elasticity is a derivative in which the variables are in logarithms which are designed for convenience in working with products and quotients and not sums and differences. If u and v are single-valued functions of x and y, and $\frac{Ey}{Ex} = \frac{d(\log y)}{d(\log x)} = \frac{x}{y}\,\frac{dy}{dx}$, then $\frac{E(u\pm v)}{Ex} = \frac{u\,\frac{Eu}{Ex} \pm v\,\frac{Ev}{Ex}}{u \pm v}$ while, e.g., $\frac{E(uv)}{E(x)} = \frac{Eu}{Ex} + \frac{Ev}{Ex}$. See R. G. D. Allen, Mathematical Analysis for Economists (London: Macmillan and Company, 1938), pp. 251-254.

In practice, our η_L estimates came out strikingly different than the first method. To be sure, the η_L approach suffers from the same fundamental defect as the η_a approach in that the theory applies strictly only to the firm and not to the industry. So we again have a spectrum or continuum of reliability extending from the polar case of pure monopoly (where the firm is the industry) to the oposite pole of pure competition (where a large number of firms populate the industry).[1] The exact relationship between all our estimates may be found in Appendix C where we have computed product moment and rank correlation coefficients for eleven different elasticity estimates.

In the tables showing the "welfare losses," we shall show the losses based upon elasticities of unity (Harberger's assumption), and our η_L estimates. Of course, merely multiplying the figures for unity elasticity by two yields the Schwartzman assumption.

Another suggested possible modification concerns mergers. As in the case of intangibles, monopoly profits can be capitalized--in this case, by consolidation revaluations. This makes Harberger's estimation of the "welfare losses" biased in a downward direction. Stigler feels, if the proportion of growth in total assets were calculated, it would at least double the Weston findings of one-quarter. As a compromise, we suggest that the reader should project the losses assuming total assets were slashed by a quarter to compare with our figures which include no adjustment.

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[1]Of course, the extreme assumptions necessary to fulfill either of these pure prototypes is never exactly found in the real world. We do have some not too distant examples of both existing types in most cultures.

We have also done a more complete job on intangibles than the Harberger-Epstein studies. This, again, is a reflection of the improved data which separate the intangible account for each industry. In the Harberger-Epstein works, intangibles were excluded from only eight of the seventy-three manufacturing industries. We have followed Epstein, in one respect, by making "an extreme assumption which is obviously not justified: namely, that none of the patents and goodwill shown by any major group represents an actual investment."[1] In our computations, to catch the "absolute" and "relative" "welfare losses" (discussed in Chapter II), we have used the new higher industry profit rates excluding intangibles minus the average rate including intangibles. The resulting figure is multiplied by the lower capital base to get the adjusted amount of "excess" profit.

Stigler's final criticism concerns "excess" returns to non-capital productive services. Monopoly gains in the payments to factors of production other than capital are not caught in the model. The monopoly elements in wages, executive compensation, royalties, and rents may be quite high (e.g., the high correlation between concentration ratios and increases in wage rates found by Garbarino).

The question is what can be done to allow for these additional factors? The royalties factor can be handled with not too much

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[1]Epstein, op. cit., p. 529. Similarly, Bain, Q.J.E., op. cit., p. 287, says "It is apparent, however, that practically all such intangibles are by definition excluded from the holdings of a firm in competitive equilibrium, and are in most cases either the source or the reflection of the monopoly position we are seeking to identify. In general, they are therefore omitted entirely from the competitive rate base."

difficulty as this account is segregated in the Statistics of Income data. Again, probably the best assumption is that royalties are 100 per cent "quasi-monopoly" returns (best, of course, from an empirical point of view). So to compensate for the understatement of "welfare losses" from this source, we have left this receipts accounts in the various industries income in computing rates of return while excluding it from the overall average return on investment.

Our adjustment for intangibles and royalties should eliminate most of the profits that have been transmuted into economic rents. Since, at least, the assumption regarding intangibles was bound to overstate the case, we decided against any further adjustment of the data on this count.

Recent work in the area of executive compensation has not contradicted the Baumol thesis that firms try to maximize sales (given a minimum profit restraint) and not profits. For example, both David R. Roberts in his book Executive Compensation[1] (based on SEC data) and Professors McGurie, Chiu, and Elbing, in their American Economic Review article[2] support the view that executive compensation is more closely

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[1]David R. Roberts, Executive Compensation (Glencoe, Illinois: The Free Press, 1959).

[2]Joseph W. McGurie, John S. Y. Chiu, and Alvar O. Elbing, "Executive Incomes, Sales, and Profits," American Economic Review, Vol. LII (September, 1962), pp. 753-761. Stigler, Capital, op. cit., p. 95 found that industries that have high rates of return also tend to have high annual earnings per worker (including wage and salary data), but the correspondence was only moderate. This supports our position on wages discussed in the next section as well as our position on executive compensation.

related to sales than the profit rate. To decide how to adjust for this factor gets us into the question of how we should measure monopoly. It seems reasonable to assume, if one does it on the basis of sales, an adjustment should be made for this factor. Since the approach here has been to measure monopoly by profit rates, it is not unreasonable to make no adjustments for executive compensation--so we have not.

The wages problem is the most difficult one to handle statistically and analytically. The proposition that the more concentrated the industry, the higher the wage, is empirically tested, with favorable results, in the above mentioned Garbarino study and elsewhere by Weiss[1] (on the basis of Bureau of Statistics data). The difficulty is that there is equally fine empirical work that has run counter to this proposition. Schwartzman, in his article, "The Burden of Monopoly," refers to another study he made,[2] in which he found,

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[1]Weiss, op. cit., pp. 506-508, says, "If wages as well as profits run half as much in competitive industries as in monopolistic ones, the distortion that results from monopoly would appear to be quite significant. It was suggested early in the book that perhaps a quarter of the national income originates in unregulated industries of high concentration [Harberger felt "20 to 30 to 40 per cent of economy is effectively monopolized," op. cit., p. 77]. If those industries earn wages and profits of a third more than what is necessary to attract labor and capital from competitive industries, perhaps 8 to 9% of the national income would be "excess" profits and "excess" wages. That would be around $35-40 billion or almost as much as the defense budget. . . . A third of a quarter is a twelfth of 8½%. The national income was running $490 billion at the end of 1959. The total defense budget was $46 billion in fiscal 1960." There are numerious a priori supporters of this proposition that concentration and high wages are correlated,e.g., Stigler, op. cit., p. 35; John K. Galbraith, American Capitalism: The Concept of Countervailing Power (Boston: Houghton Mifflin Company, 1952).

[2]David Schwartzman, "Monopoly and Wages," Canadian Journal of Economics and Political Science (August, 1960), pp. 428-438.

> . . . that the relationship between average hourly earnings of production workers and the degree of monopoly is not significant, so that any bias from this source is likely to be small. Unless payments to management, sales personnel [above we observed this is probably not the case], and advertising agencies influence price, the relative size of such payments under monopoly will not affect the estimate, since they are not included in direct cost.[1]

It is difficult for us to accept the implications of the hypothesis that monopolistic firms pay higher wages than competitive firms, e.g., that profit maximization is less of a firm goal than balance of interests or public responsibility. As Schwartzman mentions, the version of the neo-classical theory which assumes a high elasticity of supply of labor to each firm and industry appears more likely than the alternatives. In other words, to date, there has not been enough evidence on either side to decide whether monopoly is associated with monopsony so that prices paid by monopolistic firms for variable factors is lower than those paid by competitive firms; or whether the wages paid by monopolistic firms are relatively higher with these firms sloughing off "excess" profits in inefficient use of factors. This means that, perhaps, the best course is no adjustment of the data for possible biases in either direction.

A further change that we shall be making is to show C rates of return on a before-corporation tax basis as well as on an after-corporation tax basis. The reason for this stems mainly from the fact that P and SP and Form 1120-S C returns do not include tax figures. The IRS suggests that corporation net income (or defecit), i.e.,

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[1] Schwartzman, "The Burden of Monopoly," op. cit., p. 629.

before-tax income, is more comparable to P and SP net profit (or loss).[1] However, since the C figures do not allow for the fact that "double taxation" of corporate dividends means profits are liable for tax assessment, after-corporation tax income of C is probably a better unit for comparison with P and SP profit figures--given the type of problem we are attacking. Nevertheless, for the critic who feels the before-tax approach is superior, we have computed all estimates by both approaches. Alternatively, the reader may take the before-tax data and supply any discount figure he thinks necessary or use our after-tax figures. For instance, a rough kind of adjustment can be made by subtracting 1-2 per cent off the before-tax figures to obtain estimates for after-tax figures.[2]

Another adjustment is necessary because of the limitations of our data, viz., because rates of return on capital are computed on end-of-year assets rather than average (or possibly mid-year) assets.[3] The difficulty is that when the rate of growth of assets is very high, e.g., munitions industry was 356 per cent in 1942, the rate of return

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[1] U. S. Business Tax Returns, 1959-1960, U. S. Treasury Department, IRS, p. 12.

[2] Bain, Industrial Organization, op. cit., pp. 381-382, subtracts off only 1 per cent from the all-corporations profit rate as a percentage of equity figures for the years 1936-1940 because corporate income taxes were relatively low. Incidentally, much of the Epstein data was on a before-tax basis (of course, for all years before 1921 the difference between before and after tax figures is negligible).

[3] Stigler, Capital, op. cit., pp. 36-37, 113-114, is the source for this type of adjustment.

is seriously underestimated. Although the previous year-end assets are not strictly comparable to current-year-end assets because of the shifting of companies, we shall take the data at face value and recalculate our rates of return on a mid-year asset basis. Assuming the rate of increase of assets was linear, we can recalculate returns in the following way: Let A_o be assets at the beginning, and A_1 assets at the end of the year and let R be income. Then we calculate $R/\frac{1}{2}(A_o+A_1)$. Although a constant geometric rate of increase of assets might perhaps be more plausible, we have retained the simpler linear assumption. Some correlation estimates of this type of average asset return with the quarterly data provided by the FTC-SEC in Quarterly Financial Report were moderately good.[1]

Finally, it is worth noting that we contemplated making a few other changes, but decided against them--such as, subtracting out C dividends and SP's alternative wages as alternative costs not found in the other types of business establishments. However, we decided that this would not give us any better portrayal of the economist's notion of profits. The economist's notion of profits is a pure residual and what we are talking about here is the fact that when monopoly is present this residual will tend to be positive and perhaps substantial. What we subtract out of the computed return to capital is an allowance for the normal rate of return on invested capital. What we have left is the economist's notion of profits and it will tend to be zero in competitive industries, except for random fluctuation; while it will tend to be positive in monopolistic industries.

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[1] Ibid., pp. 113-114.

Similarly, we decided against trying to make exact compensations for rates of growth, economies of scale, specialized factors, etc. The difficulties that appear are legion. Of course, there are some industries, for example, electric power production, where it is possible to get a pretty good idea of the effects of economies of scale. However, for the bulk of industries it would be difficult to measure the effect on average costs of scale taken by itself. On the question of highly specialized factors, there probably are not any that are important in manufacturing. There may be a few in something like watchmaking; but they are certainly not a very significant phenomenon in manufacturing. In something like agriculture, specialized factors are undoubtedly more important.

The above argument gives a general picture of what we shall be doing empirically. However, before moving on to our estimates, we want to briefly list the assumptions involved in the first approximation model as utilized by Harberger as well as indicating where we shall depart from this approach. Our reason for making these assumptions explicit is to avoid the misconceptions and criticisms that so often accompany implicit assumptions. For comparison purposes, in the list that follows we have put the word SAME after the Harbergerian assumptions we have retained. Where we have departed, we have included a very brief resume of how we have done so. The assumptions are that: (1) all production is subject to constant costs--SAME; (2) all demand curves have unitary elasticity--although we computed the "welfare loss" for this case, we have also done it for the more realistic case using estimated specific industry elasticities; (3) all industries are in

"long-run equilibrium"--SAME; (4) The period has accounting values near actual capital values--SAME; (5) the redistribution of income is not a "welfare loss"--since data would not allow for its computation, this is, in essence, what we are assuming. Alternatively, we can say that we are assuming the marginal utility of income is the same for everyone or an appropriate fiscal adjustment keeps money income constant--SAME, (6) sales rather than value added adequately measures the extent of the necessary resource transfer (for the reasons discussed above)--SAME; (7) manufacturing corporations are the entire economy--we have modified this by figuring in SP and P besides C and compiled losses for the entire economy (all industries) not just manufacturing; (8) all industries are producing products for direct consumption so that Hotelling's formula works--SAME; (9) intangibles and advertising should be entirely excluded as monopoly elements--SAME, although we computed these for all the industries not just for some or on the basis of an average figure; (10) there is high substitutability among the products produced by different firms in the same industry and low substitutability among the goods and services of different industries--SAME; (11) monopoly profits are roughly one-third of the economy's profits, the rest a conglomerate due to such things as innovations and growth, etc.--we have made no explicit allowance for this; (12) it is reasonable to identify, at least roughly, monopoly profits with high rates of profit--SAME; (13) mergers may be neglected, for one reason or another, in computing profit rates--although we have not made any explicit estimate of this factor, we do feel it is nontrival and worth at least, speculating on; (14) resource misallocations may arise out of things exogeneous to our model: unions,

tariffs, taxes, etc.--SAME, we have assumed these things are absent to avoid the complexities of the "second best conditions"; (15) monopoly gains to factors other than capital may be safely neglected--we have made some attempt to pin our estimate down a little tighter than Harberger's estimate by various adjustments of rents and royalties; (16) figures on rates of return are "tolerably precise" (especially important is the assumption that the common stock has not capitalized monopoly elements in it)--SAME; (17) an after-corporation tax rate is more meaningful--we also compared net profits of P and SP with the income of C before taxes; (18) "welfare" may be measured unambigously from the fact that consumers prefer more to less--SAME; (19) the profit returns are more appropriately figured with funded debt and net worth than with the latter alone--although we feel this is in general true, we have included the computations both ways; (20) an average rate of return is an useful approximation for the competitive rate--SAME; (21) rates of return should be computed on an end-of-year asset basis--we used an average (or mid-year) asset base to avoid the spuriousness caused by a rapid rate of asset growth or decay; (22) there are no selling costs other than advertising expenditures even though some of such costs may be to enhance market control or monopoly position--SAME.

Although we could probably never provide a complete list of assumptions, this gives some idea of the more important assumptions--some quite stringent--that are involved in this type of analysis. For what it is worth, we can roughly identify numbers 1, 3, 4, 6, 8, 9, 12, 14, 17, 19, as probably leading to an <u>overstatement</u> of the "welfare losses" while numbers 2, 5, 7, 11, 13, 15, 20, 21, 22, leading to the

opposite--an understatement. Numbers 16, 18, and 23 do not seem to necessarily fall into either division. We would like to caution the reader against any simple counting of the items under each rubric to determine which is the more powerful factor. Just as having the same number of equations as unknowns is neither a necessary nor sufficient condition for a solution, having the same number of overstatements and understatements does not necessarily mean they are exactly counter-balanced. In our case, the fact that we have more overstatements than understatements does not necessarily imply our final results is a "welfare loss" that is biased downward. In other words, we have a type of index number problem involved here in which the proper weights must be assigned before judgment can be passed. Keeping all of this in mind, let us now turn to the data.

CHAPTER IV

ANALYSIS OF THE EMPIRICAL RESULTS

In this chapter, we shall describe the actual outcome of the techniques outlined in the earlier theoretical chapters. It is well to note that we shall not go into any detail concerning the measurement and estimation procedures employed in our data-gathering process; but, rather refer the reader to some of our earlier comments in Chapter III and more especially to Appendix A which goes into this in some detail. It is also important to keep in mind that we shall restrict ourselves in this chapter to the figures that are least subject to arbitrariness and we shall reserve our comments concerning the more obviously arbitrary adjustments such as "monopoly profits are one-third of profits," "mergers account for one-fourth of total asset growth," etc., to our final "Summary and Conclusions" chapter. Of course, no completely clean dichotomy is ever possible on such matters, but, on balance, we feel the estimates contained here stand on much firmer empirical footing.

Keeping this in mind, let us turn to the data. The first thing that we need for estimating "welfare losses" is profit rate information. To get some flavor for the many different combinations one might use, we shall show some of our findings here although more information--both in frequency distribution and raw form--may be found in Appendix B. We first found profit rates for corporations (C), partnerships (P), and

sole proprietorships (SP) alone, as well as for all three combined into all business establishments (ABE). This was done on a yearly basis for the four-year period 1957-1958 to 1960-1961 for P, SP and for the five-year period 1956-1957 to 1960-1961 for C, as well as on an average basis for the period in question. These figures were combined to give an average ABE figure as well. The C figures are segregated on the basis of before- and after-corporation tax income, and on the basis of whether a total capital or equity base was used. P, SP estimates are distinguished on the basis of whether the total capital estimates are made from known P balance sheet ratios or small C (we tried both the $0-25,000 and $0-50,000 total asset classes and found Stigler's use of the latter was wise) ratios. The equity figures are estimated by only the P balance sheet method. As mentioned, for details of all the difficulties involved in such estimates see Appendix A.

Table 2 gives us some idea of the magnitudes involved for some of the aggregate industrial classifications, e.g., all manufacturing, in C, P, SP, and ABE on an average basis.[1] Of course, the more heavily the noncorporate sector dominates an industry the more unreliable are our data--since the C data are known, while the P, SP are estimated. This along with the economic circumstances surrounding the industry partially explain such extreme rates as found in heavily noncorporate populated industries such as services. Incidentally, the rates in parenthesis show the profit rates after adjustments have been

[1]We have shown industry-by-industry average profit rate figures, for all adjustments, for C and ABE in Appendix B. This is done for both before-and-after tax income and for total capital and equity bases.

TABLE 2

PROFIT RATES FOR SOME AGGREGATIVE INDUSTRIAL CLASSIFICATIONS*

Profit Rates in Percentage Terms for: (1) Unadjusted data (2) Data adjusted for intangibles, royalties, and advertising (in parenthesis)	All Industrial Groups (1)	Agriculture Forestry and Fisheries (2)	Total Mining (3)	Construction (8)	Transportation, Communication, Electric, Gas, and Sanitary Serv. (32)	Total Wholesale and Retail (37)	Total Wholesale Trade (38)	Total Retail Trade (42)	Total Manufacturing (9)	Finance, Insurance, and Real Estate (52)	Total Services (61)
I. CORPORATIONS											
(A) After-Corporation Tax											
(1) Using Average Total Capital Base	7.013	3.076	3.718	5.743	4.301	6.731	6.280	5.410	6.909	11.401	5.450
	(8.859)	(4.09/)	(4.415)	(6./11)	(4.549)	(11.918)	(8.981)	(10.982)	(9.670)	(12.101)	(8.603)
(2) Using Average Equity Base	6.691	2.352	3.525	6.252	4.677	5.569	6.834	5.458	7.473	7.677	6.148
	(9.288)	(3.903)	(4.438)	(7.694)	(5.121)	(11.33/)	(10.690)	(13.028)	(10.948)	(8.610)	(11.994)
(B) Before-Corporation Tax											
(1) Using Average Total Capital Base	11.019	5.445	7.886	10.478	7.174	12.176	10.264	9.618	12.902	13.079	9.031
	(12.889)	(6.473)	(8.661)	(11.459)	(7.427)	(17.387)	(12.979)	(15.204)	(15.721)	(13.785)	(12.254)
(2) Using Average Equity Base	12.320	5.951	8.979	13.282	9.817	11.668	12.507	11.168	14.983	9.956	12.652
	(14.967)	(7.519)	(10.027)	(14.752)	(10.279)	(17.506)	(16.391)	(18.764)	(18.549)	(10.901)	(18.734)
II. PARTNERSHIPS											
(A) Using Average Total Capital Base											
(1) Estimated from P Balance Sheet Ratios	12.746	5.788	0.473	22.714	12.872	16.718	17.419	17.394	16.865	4.864	46.074
	(14.148)	(6.155)	(1.336)	(24.583)	(13.578)	(20.385)	(19.727)	(21.391)	(20.075)	(5.204)	(48.945)
(2) Estimated from Small Corporation balance Sheet Ratios ($0-50,000 total asset class)	25.986	33.454	0.834	40.395	31.356	23.048	19.794	25.738	25.395	11.050	93.631
	(29.055)	(36.958)	(2.378)	(43.798)	(34.147)	(28.500)	(22.424)	(31.791)	(30.526)	(11.882)	(100.809)
(B) Using Average Equity											
(1) Estimated from P Balance Sheet Ratios	18.600	7.809	- 0.463	45.515	25.352	20.562	24.176	21.143	19.981	7.535	68.577
	(20.910)	(8.365)	(0.694)	(49.535)	(27.397)	(25.500)	(27.502)	(26.248)	(24.047)	(8.263)	(73.395)
III. SOLE PROPRIETORSHIP											
(A) Using Average Total Capital Base											
(1) Estimated from P Balance Sheet Ratios	13.580	5.242	- 0.370	31.364	15.465	18.678	30.679	17.159	19.804	4.496	53.047
	(14.948)	(5.758)	(7.713)	(33.359)	(16.298)	(21.876)	(33.074)	(20.776)	(22.542)	(15.019)	(56.247)
(2) Estimated from Small Corporation balance Sheet Ratios ($0-50,000 total asset class)	33.723	30.416	- 0.858	55.909	36.440	27.404	34.824	26.463	30.109	9.471	102.526
	(37.544)	(34.728)	(4.159)	(59.559)	(39.473)	(32.187)	(37.553)	(32.170)	(34.403)	(10.632)	(110.170)
(B) Using Average Equity											
(1) Estimated from P Balance Sheet Ratios	19.557	7.382	- 1.195	48.586	32.208	22.692	37.931	20.731	22.581	8.635	79.055
	(22.102)	(8.109)	(2.018)	(51.881)	(34.803)	(26.791)	(41.031)	(25.380)	(25.952)	(9.696)	(84.473)
IV. ALL BUSINESS ESTABLISHMENTS											
(A) After-C Tax Income of C with Untaxed P,SP Income											
(1) Average Total Capital Base											
a. P,SP estimated by P Balance Sheet Ratios	8.992	5.242	2.841	18.775	4.662	12.283	10.464	11.755	7.327	8.916	34.218
	(10.689)	(5.730)	(3.747)	(20.308)	(4.904)	(16.546)	(13.089)	(16.324)	(10.093)	(9.519)	(37.398)
b. P,SP estimated by Small Corporation Balance Sheet Ratios ($0-25,000 total asset class)	11,665	40.063	3.388	29.520	4.768	15.883	11.470	16.247	7.478	12.481	59.500
($0-50,000 total asset class)	10.949	26.045	3.462	21.523	4.753	14.438	10.762	14.416	7.420	11.150	49.581
	(13.035)	(29.473)	(4.586)	(23.290)	(5.021)	(19.484)	(13.464)	(20.046)	(10.222)	(11.916)	(54.581)
(2) Average Equity Base											
a. P,SP estimated by P Balance Sheet Ratios	10.485	7.275	2.574	28.434	5.554	13.108	12.837	13.974	7.987	7.801	53.181
	(12.957)	(8.004)	(3.789)	(30.972)	(6.031)	(18.204)	(16.545)	(19.983)	(11.469)	(8.726)	(58.842)
(B) Before-C Tax Income of C with Untaxed P,SP Income											
(1) Average Total Capital Base											
a. P,SP estimated by P Balance Sheet Ratios	11.741	5.324	6.031	20.787	7.399	15.056	13.522	13.703	12.816	9.974	35.535
	(13.456)	(5.813)	(7.000)	(22.326)	(7.668)	(19.347)	(16.157)	(18.283)	(15.636)	(10.581)	(38.737)
b. P,SP estimated by Small Corporation Balance Sheet Ratios ($0-25,000 total asset class)	15.232	40.694	7.191	32.684	7.601	19.409	14.822	18.940	13.080	13.963	61.790
($0-50,000 total asset class)	14.297	26.455	7.349	23.829	7.576	17.698	13.908	16.806	12.978	12.473	51.490
	(16.409)	(29.901)	(8.568)	(25.603)	(7.851)	(22.782)	(16.620)	(22.452)	(15.836)	(13.245)	(56.534)
(2) Average Equity Base											
a. P,SP estimated by P Balance Sheet Ratios	14.453	7.394	6.848	31.702	10.520	16.410	17.139	16.525	14.863	9.432	55.301
	(16.963)	(8.124)	(8.178)	(34.254)	(11.020)	(21.546)	(20.866)	(22.553)	(18.429)	(10.366)	(61.017)

*The Corporation (C) rates are based upon the average returns over the five-year period, 1956-1957 to 1960-1961 while the Partnership (P) and Sole Proprietorship (SP) returns are for the four-year period 1957-1958 to 1960-1961. All business establishments is a weighted average of C, P, plus SP.

SOURCE: IRS Statistics of Income, Corporation Income Tax Returns and Business Income Tax Returns for the relevant years. The numbers across the top of this table refer to the order in which the industries are listed in the source from 1 to 69.

made for intangibles, royalties, and advertising. The importance of these latter figures will become apparent in Table 2.

Frequently, it is more useful and easier to grasp data if they are presented in frequency distribution form. Table 3 contains information similar to that found in Table 2 only Table 3 is for the sixty specific industries included in our study while Table 2 shows aggregates of these industries. The same information for C, P and SP separately is contained in Appendix B.

A logical question, at this point, is how well do our different profit estimates compare? In other words, how significant are the correlation coefficients between the alternative methods? In an attempt to answer this question, we have computed rank correlations for profit methods 1, 3, 4, 5, 7, 8 (not I-VIII, see Appendix A's discussion under "Profit Rate and Welfare Loss Adjustments" for the distinction)--Table 3 contains an outline description of these different methods.[1]

Table 4 indicates that on, at least, this crude level, the profit rates by any method--unadjusted or not--seem to be highly correlated ($R \approx .64$ being the lowest coefficient). But remember we may have profit rates on quite different absolute levels and yet be highly intercorrelated. In other words, although the industries may have about the same relative

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[1]A discussion of the distinction between the Spearman rank correlation coefficients and the Pearson product moment correlation coefficients may be found in almost any introductory statistics text; however, W. Dixon and F. Massey, Introduction to Statistical Analysis (second edition; New York: McGraw-Hill Book Company, Inc., 1957), pp. 294-295; H. Walker and J. Lev, Statistical Inference (New York: Holt, Rinehart and Winston, 1953), pp. 278-282; F. Croxton and D. Cowden, Applied General Statistics (first edition; New York: Prentice-Hall, Inc., 1939), pp. 685-686, are especially good. It is worth mentioning that the rank method is a non-parametric or distribution-free criterion for testing the null hypothesis of no association.

TABLE 3

FREQUENCY DISTRIBUTION OF PROFIT RATES FOR ALL BUSINESS ESTABLISHMENTS*
[All Business Establishments (ABE) = Corporations (C), Partnerships (P), and Sole Partnerships (SP)]

	Combining C with P Balance Sheet Ratio Estimates for P, SP Capital				Combining C with Small C Balance Sheet Ratio Estimates for P, SP Capital, $0-50,000 total asset class ($0-25,000 total asset class in parenthesis Method II)		
	Average (or Mid-year) Total Capital Base (Method 1)		Average (or Mid-year) Equity Base (Method 4)		Average (or Mid-year) Total Capital Base (Method 3)		
	Unadjusted (U)	Adjusted for Int. Roy., & Adv.** (A)	(U)	(A)	(U)		(A)
Profit Rate in Percentage Terms	Number of Industries--After-Corporation Tax Income						
0.00 - 1.99	0	0	2	0	0	(0)	0
2.00 - 3.00	9	4	5	3	4	(4)	2
4.00 - 5.99	6	7	7	5	8	(7)	6
6.00 - 7.99	13	4	9	7	11	(11)	3
8.00 - 9.99	13	12	12	7	13	(14)	12
10.00 - 11.99	6	3	9	7	7	(4)	5
12.00 - 13.99	3	10	3	2	5	(5)	8
14.00 - 15.99	2	6	1	6	0	(3)	5
16.00 - 17.99	0	5	2	4	2	(1)	4
18.00 - 19.99	3	1	0	5	3	(1)	3
20.00 - 21.99	2	3	2	2	1	(1)	3
22.00 - 31.99	1	3	4	7	3	(3)	5
32.00 and over	2	2	4	5	3	(6)	4
Total	60	60	60	60	60		60
Mean	8.992	10.689	10.485	12.957	10.949	(11.665)	13.035

Profit Rate in Percentage Terms	Number of Industries--Before-Corporation Tax Income						
	Method 5		Method 8		Method 7		(Method VI)
	(U)	(A)	(U)	(A)	(U)		(A)
0.00 - 1.99	0	0	1	0	0	(0)	0
2.00 - 3.99	4	1	2	1	2	(2)	1
4.00 - 5.99	7	8	2	2	5	(4)	3
6.00 - 7.99	4	3	7	5	4	(5)	5
8.00 - 9.99	5	6	8	6	4	(6)	2
10.00 - 11.99	9	2	4	6	8	(5)	5
12.00 - 13.99	8	6	8	2	12	(6)	6
14.00 - 15.99	8	7	3	1	7	(13)	6
16.00 - 17.99	6	6	8	5	5	(5)	6
18.00 - 19.99	2	6	3	6	4	(2)	1
20.00 - 21.99	3	3	4	6	2	(2)	10
22.00 - 31.99	2	10	6	12	4	(2)	10
32.00 and over	2	2	5	8	3	(8)	5
Total	60	60	60	60	60		60
Mean	11.741	13.456	14.453	16.963	14.297	(15.232)	16.409

*Based upon average returns for the five-year period 1956-1957 to 1960-1961 for C, and the four-year period 1957-1958 to 1960-1961 for P, SP.

**Int. = Intangibles; Roy. = Royalties; and Adv. = Advertising Expenditures.

SOURCE: See Table 2. Note that Methods II,VI differ from 1, 3, 4, 5, 7, 8; see Appendix A's section "Profit Rate and Welfare Loss Adjustments" for the distinction.

TABLE 4

RANK CORRELATION OF UNADJUSTED AND FULLY ADJUSTED PROFIT RATES BY METHODS 1, 3, 4, 5, 7, AND 8*

Variables

X(1) = Unadjusted Profit Rate by Method 1
X(2) = Fully Adjusted (for royalties, intangibles, advertising expenditure), by Method 1
X(3) = Unadjusted Profit Rate by Method 3
X(4) = Fully Adjusted (for royalties, intangibles, advertising expenditure), by Method 3
X(5) = Unadjusted Profit Rate by Method 4
X(6) = Fully Adjusted (for royalties, intangibles, advertising expenditure), by Method 4
X(7) = Unadjusted Profit Rate by Method 5
X(8) = Fully Adjusted (for royalties, intangibles, advertising expenditure), by Method 5
X(9) = Unadjusted Profit Rate by Method 7
X(10)= Fully Adjusted (for royalties, intangibles, advertising expenditure), by Method 7
X(11)= Unadjusted Profit Rate by Method 8
X(12)= Fully Adjusted (for royalties, intangibles, advertising expenditure), by Method 8

Rank Correlation Coefficient Matrix

Variable	X(1)	X(2)	X(3)	X(4)	X(5)	X(6)	X(7)	X(8)	X(9)	X(10)	X(11)	X(12)
X(1)	1.000000	.912587	.884357	.807724	.898250	.815060	.836899	.789997	.788441	.721145	.784718	.728880
X(2)		1.000000	.817505	.887358	.888914	.932315	.843123	.896138	.801945	.841011	.830897	.859438
X(3)			1.000000	.928091	.860239	.788219	.670909	.647458	.836899	.793832	.658683	.637172
X(4)				1.000000	.839233	.876077	.686913	.750653	.858905	.909808	.697472	.753001
X(5)					1.000000	.941539	.797666	.791442	.800222	.770936	.870019	.845265
X(6)						1.000000	.762378	.838177	.761545	.823340	.855238	.905236
X(7)							1.000000	.954098	.881078	.814226	.944762	.884004
X(8)								1.000000	.856682	.878855	.933537	.948310
X(9)									1.000000	.945374	.846457	.813250
X(10)										1.000000	.817338	.862050
X(11)											1.000000	.959426
X(12)												1.000000

SOURCE: See Table 2. *These different profit methods are outlined in Table 3 and discussed in Appendix A.

position for unadjusted as for fully adjusted estimates, the latter estimates may be at twice or three times (to take a hypothetical example) the level of the former. And for many problems, such as "welfare losses," the absolute levels are quite important. We shall have occasion to return to this question below after we have actually shown our estimated "welfare losses."

Before leaving profit rates, there are three interesting relationships we want first to explore. First of all, in (1.1) we check the relationship between profit rates on the one hand and intangible assets, royalties, and advertising expenditure on the other. Secondly, in (1.2) the same relationship is examined except we drop intangibles for the equation. Finally, in (1.3) we investigate the relationship of intangibles with royalties and advertising expenses. These are based on data for corporations for the five-year period, 1956-1957 to 1960-1961.

Our estimating equation are of the following type:

$$(1.1)\quad \pi'_{ij} = a_1 + b_{11} I_{ij} + b_{21} R_{ij} + b_{31} AE_{ij}$$

$$(1.2)\quad \pi'_{ij} = a_2 + b_{22} R_{ij} + b_{32} AE_{ij}$$

where

$$(1.3)\quad I_{ij} = a_3 + b_{23} R_{ij} + b_{33} AE_{ij} \quad i = 1, \ldots, 60 \quad j = 1, \ldots, 5$$

π'_{ij} = the profit rate on average total capital in the ith industry for the jth year (i.e., π'_{ij} = net income after corporation taxes − royalties + interest payments, all divided by average total capital − intangible assets).

I_{ij} = intangible assets in the ith industry for the jth year.

R_{ij} = royalties in the ith industry for the jth year.

AE_{ij} = advertising expenditures in the ith industry for the jth year.

We than have, for our estimated relationships, five cross-section equations. If the disturbance terms in a given year are dependent on the disturbance terms in any preceding year, we may use Aitken's generalized least-squares and increase the efficiency ("efficient" estimators have the smallest limiting variance and are necessarily consistent and unbiased in the limit--although they need not be unbiased for finite samples[1]) of our estimates.[2] Since the presence of serial correlation[3] and low intercorrelation of the independent variables (lack of multicollinearity) is reasonable, we may usefully employ Aitken's procedure. Fortunately, Zellner has developed a technique for

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[1]Mood, op. cit., pp. 150-151; in other words, we may say inefficient predictors have needlessly large sampling variances.

[2]A. C. Aitken, "On Least-Squares and Linear Combination of Observations," Proceedings of the Royal Society of Edinburgh, 55 (1934-1935), pp. 42-48. It should be mentioned that two other consequences of autocorrelated disturbances besides the inefficiency of the predictions in the straightforward application of ordinary least-squares are that we are likely to obtain a serious underestimation of the variances of the regression coefficients; and although we shall obtain unbiased estimates of alpha and beta, the sampling variances of these estimates may be unduly large. See J. Johnston, Econometric Methods (New York: McGraw-Hill Book Company, Inc., 1963), p. 179.

[3]The well-known "regression fallacy" suggests that such things as profit rates might be expected to exhibit serial correlation as the extremes move toward the means.

using the Aitken generalized estimators when the disturbance variance and covariance are unknown.[1] This method allows us to make use of both the time series and the cross-sectional aspects of our data. In testing for significance, it is important to remember that the standard errors are asymptotic standard errors. However, Zellner has shown that a finite sample size of n = 20 (in our case n = 60), the results are not very different.[2] Our estimates using the "efficient estimators" approach is contained in Table 5.

We shall first look at the results on equation (1.1). Our results are useful in answering a number of interesting questions. First of all, the only variable that is significant is advertising expenditures. And even here, it is only so four of the five years and even then it is questionable whether the level of significance is "reasonable" in all cases. This suggests that our labors in computing profit rates on a fully adjusted basis was worthwhile. Advertising, and the constant term, have a positive relationship to profit rates. Royalties and intangible assets had negative signs for all five years. The sign for royalties may be interpreted as a competitive profit-equalizing adjustment by the capital market: the industries with small royalties have larger

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[1] Arnold Zellner, "An Efficient Method of Estimating Seemingly Unrelated Regressions and Tests for Aggregation Bias," Journal of the American Statistical Association, Vol. 57 (June, 1962), pp. 348-368.

[2] Arnold Zellner, "Estimators for Seemingly Unrelated Regression Equations: Some Exact Finite Sample Results," Journal of the American Statistical Association, Vol. 58 (December, 1963), pp. 977-992. It is important to note that since the estimating technique does not minimize the squared deviations around each individual regression, the coefficient of multiple determination (R^2) is not a relevant statistic.

TABLE 5

RESULTS OF GENERALIZED LEAST-SQUARES ESTIMATION OF COEFFICIENTS*

Equation 1.1

Year	N	a_1	b_1	b_{21}	b_{31}
1956-57	60	6.893 E-02[4]	-2.251 E-08°	-1.243 E-07°	2.998 E-08[1]
		(5.379 E-03)	(2.941 E-08)	(1.459 E-07)	(2.215 E-08)
1957-58	60	5.953 E-02[4]	-2.202 E-08°	-1.139 E-07°	3.499 E-08[2]
		(5.989 E-03)	(2.979 E-08)	(1.384 E-07)	(2.093 E-08)
1958-59	60	6.431 E-02[4]	-1.780 E-08°	-1.553 E-07°	1.126 E-08°
		(1.187 E-02)	(6.873 E-08)	(4.129 E-07)	(5.209 E-08)
1959-60	60	5.872 E-02[4]	-1.764 E-08°	-8.087 E-08°	4.500 E-08[4]
		(4.598 E-03)	(2.252 E-08)	(1.063 E-07)	(1.673 E-08)
1960-61	60	4.818 E-02[4]	-4.224 E-09°	-7.481 E-08°	3.670 E-08[2]
		(5.411 E-03)	(2.637 E-08)	(1.053 E-07)	(1.859 E-08)
Mean		5.993 E-02	1.684 E-08	1.078 E-07	3.158 E-08

Equation 1.2

Year	N	a_2	b_{22}	b_{32}
1956-57	60	6.828 E-02[4]	-1.553 E-07°	2.886 E-08[1]
		(1.303 E+01)	(1.391 E-07)	(2.184 E-08)
1957-58	60	5.888 E-02[4]	-1.482 E-07°	3.457 E-08[2]
		(5.428 E-03)	(1.329 E-07)	(2.062 E-08)
1958-59	60	6.364 E-02[4]	-1.826 E-07°	1.191 E-08°
		(1.166 E-02)	(3.818 E-07)	(5.160 E-08)
1959-60	60	5.828 E-02[4]	-1.216 E-07°	4.618 E-08[4]
		(4.523 E-03)	(1.017 E-07)	(1.660 E-08)
1960-61	60	4.812 E-02[4]	-9.639 E-08°	3.806 E-08[3]
		(5.289 E-03)	(1.024 E-07)	(1.835 E-08)
Mean		5.944 E-02	-1.408 E-07	3.191 E-08

Equation 1.3

Year	N	a_3	b_{23}	b_{33}
1956-57	60	4.572 E+04[3]	2.957 E-01°	2.361 E-02°
		(1.792 E+04)	(2.746 E-01)	(4.576 E-02)
1957-58	60	4.721 E+04[3]	3.919 E-01[2]	7.471 E-03°
		(1.834 E+04)	(2.259 E-01)	(4.085 E-02)
1958-59	60	4.770 E+04[3]	3.580 E-01[1]	5.927 E-03°
		(1.806 E+04)	(2.705 E-01)	(4.222 E-02)
1959-60	60	4.513 E+04[3]	4.362 E-01[2]	-1.336 E-02°
		(2.040 E+04)	(2.328 E-01)	(4.591 E-02)
1960-61	60	4.564 E+04[3]	4.001 E-01[2]	-9.319 E-03°
		(2.086 E+04)	(2.114 E-01)	(4.579 E-02)
Mean		4.626 E+04	3.764 E-01	2.866 E-03

TABLE 5--Continued

*Standard errors appear in parentheses below the coefficients. The E's are to be interpreted as indicating where the decimal should be, +'s mean the present decimal should be moved to the right, -'s to the left, by the number of places indicated by the number immediately following the sign, e.g., 6.893 E-02 should be interpreted as .06893.

o = not significantly different from zero
1 = significantly different from zero at better than the 20% level
2 = significantly different from zero at better than the 10% level
3 = significantly different from zero at better than the 5% level
4 = significantly different from zero at better than the 1% level

All tests are two tailed t-tests.

royalty-less profit rates to compensate. The results on equations (1.2) and (1.3) are also interesting. They first indicate that very little is lost by running the regression on profit rates without intangible assets. Royalties is still never significant and advertising expenditures is still significant in four of the five years with the significance level for one year going from .10 to .05. Equation (1.2) further reaffirms our suspicion that royalties and intangible assets are positively related, while intangible assets and advertising are never significant and with minus signs for two of the five years.

After having found our profit rates, the next step is to find the amount by which profits diverge from the "average." We may then add up all the pluses and all the minuses to find the amount of resource transfer that would be necessary from low-profit to high-profit industries to obtain equilibrium.[1] Harberger estimated that profits from monopoly power in the economy as a whole, which for him was manufacturing, summed to $4.6 billion or 1.5 per cent of the national income (all in 1953 present value terms). In other words, the misallocation of resources which existed in United States manufacturing in 1924-1928 might have been eliminated by a net transfer of roughly 4 per cent of the resources in the manufacturing industry or 1½ per cent of the total resources of the economy.

The question now becomes "How do our estimates compare with Harberger's?" Our answer is not one single answer but rather a combination of answers depending upon the method used. These are all shown

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[1]Assuming that the elasticity is unity.

in Table 6. From our point-of-view, the most useful estimates are the ones involving after-corporation tax income with either of the capital bases. If one wants to compare the figures with Harberger's, he used before-tax income on a total capital base. However, given the low tax rates in the 1924-1928 period, it would be more instructive to compare his figure with our after-tax income results. Before examining the table, it is again worth mentioning that we have shown the misallocations based upon adjusted (for intangibles, royalties, and advertising) as well as upon unadjusted profit rates. The Harberger figure mentioned above refers to unadjusted data. His total figure after the intangible adjustment, e.g., was 1.75 per cent of national income.

The table indicates our spectrum or continuum of estimates ranging from roughly $15 to $31 billion or from roughly 3.9 per cent to 8 per cent of the average national income over these years.[1] We can already see that our figures are becoming of a different order of magnitude than Harberger's (or Schwartzman's) estimates. These differentials will become even more apparent after we apply the Hotelling formula to find out how much better off people would be if we actually effected these desired resource transfers.

The summary results of our application of the "welfare formula"[2] are shown in Table 7.

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[1]The average for the years 1956 to 1961 is approximately $387.7 billion. Remember these estimates assume only unity elasticity. Our results would be even more striking if we used the estimated elasticities times "excess" profits measure of the required resource transfer.

[2]It is important to recall that we are using the word "welfare" loosely here to denote economic efficiency.

TABLE 6

ESTIMATES OF THE MISALLOCATION OF RESOURCES*

Profit Rate Methods	Using After-Corporation Tax Income of Corporations (C) With Untaxed Partnership (P) and Sole Proprietorship (SP) Income (thousand dollars) (U)	(I)	(I),(R)	(I),(R),(A)
Using Average Total Capital Base:				
(1) Estimated for (P),(SP) by P Balance Sheet Data	18,931,308 (4.88)	18,999,768 (4.90)	19,554,572 (5.04)	24,674,585 (6.36)
(2) Estimated for (P),(SP) by Small Corporation Balance Sheet Date				
a. using $0-25,000 total asset class	20,354,724 (5.25)	20,453,334 (5.28)	20,995,162 (5.42)	26,441,728 (6.82)
b. using $0-50,000 total asset class	18,765,574 (4.84)	18,862,497 (4.86)	19,414,998 (5.01)	24,630,725 (6.35)
Using Average Equity Base:				
(1) Estimated for (P),(SP) by Balance Sheet Data	14,989,845 (3.87)	15,080,923 (3.89)	15,630,044 (4.03)	20,947,663 (5.40)

NOTE: Since the sum of all the pluses and minuses are never exactly equal, we shall always give the absolute average.

SOURCE: See Table 2.

Using Before-Corporation Tax Income of Corporations (C) With Untaxed Partnership (P) and Sole Proprietorship (SP) Income (thousand dollars)			
(U)	(I)	(I),(R)	(I),(R),(A)
24,249,442 (6.25)	24,360,424 (6.28)	24,765,897 (6.39)	30,828,524 (7.95)
22,655,765 (5.84)	22,848,020 (5.89)	23,129,067 (5.96)	28,650,498 (7.39)
21,104,421 (5.44)	21,356,222 (5.51)	21,873,126 (5.64)	27,329,557 (7.05)
19,174,880 (4.94)	19,414,475 (5.01)	19,686,700 (5.08)	25,297,199 (6.52)

*The per cent of average national income over the 1956 to 1961 period which the estimate comprises appears in parenthesis below the estimates. The extent of the misallocation is defined here to be the sum of the profits due to monopoly power in American industry in the period 1956-1957 to 1960-1961 computed for unadjusted (U) and adjusted for intangibles (I), royalties (R), and advertising expenditures (A) data. By assuming the misallocation equals profits means unity elasticity is assumed.

Although the general format of this table is similar to Table 6, we should like to spend some time explaining the estimates, for in essence, this is what our whole analysis has been pointing toward. Table 7 looks at after- and before-corporation tax income of C with intaxed P and SP income. The estimates are done using both average total capital and average equity as the base upon which profit rates have been computed. The other modifications in the table refer to the various ways in which the non-corporate sector's assets were estimated.

The next thing to be noticed is that our estimates moved from unadjusted to more and more realistic estimates.[1] We make successive adjustment for intangibles, royalties and advertising on the assumption that these accounting items hide much of what is economically relevant to the malallocation problem. For instance, we want to adjust for advertising expenditures. For although product prices might not be too different from costs, the whole cost curve might be too high from wasteful monopoly practices such as competitive (i.e., non-informative) advertising.

It should also be noted that the estimates have been computed using an elasticity of unity and using industry-by-industry elasticity estimates based upon the Lerner-Robinson proposition.[2] The reader

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[1] What per cent our estimates are of average national income appear in the parentheses below the absolute estimates.

[2] The estimates based upon the Dorman-Steiner-Telser proposition turned out to be such high upper bounds to be worthless for our purposes. Indeed, in some cases they indicated that the losses exceed national income. Therefore we can move on to a higher indifference curve, or

TABLE 7

ESTIMATES OF AGGREGATIVE "WELFARE LOSSES"*
Computed for Unadjusted (U) and Adjusted for Intangibles (I), Royalties (R), and Advertising (A) Profit Rates Assuming Unity Elasticity ($\eta=1$) and Lerner-Robinson Elasticity Estimates (η_L)
(thousand dollars)

Profit Rate Methods	No.	(U)		(I)		(I),(R)		(I),(R),(A)	
		$\eta = 1$	η_L	$\eta=1$	η_L	$\eta=1$	η_L	$\eta=1$	η_L
Using After-Corporation Tax Income of Corporations (C) With Untaxed Partnership (P) and Sole Proprietorship (SP) Income									
Using Average Total Capital Base:									
(1) Estimated for (P),(SP) by P Balance Sheet Data	I	6,088,064 (1.57)	17,931,308 (4.62)	6,106,883 (1.58)	17,999,768 (4.64)	6,399,913 (1.65)	18,554,571 (4.78)	7,236,797 (1.87)	23,674,258 (6.11)
(2) Estimating for (P),(SP) by Small Corporation Balance Sheet Data									
a. using$0-25,000 total asset class	II	5,541,386 (1.43)	20,354,723 (5.25)	5,627,007 (1.45)	20,453,334 (5.28)	5,951,335 (1.54)	20,995,162 (5.42)	6,776,113 (1.75)	26,441,727 (6.82)
b. using$0-50,000 total asset class	III	5,453,365 (1.41)	18,765,575 (4.84)	5,483,233 (1.41)	18,862,497 (4.86)	5,793,177 (1.49)	19,414,998 (5.01)	6,608,370 (1.70)	24,630,725 (6.35)
Using Average Equity Base:									
(1) Estimated for (P),(SP) by P Balance Sheet Data	IV	4,000,496 (1.03)	14,989,985 (3.87)	4,056,966 (1.05)	15,080,923 (3.89)	4,315,317 (1.11)	15,630,044 (4.03)	4,961,630 (1.28)	20,947,663 (5.40)
Using Before-Corporation Tax Income of Corporations (C) With Untaxed Partnership (P) and Sole Proprietorship (SP) Income									
Using Average Total Capital Base:									
(1) Estimated for (P),(SP) by P Balance Sheet Data	V	15,724,967 (4.06)	24,249,442 (6.25)	15,756,727 (4.06)	24,360,425 (6.28)	16,292,773 (4.28)	24,765,897 (6.39)	17,643,204 (4.55)	30,828,523 (7.95)
(2) Estimated for (P),(SP) by Small Corporation Balance Sheet Data									
a. using$0-25,000 total asset class	VI	10,398,164 (2.68)	22,655,766 (5.84)	10,442,740 (2.69)	22,848,020 (5.89)	10,816,925 (2.79)	23,129,067 (5.96)	11,855,472 (3.06)	28,650,314 (7.39)
b. using$0-50,000 total asset class	VII	9,915,876 (2.56)	21,104,421 (5.44)	10,050,507 (2.59)	21,356,223 (5.51)	10,531,390 (2.72)	21,873,126 (5.64)	11,512,863 (2.97)	27,329,557 (7.05)
Using Average Equity Base									
(1) Estimated for (P),(SP) by P Balance Sheet Data	VIII	8,919,432 (2.30	19,174,880 (4.94)	9,000,850 (2.32)	19,414,480 (5.01)	9,346,280 (2.41)	19,686,700 (5.08)	10,299,487 (2.66)	25,297,199 (6.52)

*Per cent of average national income over 1956 to 1961 period which the estimate comprises appear in parentheses below estimate.

SOURCE: See Table 2.

should also keep in mind Schwartzman's suggestion that perhaps an elasticity of two is appropriate. It is interesting to note that in at least one case, method V--we have numbered the estimates to avoid repeating all the relevant information each time--an elasticity of two would give larger losses than our estimated elasticities!

In order to give the reader an idea how these different estimates are related, we have included the product moment correlations (simple and partial) and the rank correlations. We have done this for the fully adjusted estimates--which are from our standpoint the more realistic--for both the unity ($\eta 1$) and (η_i) elasticity assumptions.

Regarding the correlations in Table 8, we find, for the most part, results which our previous figures would have us anticipate. However, there are a few interesting things to be noted. For instance, although the simple product moment correlations under the unity elasticity assumption are high, it is interesting to note that some of the rank correlations are lower than the corresponding product moment correlations. Also interesting is that, although the own simple correlations of the absolute "welfare losses" and "welfare losses" as a per cent of business receipts are also high under the Lerner-Robinson elasticity assumption, the simple correlations between the

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higher income level, by specializing in leisure! This, of course, does not affect their usefulness for the relative purposes mentioned above. However, both the product moment and rank correlation coefficients for the various elasticities shown in Appendix C indicate that the Dorfman-Steiner-Telser estimates may be limited even for ranking purposes.

TABLE 8

"WELFARE LOSS" CORRELATIONS: PRODUCT MOMENT AND RANK

Variables for all Sections in Table 8

X(1) = Welfare Losses Using Profit Method I
X(2) = Welfare Losses Using Profit Method II
X(3) = Welfare Losses Using Profit Method III
X(4) = Welfare Losses Using Profit Method IV
X(5) = Welfare Losses Using Profit Method V
X(6) = Welfare Losses Using Profit Method VI
X(7) = Welfare Losses Using Profit Method VII
X(8) = Welfare Losses Using Profit Method VIII
X(9) = Average Business Receipts for All Business Establishments--1956-1957, 1960-1961
X(10) = X(1)/X(9)
X(11) = X(2)/X(9)
X(12) = X(3)/X(9)
X(13) = X(4)/X(9)
X(14) = X(5)/X(9)
X(15) = X(6)/X(9)
X(16) = X(7)/X(9)
X(17) = X(8)/X(9)

Note: These different profit methods are outlined in Table 7 (N = 60).

TABLE 8--(Continued)

"Welfare Losses," Fully Adjusted, Unity Elasticity Assumption

Zero Order Product Moment Correlation Coefficient Matrix

Variable	X(1)	X(2)	X(3)	X(4)	X(5)	X(6)	X(7)	X(8)	X(9)
X(1)	1.000000	.766107	.916827	.770723	.559547	.466086	.669214	.461287	-.127840
X(2)		1.000000	.925520	.927822	.475369	.835343	.853382	.833247	-.128136
X(3)			1.000000	.842211	.538832	.679391	.825492	.644965	-.121606
X(4)				1.000000	.432174	.696583	.700580	.737814	-.131801
X(5)					1.000000	.449689	.556011	.428029	-.206385
X(6)						1.000000	.940500	.979329	-.162739
X(7)							1.000000	.887647	-.169995
X(8)								1.000000	-.162269
X(9)									1.000000

Variable	X(10)	X(11)	X(12)	X(13)	X(14)	X(15)	X(16)	X(17)
X(1)	.429212	.357789	.399532	.420877	.400616	.244098	.265449	.324502
X(2)	.221698	.528296	.484935	.364493	.331992	.590242	.589171	.550587
X(3)	.169640	.338121	.322177	.247982	.226346	.361783	.366270	.345186
X(4)	.395385	.543948	.536879	.483111	.448761	.514173	.522965	.539609
X(5)	.279677	.372596	.373959	.332424	.531590	.348007	.357582	.366091
X(6)	.194946	.727299	.638456	.432879	.395259	.877515	.867421	.780088
X(7)	.172813	.610825	.542634	.366824	.335897	.732175	.727173	.652017
X(8)	.312581	.809353	.731313	.543480	.501181	.923096	.916906	.853243
X(9)	-.140962	-.184510	-.183804	-.167949	-.196186	-.171238	-.174910	-.181940
X(10)	1.000000	.761327	.850379	.960951	.928267	.474661	.513793	.687170
X(11)		1.000000	.988333	.910932	.866148	.932033	.947360	.994176
X(12)			1.000000	.962838	.919131	.866161	.887839	.966193
X(13)				1.000000	.959659	.699561	.730933	.861295
X(14)					1.000000	.656543	.687394	.815732
X(15)						1.000000	.998951	.965590
X(16)							1.000000	.976239
X(17)								1.000000

TABLE 8--(Continued)

The Coefficients of Variation, $V = \frac{\sigma}{\bar{X}}$, are:

$V_1 = 300.4\%$	$V_7 = 325.5\%$	$V_{13} = 585.5\%$
$V_2 = 267.2\%$	$V_8 = 373.2\%$	$V_{14} = 500.6\%$
$V_3 = 279.3\%$	$V_9 = 102.2\%$	$V_{15} = 574.2\%$
$V_4 = 303.7\%$	$V_{10} = 696.7\%$	$V_{16} = 560.7\%$
$V_5 = 311.7\%$	$V_{11} = 530.2\%$	$V_{17} = 542.0\%$
$V_6 = 350.8\%$	$V_{12} = 529.4\%$	

Rank Correlation Coefficient Matrix for Absolute "Welfare Losses"

Variable	X(1)	X(2)	X(3)	X(4)	X(5)	X(6)	X(7)	X(8)
X(1)	1.000000	.901528	.886357	.913476	.797388	.833787	.770881	.810225
X(2)		1.000000	.960656	.919978	.774271	.879800	.778438	.812114
X(3)			1.000000	.898361	.792553	.898194	.772659	.811559
X(4)				1.000000	.772381	.819339	.787163	.833287
X(5)					1.000000	.860072	.811170	.881412
X(6)						1.000000	.845013	.882134
X(7)							1.000000	.841289
X(8)								1.000000

N=60

TABLE 8--(Continued)

"Welfare Losses," Fully Adjusted, Using Lerner-Robinson Elasticity

Zero Order Product Moment Correlation Coefficient Matrix

Variable	X(1)	X(2)	X(3)	X(4)	X(5)	X(6)	X(7)	X(8)	X(9)
X(1)	1.000000	.952862	.977141	.714058	.876430	.750989	.801684	.890401	.353107
X(2)		1.000000	.985527	.547021	.890300	.620887	.686963	.874575	.321715
X(3)			1.000000	.663934	.864414	.723802	.782350	.873278	.329501
X(4)				1.000000	.437931	.974037	.959397	.556212	.365060
X(5)					1.000000	.519605	.584125	.876334	.403531
X(6)						1.000000	.993315	.581088	.378333
X(7)							1.000000	.641779	.374692
X(8)								1.000000	.352828
X(9)									1.000000

Variable	X(10)	X(11)	X(12)	X(13)	X(14)	X(15)	X(16)	X(17)
X(1)	.111848	.027989	.054207	.065212	-.044232	-.002002	.003746	-.016654
X(2)	.108775	.049753	.071546	.067708	-.036764	.016383	.021988	.001884
X(3)	.114301	.045511	.071067	.074892	-.037000	.014567	.020381	-.003036
X(4)	.028341	-.002918	.009783	.077151	-.041036	.014953	.012484	-.014813
X(5)	.114911	.055248	.075092	.062911	.104289	.024741	.030262	.012260
X(6)	.047581	.023103	.035498	.094626	-.025191	.040955	.038399	.006647
X(7)	.066836	.033366	.048776	.101697	-.022408	.044007	.043514	.011287
X(8)	.148269	.094928	.113939	.129103	.003716	.071202	.076737	.070297
X(9)	-.233358	-.187570	-.195809	-.173146	-.217012	-.152921	-.158738	-.161196
X(10)	1.000000	.943799	.964810	.942783	.732270	.897700	.910226	.905833
X(11)		1.000000	.996198	.992334	.771024	.990962	.994673	.991545
X(12)			1.000000	.987850	.769733	.976722	.983320	.978209
X(13)				1.000000	.745699	.987577	.990341	.987688
X(14)					1.000000	.757916	.760495	.742082
X(15)						1.000000	.999254	.997884
X(16)							1.000000	.998001
X(17)								1.000000

N=60

TABLE 8--(Continued)

The Coefficients of Variation $V = \frac{\sigma}{\bar{X}}$, are:

V_1 = 151.8%	V_7 = 199.2%	V_{13} = 331.6%
V_2 = 134.4%	V_8 = 136.7%	V_{14} = 352.5%
V_3 = 142.7%	V_9 = 106.9%	V_{15} = 449.4%
V_4 = 260.2%	V_{10}= 262.1%	V_{16} = 436.2%
V_5 = 134.2%	V_{11}= 356.2%	V_{17} = 467.9%
V_6 = 218.5%	V_{12}= 331.1%	

Rank Correlation Coefficient Matrix for Absolute "Welfare Losses"

Variable	X(1)	X(2)	X(3)	X(4)	X(5)	X(6)	X(7)	X(8)
X(1)	1.000000	.870464	.881856	.909030	.752376	.818005	.810892	.762767
X(2)		1.000000	.966046	.933537	.758933	.883801	.874799	.766213
X(3)			1.000000	.924590	.759655	.894860	.861295	.779772
X(4)				1.000000	.793165	.861517	.870853	.836010
X(5)					1.000000	.827952	.864296	.762156
X(6)						1.000000	.943595	.808614
X(7)							1.000000	.857794
X(8)								1.000000

N=60

absolute losses and the relative losses are rather low: indeed, even negative in some cases.[1]

To give the reader a more complete and detailed picture of what we have tried to do, as well as providing some information perhaps useful for other researchers for other purposes, we have shown in Table 9 an industry-by-industry breakdown of our estimated losses using profit rate Method I. This table shows how the losses for each industry change as we make successive adjustments. In Appendix D, we have included only the unadjusted and fully adjusted industry-by-industry figures estimated by Methods II, III, V-VIII, as well as all intermediate adjustments under Method IV.

Returning now to Table 7, we can see that our "welfare loss" estimates range from roughly $4 to $31 billion or from one per cent to 8 per cent of national income. Compared with Harberger-Schwartzman estimates of from one-thirteenth to one-tenth of one per cent of national income, these are rather large figures. The figure most comparable to their estimates would be Method I, fully adjusted, unity elasticity.[2] The estimate turns out to be about $7.2 billion or 1.9% per cent of national income (a non-trival change of magnitude in itself). From our standpoint, we feel that any one of the after-corporation tax, completely adjusted with industry-by-industry

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[1]It would not have been worthwhile to show the partials of one profit method on another as the high intercorrelations made the matrix approach singularity, i.e., the ith variable to be added was found to be approximately a linear combination of the previous i-1 variable. This same multicollinearity shall prevent us from showing partials on different elasticities, concentration ratios, etc.

[2]Actually he made no adjustments for royalties.

TABLE 9

INDUSTRY-BY-INDUSTRY "WELFARE LOSSES" FOR PROFIT METHOD I INCLUDING ALL INTERMEDIATE ADJUSTMENTS*

Industry	Unadjusted (U) Profit Rates		Adjusted for Intangibles (I)		Adjusted for (I) and Royalties (R)		Adjusted for (I), (R) and Advertising (A)	
	$\eta = 1$	η_L	$\eta = 1$	η_L	$\eta = 1$	η_L	$\eta = 1$	η_L
1. Agriculture, forestry and fisheries	131,778	1,469,836	132,674	1,474,825	143,078	1,531,564	167,100	1,655,146
2. Metal mining	11,947	113,093	11,637	111,615	12,206	114,313	12,277	114,645
3. Bituminous coal and lignite mining	4,171	70,732	4,156	70,610	4,348	72,217	4,470	73,229
4. Crude petroleum and natural gas	29,064	292,815	28,091	287,870	29,289	293,941	31,080	302,800
5. Mining and quarrying of non-metallic minerals and anthracite mining	10	3,137	25	5,056	41	6,482	125	11,362
6. Construction	24,626	784,619	24,749	786,582	25,489	798,260	33,469	914,720
7. Beverage industries	436	42,075	460	43,222	526	46,242	14,923	246,243
8. Food and kindred products	423	101,235	441	103,352	531	113,432	14,148	585,250
9. Tobacco manufacturers	65	12,125	65	12,204	90	14,283	5,595	112,841
10. Textile mill products	4,103	166,477	4,103	166,482	4,393	172,252	7,095	218,920
11. Apparel and other finished products made from fabrics and similar materials	36	14,190	38	15,264	50	17,529	969	77,128
12. Lumber and wood products except furniture	500	46,259	680	53,972	780	57,770	1,112	68,981
13. Furniture and fixtures	3	2,944	5	3,555	9	4,808	573	38,095
14. Paper and allied products	563	55,987	574	56,523	704	62,951	2,115	108,474
15. Printing, publishing, and allied industries	469	55,177	579	61,291	667	65,774	1,862	109,930
16. Chemicals and allied industries	252	55,517	299	60,541	442	73,597	23,219	533,420
17. Petroleum refining and related industries	36,176	809,850	34,299	788,563	36,309	811,343	44,706	900,279
18. Rubber and miscellaneous plastic products	180	24,794	182	24,916	220	27,418	2,041	83,470

TABLE 9--(Continued)

Industry	Unadjusted (U) Profit Rates		Adjusted for Intangibles (I)		Adjusted for (I) and Royalties (R)		Adjusted for (I), (R) and Advertising (A)	
	$\mathcal{N}=1$	$\mathcal{N}_L$	$\mathcal{N}=1$	$\mathcal{N}_L$	$\mathcal{N}=1$	$\mathcal{N}_L$	$\mathcal{N}=1$	$\mathcal{N}_L$
19. Leather and leather products	172	18,060	173	18,096	193	19,106	870	40,582
20. Stone, clay, and glass products	34	12,962	38	13,622	70	18,426	624	55,148
21. Primary metal industries	4,167	237,238	4,186	237,769	4,720	252,485	6,942	306,207
22. Fabricated metal products (including ordnance) except machinery and transportation equipment	935	93,238	952	94,101	1,099	101,061	3,720	185,962
23. Machinery, except electrical and transportation equipment	684	94,875	729	97,949	919	109,916	4,740	249,667
24. Electrical machinery,equipment and supplies	73	27,265	90	30,333	135	37,189	4,549	215,572
25. Transportation equipment except motor vehicles	9,265	271,698	9,325	272,574	9,587	276,376	11,042	296,612
26. Motor vehicles and motor vehicle equipment	929	105,335	977	107,982	1,143	116,834	3,977	217,904
27. Professional, scientific, and controlling instruments; photography and optical goods; watches and clocks	20	7,594	27	8,817	44	11,167	2,099	77,265
28. Other manufacturing	748	53,787	756	54,071	828	56,579	2,865	105,255
29. Transportation	145,772	1,529,379	145,387	1,527,362	152,948	1,566,574	167,984	1,641,773
30. Communication	11,684	275,051	11,847	276,962	13,275	293,182	16,634	328,177
31. Electric and gas companies and systems	146,795	1,097,966	146,839	1,098,134	156,602	1,134,049	162,015	1,153,483
32. Water supply and other sanitary services	7,575	37,911	7,566	37,866	8,029	39,030	8,123	39,257
33. Groceries and related products	198	57,378	202	58,015	221	60,726	950	125,799
34. Electrical goods, hardware, and plumbing and heating equipment	73	22,852	75	23,202	94	26,049	573	64,244

TABLE 9--(Continued)

Industry	Unadjusted (U) Profit Rates		Adjusted for Intangibles (I)		Adjusted for (I) and Royalties (R)		Adjusted for (I), (R) and Advertising (A)	
	$\mathcal{N} = 1$	$\mathcal{N}_L$	$\mathcal{N} = 1$	$\mathcal{N}_L$	$\mathcal{N} = 1$	$\mathcal{N}_L$	$\mathcal{N} = 1$	$\mathcal{N}_L$
35. Other wholesalers	861	208,066	891	211,572	1,056	230,454	6,196	558,266
36. Food	3,031	274,936	3,096	277,881	3,253	284,843	9,634	490,190
37. General merchandise	122	39,849	126	40,475	182	48,763	178	48,195
38. Apparel and accessories	172	31,826	179	32,445	217	35,707	5,320	176,926
39. Furniture, home furnishings, and equipment	16	8,705	21	9,863	37	13,189	5,957	168,104
40. Automotive dealers and gasoline service stations	19	21,787	22	23,727	43	32,915	2,693	261,624
41. Eating and drinking places	9,193	256,286	9,556	261,300	9,831	265,032	15,389	331,597
42. Building materials, hardware, and farm equipment	235	38,748	238	38,968	294	43,302	1,368	93,400
43. Other retail stores	4,823	249,663	5,083	256,308	6,993	87,703	14,736	436,393
44. Wholesale and retail trade not allocable	105	59,812	112	30,852	5,396	264,068	1,671	119,130
45. Banking	865,763	799,413	881,804	806,785	147	35,281	1,105,018	903,143
46. Credit agencies other than banks	3,257	59,852	3,446	61,571	927,337	827,353	20,993	151,958
47. Holding and other investment companies	259,917	126,403	265,103	127,657	325,497	141,453	332,932	143,059
48. Security and commodity brokers, dealers, exchanges, and services	20,423	133,057	20,679	133,890	22,493	139,639	57,591	223,439
49. Insurance carriers	3,632	190,834	3,666	191,724	4,233	206,006	5,239	229,188
50. Insurance agents, brokers, and service	109,974	433,321	110,062	435,459	111,682	436,674	123,762	459,682
51. Real estate except lessors of real property other than buildings	1,501,999	2,034,105	1,498,593	2,031,797	1,582,567	2,087,948	1,806,252	2,230,631
52. Lessors of real property, except buildings	1,209,973	161,487	1,206,589	161,261	1,258,229	164,675	1,262,879	164,979

TABLE 9--(Continued)

Industry	Unadjusted (U) Profit Rates		Adjusted for Intangibles (I)		Adjusted for (I) and Royalties (R)		Adjusted for (I), (R) and Advertising (A)	
	$\pi = 1$	π_L	$\pi = 1$	π_L	$\pi = 1$	π_L	$\pi = 1$	π_L
53. Hotels, rooming houses, camps, and other lodging places	26,065	227,589	25,942	227,052	27,306	232,942	39,448	279,983
54. Personal services	47,470	422,295	48,036	424,805	48,887	428,550	65,161	494,764
55. Business services	17,057	285,934	17,409	288,870	17,800	292,095	23,160	333,182
56. Automotive repair services, and garages, and other repair services	20,091	249,964	20,239	250,883	20,729	253,905	28,104	295,640
57. Motion pictures	5,720	86,529	5,509	84,918	5,783	87,004	13,621	133,528
58. Amusement and recreation services, except motion pictures	150	14,487	291	20,178	328	21,418	2,420	58,150
59. Other services	1,402,974	3,456,046	1,405,838	3,459,572	1,409,326	3,463,860	1,520,728	3,598,160
60. Nature of business not allocable	1,096	26,143	1,123	26,456	1,189	27,230	1,758	33,110
TOTAL "WELFARE LOSS"	6,088,064	17,931,308	6,106,883	17,999,768	6,399,913	18,554,571	7,236,797	23,674,258

*This is computed for all business establishments--Corporations (C), Partnerships (P), and Sole Proprietorships (SP)- using after-C tax income of C with untaxed P and SP income and estimating P, SP average total capital figures by utilizing P balance sheet--the profit rates for C are average returns over the five-year period 1956-1957 to 1960-1961, while they are for four-year period 1957-1958 to 1960-1961 for P, SP.

SOURCE: IRS Statistics of Income, Corporation Income Tax Returns, and Business Income Tax Returns for the relevant years.

elasticities, estimates are the most relevant for estimating efficiency losses. These estimates run from $20.9 to $26.4 billion or 5.4-6.2 per cent of national income. We discussed in an earlier chapter what we felt were the analytical and empirical drawbacks of the unity assumption. To be accurate, we can trace our rather sharp increase over the Harberger estimate to two main sources: the change in scope and the change in elasticity assumption. Of course, there were also a number of other, less-important, influences.

To get a better idea of the order of correlation between Harberger's estimates for the 1924-1928 period and our estimates by Method I for approximately the 1956-1967--1960-1961 period, as well as to establish a number of interesting sidelights, we have included our product moment correlation results in Table 10. We were able to compare our findings by lumping the seventy-three manufacturing subindustries Harberger used into our twenty-two industry SIC schema. It should be noted that a number of our correlations are spurious, in that one of the arguments is partially composed of one of the others, e.g., X(10) and X(3). However, to preserve the symmetry of the correlation matrix we have presented the entire results.

The important correlations for our comparison are $R_{10,9}$ and $R_{11,12}$--the relationship of Harberger's "excess" profit rate estimates, X(9), to our estimates, X(10), and his estimated "welfare losses" divided by sales, X(11), to our "welfare losses" divided

TABLE 10

PRODUCT MOMENT CORRELATION OF HARBERGER'S AND OUR ESTIMATED "EXCESS" PROFITS AND "WELFARE LOSSES"

Variables

X(1) = Harberger's "Excess" Profits in Manufacturing, 1924-1928
X(2) = Harberger's Total Capital in Manufacturing, 1924-1928
X(3) = Our Estimated "Excess" Profits in Manufacturing by Profit Method I--1956-1957 to 1960-1961
X(4) = Our Estimated Average Total Capital in Manufacturing for 1956-1957 to 1960-1961
X(5) = Harberger's "Welfare Losses" in Manufacturing 1924-1928
X(6) = Sales in Manufacturing for 1928
X(7) = Our Estimated "Welfare Losses" in Manufacturing by Profit Method I--1956-1957 to 1960-1961
X(8) = Average Business Receipts in Manufacturing 1956-1957 to 1960-1961
X(9) = Harberger's "Excess" Profit Rate
X(10) = Our "Excess" Profit Rate
X(11) = Harberger's "Welfare Losses"/Sales
X(12) = Our "Welfare Losses"/Average Business Receipts

Zero Order Product Moment Correlation Coefficient Matrix

Variable	X(1)	X(2)	X(3)	X(4)	X(5)	X(6)
X(1)	1.000000	-.616255	.587126	.120896	-.446703	-.265541
X(2)		1.000000	-.717964	-.145211	.772887	.711638
X(3)			1.000000	.103393	-.186390	-.396152
X(4)				1.000000	-.115105	.451724
X(5)					1.000000	.664184
X(6)						1.000000

TABLE 10--(Continued)

Variable	X(7)	X(8)	X(9)	X(10)	X(11)	X(12)
X(1)	-.441253	-.239747	.711170	.674627	-.070533	-.447619
X(2)	.694434	.540275	-.222223	-.682370	.144954	.624129
X(3)	-.790449	-.437714	.336791	.851570	.354461	-.622482
X(4)	-.088873	-.210303	.387086	.146552	-.153667	-.117309
X(5)	.177118	.443364	-.096286	-.285179	.390534	.166317
X(6)	.355037	.385605	.105811	-.395388	-.034936	.291010
X(7)	1.000000	.420335	-.250654	-.598518	.131415	.948111
X(8)		1.000000	-.241765	-.322826	.167348	.340154
X(9)			1.000000	.423297	-.069205	-.312842
X(10)				1.000000	.323404	-.499663
X(11)					1.000000	.321722
X(12)						1.000000

$R_{10,9}$ $R^2 = .18$, $\bar{R}^{2*} = .14$
$R = .42$, $\bar{R} = .37$

Using two tailed t-tests, $R_{10,9}(R_{11,12})$ is significantly different from zero at better than 5% (20%) level.

$R_{11,12}$ $R^2 = .10$, $\bar{R}^2 = .06$
$R = .32$, $\bar{R} = .24$

N = 22, degrees of freedom (d.f) = 20

*Bars indicate adjusted for d.f.

The Coefficients of Variation, $V = \frac{\sigma}{\bar{X}}$ are:

V_1 = 3,699.1%	V_4 = 228.4%	V_7 = 283.8%	V_{10}= 224.0%
V_2 = 130.7%	V_5 = 148.6%	V_8 = 712.4%	V_{11}= 112.3%
V_3 = 330.6%	V_6 = 100.0%	V_9 = 318.6%	V_{12}= 202.9%

SOURCE: See Table 7 and Appendix A for definition and discussion.

by business receipts, X(12).[1] Only the first of these two correlations, $R_{10,9}$, is different from zero at any reasonable level of significance, 5%. The other is significant only at the 20% level--both being for two-tailed t tests, where t refers to "Student's" distribution. We divided the losses by sales (or business receipts) to remove the scale factor. For, we did not want the mere growth in size of an industry and hence the possible growth in absolute size of the "welfare losses"--proportionate losses remaining the same--to indicate a growth in losses. Later, we shall discuss changes in absolute losses, but for now we are concerned with relative losses in our estimates vis-a-vis Harberger's. For what it is worth, using absolute, rather than relative, "excess" profits ("welfare losses") yields much higher (lower) correlations between his estimates and ours.

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[1]Since we shall be making use of both $\bar{R}^2$ (read R bar squared) as well as R^2 (the coefficient of multiple determination), it is useful to spend a moment distinguishing between these two. Since R^2 is defined as the sum of squares "explained by" (due to) the regression divided by the total sum of squares, $100 \cdot R^2$ is the percentage of the sum of squares of Y "explained by" (or associated with) the independent variables. Since $\bar{R}^2 = 1-(1-R^2)\frac{N-1}{N-k-1}$ (where N = number of observations, k = number of independent variables; alternatively we may think of the latter term as $\frac{N-1}{N-m}$ where m = number of degrees of freedom used up in fitting the regression equation), it is smaller than R^2 for any finite sample size. (Incidentally, if desired, the coefficients of partial correlation may be adjusted using the same formula). All this means that R (R^2) is biased upward for small samples while $\bar{R}$ (or $\bar{R}^2$) is unbiased. In terms of our previous phraseology, we may say that since $\bar{R}^2$ gives the exact split of variance into explained and unexplained variance whereas R^2 splits the sum of squares, $100 \cdot \bar{R}^2$ is the percentage of the variance of Y "explained by" the independent variables. In simple terms, we may say that since adding another independent variable to an equation can only increase, or at the limit leave unchanged, R^2, a researcher could add variables ad infinitum until some "desired"--presumably high--"goodness of fit" was obtained. Hence, we want to

Of course, for our more refined estimates, the correlations between our respective estimates would be much lower. Before moving on there are a number of interesting relationships indicated in the preceding matrix that are worth spending a moment on;[1] for instance, the negative relationship between the "welfare loss" ratio and the "excess" profit ratio (and absolute amounts) and with the average total capital variable. Remembering that the minus profit rates are computed by subtracting from an overall average, i.e., the underproduction in minus industries is relative to overproduction in "high" profit industries, the relationship is not so surprising. In other words, since our individual "welfare" estimates show the amount by which consumer "welfare" would increase if that industry either acquired or divested itself of the appropriate amount of resources, the negative sign merely indicates that the desired minus resource reallocation is not exactly matched by the plus transfers in this particular case--by some other estimating methods we get the opposite sign. The reversal of sign in one case when "welfare losses" are in absolute terms for the second relationship is also suggestive that the negative sign may be ambiguous. The partial correlation coefficients indicated that the positive correlation of "welfare losses" and sales (business receipts) combined with the high negative correlation

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attach a "cost" to the addition of variables to weigh against the "benefit" of a higher per cent of "explanation." We do this by decreasing the degrees of freedom by one each time we add a variable. Thus, an enlarged $\bar{R}^2$ is more meaningful than an enlarged R^2 and corrects the upward bias of R^2 for small samples.

[1]The reader can gain some insight from the measure of relative dispersion, the coefficients of variation or the estimated standard deviations divided by the estimated means, which we have included at the bottom of Table 10.

of sales and "excess" profits explains part of the sign as well. The "partials" between "welfare losses" and "excess" profits becomes less negative as we add average total capital (ATK) and business receipts to the equation. It is also interesting to note that the "partial" between ATK and "welfare losses" changes from negative to positive after business receipts is added to the equation with "excess" profits. Similarly, the "partial" between "welfare losses" and "excess" profits falls slightly as ATK is added. Nonetheless, the implication that the smaller the industry, in asset terms, the larger the "welfare losses" (in absolute or ratio terms) is certainly interesting though hardly conclusive. For one thing, since the large firms may be able to hide "quasi-monopoly" elements better, our adjusted figures may be more relevant. And, of course, such things as economies of scale are relevant in this context.

In Table 11, we have shown the rank correlation coefficients for the two estimates of absolute "welfare losses" and "excess" profits.

The correlation for ranks appears more significant than the product moment results. The reader should be careful to note, although $R_{3,4}$ has approximately the same value as $R_{11,12}$ in Table 10, we are now comparing absolute "welfare losses" and not "welfare losses" as a percentage of sales--the former, $R_{7,5}$, before was only .18 not .32. However, this suggests that the significance level for the latter would also be higher. Incidentally, the negative correlation between "excess" profits and "welfare losses" for the zero order coefficients disappears for one of the "partials." Thus, $R_{1,3.24}$ [variable 1 on 3 with the effects of (dependence on) 2,4 "taken out"]

TABLE 11

RANK CORRELATION OF HARBERGER'S AND OUR ESTIMATED "EXCESS" PROFITS AND "WELFARE LOSSES"

Variables

X(1) = Harberger's "Excess" Profits in Manufacturing Corporations for 1924-1928
X(2) = Our "Excess" Profits for Manufacturing Establishments for 1956-1957 to 1960-1961
X(3) = Harberger's "Welfare Losses" in Manufacturing Corporations for 1924-1928
X(4) = Our "Welfare Losses" for Manufacturing Establishments for 1956-1957 to 1960-1961

Zero Order Product Moment Correlation Coefficient Matrix

Variable	X(1)	X(2)	X(3)	X(4)
X(1)	1.000000	.607002	.047995	-.386787
X(2)		1.000000	.086392	-.437606
X(3)			1.000000	.314512
X(4)				1.000000

$R_{1,2}$	$R^2 = .37$ $\bar{R}^{2*} = .34$	*Bars indicate adjusted for d.f.
	$R = .61$ $\bar{R}^{2*} = .58$	
$R_{3,4}$	$R^2 = .10$ $\bar{R}^2 = .06$	
	$R = .31$ $\bar{R} = .23$	

N = 22, 20 d.f.

Using two tailed t-tests $R_{1,2}$ ($R_{3,4}$) is significantly different from zero at better than 1% (20%) level.

SOURCE: By Profit Method I described in Table 7 and Appendix A.

is positive but not significant while $R_{1,4.2}$ is negative and insignificant.

Finally, as a synthesis of much of what we have been doing we want to ascertain the relationship between eight different two-digit concentration ratios (hereafter CR), which we estimated from available four-digit data, and some of our previous results. The CR were based upon the amount of value-added and the amount of employment accounted for by the 4, 8, 20, and 50 largest firms. A full description of our estimation techniques and our resultant CR is contained in Appendix E. It should be noted that although the source for these estimates was quite good, the data are only for twenty two-digit manufacturing industries, or about a third of our results for all business establishments. Thus, any conclusions drawn from the CR information must be of a more tentative nature than our earlier results.

Since CR are the proxy variables most employed by experts in industrial organization for determining the presence or absence of monopoly power, we have correlated the CR with some of our findings on the magnitude of the misallocation of resources in the economy. Since in the last analysis, it is the size of the malallocative effects that is important in social control and not the CR per se, the correlation will provide us with a check on the latter's efficacy in terms of the former. However, it is important to keep in mind that these CR are merely a convenient method for approximating the <u>proportional</u> misallocation in various industries. We say proportionate misallocation since these CR are not trying to measure the deleterious effects in any absolute sense but more along Lerner's (P-MC)/P index

basis. This means that we may expect the relationship of "welfare losses"/business receipts to be more significant on CR than the absolute losses.

Of course, one could turn the emphasis around if he felt the CR were more reliable estimators of the misallocation problem and determine which of our estimates appears the more accurate index of CR. Our results allow for investigation of both of these divergent lines of thought. We have included zero order correlation on the above mentioned variables in Table 12.

First of all, as expected the CR themselves are highly inter-correlated--the lowest simple correlation being approximately .90.[1] Secondly, and more importantly, the correlation of CR and profit rates by Method I, fully adjusted (FA), assuming unity elasticity ($\eta = 1$), has a higher R (excluding, of course, the trivial diagonal elements in our matrix, i.e., auto relations as X(9) on itself--all our subsequent comments shall retain this assumption), than does the unadjusted (U) estimates. Assuming, as we shall at this juncture, that the CR indicates the "true" efficiency losses, we may be encouraged that our U and FA profit rates have such a relationship--for much of our work has been involved with making these adjustments. Equally encouraging and perhaps most relevant of all is the Lerner index relationships. These are more relevant than even the "welfare losses" (absolute or divided by business receipts) since the "welfare losses" show the amount by which consumers' "welfare" is reduced by industries having either too many or

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[1] This multicollinearity prevents us from investigating the "partials."

TABLE 12

PRODUCT MOMENT CORRELATIONS OF TWO-DIGIT CONCENTRATION RATIOS, PROFIT RATES, LERNER'S INDEX OF MONOPOLY POWER AND "WELFARE LOSSES"

Variables

X(1) = 2-digit value-added concentration ratio for 4 largest firms in 1958
X(2) = 2-digit value-added concentration ratio for 8 largest firms in 1958
X(3) = 2-digit value-added concentration ratio for 20 largest firms in 1958
X(4) = 2-digit value-added concentration ratio for 50 largest firms in 1958
X(5) = 2-digit employment concentration ratio for 4 largest firms in 1958
X(6) = 2-digit employment concentration ratio for 8 largest firms in 1958
X(7) = 2-digit employment concentration ratio for 20 largest firms in 1958
X(8) = 2-digit employment concentration ratio for 50 largest firms in 1958
X(9) = Profit rate for 1956-1957 to 1960-1961 for all business establishments, unadjusted*
X(10) = Profit rate for 1956-1957 to 1960-1961 for all business establishments, fully adjusted*
X(11) = Lerner's Index of monopoly power assuming an elasticity of unity and using unadjusted data**
X(12) = Lerner's Index of monopoly power assuming an elasticity of unity and using fully adjusted data**
X(13) = Lerner's Index of monopoly power assuming an elasticity of unity and using fully adjusted data*
X(14) = Unadjusted "Welfare Losses," assuming an elasticity of unity*
X(15) = Unadjusted "Welfare Losses," assuming an elasticity by Lerner-Robinson*
X(16) = Fully adjusted "Welfare Losses," assuming an elasticity of unity*
X(17) = Fully adjusted "Welfare Losses," assuming an elasticity by Lerner-Robinson*
X(18) = Average business receipts for all business establishments, 1956-1957 to 1960-1961
X(19) = X(14)/ X(18)
X(20) = X(15)/ X(18)
X(21) = X(16)/ X(18)
X(22) = X(17)/ X(18)

N=60

*Using Profit Method I with minus adjustment.
**Using Profit Method 1 without minus adjustment.

SOURCE: See definitions in Table 7 and Appendix A's "Profit Rate and Welfare Loss Adjustments."

TABLE 12-(Continued)

Zero Order Product Moment Correlation Matrix

Variable	X(1)	X(2)	X(3)	X(4)	X(5)	X(6)	X(7)	X(8)	X(9)	X(10)	X(11)
X(1)	1.000000	.989475	.940682	.889636	.986137	.973196	.932941	.897854	.414540	.509423	.350842
X(2)		1.000000	.975919	.935509	.986231	.992658	.969104	.941243	.347678	.436300	.250223
X(3)			1.000000	.986112	.962269	.984776	.993576	.983559	.267161	.320993	.121650
X(4)				1.000000	.922048	.950591	.980511	.992488	.198243	.236551	.046918
X(5)					1.000000	.987971	.964211	.934722	.428071	.466002	.322194
X(6)						1.000000	.987514	.962622	.359940	.409735	.232082
X(7)							1.000000	.990390	.289776	.308521	.131613
X(8)								1.000000	.226399	.240697	.072941
X(9)									1.000000	.849484	.906486
X(10)										1.000000	.913090
X(11)											1.000000

Variable	X(12)	X(13)	X(14)	X(15)	X(16)	X(17)	X(18)	X(19)	X(20)	X(21)	X(22)
X(1)	.534827	.530163	.067119	.097358	.195322	.200611	.051336	.137347	.186992	.607226	.556033
X(2)	.453826	.479720	.188213	.217005	.312932	.304937	.109260	.243971	.276674	.689654	.616810
X(3)	.318075	.368992	.333857	.367837	.458415	.447607	.220552	.372781	.377598	.723634	.637846
X(4)	.228229	.287812	.365287	.407971	.481064	.476938	.246857	.406808	.423916	.703119	.641288
X(5)	.464589	.491095	.164217	.197714	.270802	.265374	.076982	.244472	.292427	.623529	.583994
X(6)	.416312	.473275	.258988	.284559	.368406	.341149	.106895	.318608	.342645	.716855	.636805
X(7)	.306549	.383826	.345440	.375817	.444969	.413940	.158485	.399691	.414395	.729033	.647643
X(8)	.240954	.327811	.357236	.395262	.450925	.425693	.167063	.412320	.445530	.714411	.660202
X(9)	.703039	.735797	-.143531	-.130634	-.125907	-.116492	-.138293	.063547	.098520	.115049	.140431
X(10)	.928941	.829272	-.313787	-.322162	-.114245	-.069475	-.078762	-.182251	-.138831	.236403	.267863
X(11)	.856309	.800187	-.499495	-.491005	-.398098	-.347005	-.283752	-.317543	-.180538	-.052322	.094921
X(12)	1.000000	.894907	-.495258	-.515292	-.217281	-.199234	-.206624	-.408636	-.344856	.236379	.234550
X(13)		1.000000	-.294781	-.295056	-.078728	-.114478	-.258016	-.175348	-.056137	.416448	.419116
X(14)			1.000000	.979286	.856607	.745393	.425395	.943915	.732216	.567940	.352427
X(15)				1.000000	.857490	.794993	.518486	.946271	.785029	.553045	.383538
X(16)					1.000000	.947992	.651018	.767900	.551484	.713467	.461572
X(17)						1.000000	.835108	.665995	.503383	.599414	.432482
X(18)							1.000000	.324149	.142278	.165961	.019534
X(19)								1.000000	.869122	.585337	.437083
X(20)									1.000000	.551267	.674780
X(21)										1.000000	.817619
X(22)											1.000000

too few resources. This means that an industry could have large losses and be highly competitive since its below average profit rate minus the overall profit rate, the per cent of underpricing, yields a negative figure. But when squared for determining 'welfare losses" it may yield a higher "loss" than a less competitive firm--albeit for different reasons. In short, big 'welfare losses" are not necessarily indicative under our model, that a firm is highly monopolistic. What is more relevant for comparison with evil effects of monopoly positions as reflected in CR is the percentage that prices are too "high" or too "low" compared with an optimal allocation of resources, i.e., the Lerner index under our assumptions. This latter index retains the sign of the percentage deviations so that we may usefully compare these with CR. Since some readers will undoubtedly be interested in the ranking of industries by this criterion, we have included our industry rankings, from highest to lowest, computed from profit Methods I and IV for FA, $\eta = 1$ data in Appendix F.

Returning to Table 12, we find that the Lerner index, without minus adjustments,[1] based on FA profit rates, $\eta = 1$, has, without exception, a higher relation to CR than does U profit rates. This again reaffirms our belief that the adjusted results are much more realistic for determining the malallocative effects of monopoly positions. We also ran the Lerner index for the FA results, $\eta = 1$, with minus adjustment, i.e., the method we employed in computing "welfare

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[1]For a detailed description of the distinction between with and without minus adjustments, see Appendix A's section entitled "Profit Rate and 'Welfare Loss' Adjustments."

losses." As we might expect, the results are slightly less clear-cut--the with exceeds the without correlation with CR in all but one case.

Our results for absolute "welfare losses" and relative "welfare losses" follows much the same pattern as the above. That is, the FA results are more significantly related to CR than the U. The reader may spot check this rather significant difference by comparing the U results of X(14), X(15) and X(19), X(20) against the corresponding FA results of X(16), X(17) and X(21), X(22). The only result which is "negative" as far as our analysis is concerned is when our η_L estimates are less significant than the $\eta = 1$ results on CR. Except for X(14), X(15) and X(19), X(20), the coefficients are reversed from what we might expect. However, since the magnitudes are in the proper direction in the other cases mentioned above, there is the possibility that randomness could account for our unexpected results.

Turning the emphasis around, the reader can take a given estimate assuming it reflects the "true" relationship and examine the simple correlations of X(1) to X(8) to see which of the CR best estimates the "true" relationship. There does not appear that any one of the CR is "best" under all conditions. In other words, no one of the CR, say value-added of the four largest firms, always yields the largest R for the different estimates.

CHAPTER V

SUMMARY AND CONCLUSIONS

This dissertation has consisted mainly of a further development of the Harberger-Hotelling technique for the estimation of "welfare (or more accurately efficiency) losses." The further development has been concerned with extending the scope and timing of the empirical investigation and modification of the theory to permit a more realistic appraisal of the general order of magnitude.

Our investigation of the "welfare losses" in the American economy extended over approximately the 1956-57 to 1960-61 period. We first obtained estimates of profit rates for corporations (C), partnerships (P) and sole proprietorships (SP), per annum, over the five-year period 1956-57 to 1960-61 for C, and the four-year period 1957-58 to 1960-61 for P and SP as well as the average rates over this time. This was done on the basis of unadjusted data and data adjusted for royalties, intangible assets and advertising expenditures. Furthermore, the rates were computed using both before-tax and after-tax income and using both total capital and equity bases. We also combined our above results to obtain the average profit rates for all business establishments. This was the information that was eventually used in our first approximation to the "welfare losses." The rank correlations between our eight basic profit methods were quite high--$R \gtrsim .64$ being the lowest coefficient.

We discovered, by the "efficient estimators" technique (generalized least-squares) that advertising expenditures was the only variable among the reputed monopoly indices of royalties, intangible assets and advertising expenditures that was significantly related to the unadjusted profit rate. This suggests that our computation of adjusted profit rates was worthwhile. Further regressions indicated that little is lost by dropping intangibles out of the equation and while royalties and intangibles are slightly related, intangibles and advertising expenditures are never significantly related. Our a priori suspicion that royalties and profit rates may be negatively related because of competitive "returns - equalizing" forces in the capital marketwas substantiated.

We further observed the amount of resources that it would be necessary to transfer to equalize profit rates (assuming unity elasticity) ranged from roughly 3.9 to 8.0 per cent of national income as compared to Harberger's estimated 1 1/2 - 1 3/4 per cent of national income. However, before we could utilize this information for estimating "welfare losses" we needed to know something about demand elasticities.

We estimated elasticities for all our industries by two different methods. One method which employed advertising intensity data yielded upper bound estimates which were of little use for our purposes. However, the estimates which utilized the fact that the reciprocal of Lerner's index of monopoly power yields an estimate of actual (not upper bound) elasticity, provided we

have a profit-maximizing firm in equilibrium, were an important addition to our analysis. We estimated these elasticities separately for all our "welfare loss" estimates since changes in "excess" profits affect these estimates. The product moment and more especially the rank correlation coefficients between own elasticities were quite high, i.e., the relationship was significant as between different estimates of either the advertising or marginal estimation method separately. However, the negative correlations between the different approaches suggests that we must be careful about the utilization of the advertising approach for even relative ranking purposes.

Utilizing our estimated elasticities as well as employing the Harberger assumption of unity elasticity and the Schwartzman assumption of an elasticity of two, we calculated "welfare losses" that range from one to eight per cent of national income. Previous studies placed the losses in manufacturing around one-tenth to one-thirteenth of one per cent of national income. Even using approximately the same methods and assumptions as Harberber, we get losses in the vicinity of two per cent of national income for the whole economy. This suggests that either the losses have increased in our investigated time period relative to his period or that our estimation procedure is more inclusive.

Further investigation of Harberger's "excess" profits and relative "welfare losses" with the estimate which most nearly paralelled his, we found a significant relationship between only the first of these variables. To impart some flavor to the reader as to

how the magnitudes change as the various adjustments are carried out, we have shown some detailed, step-by-step, estimations by the two most realistic profit methods. We further noted that although most of the "welfare losses" are highly interrelated, the absolute "welfare losses" and the relative "welfare losses" (i.e., "welfare losses" divided by business receipts) had a low correlation--indeed, negative in some cases. The rank correlations on the absolute "welfare losses" were somewhat higher. An observed negative relationship between "excess" profits and "welfare losses" was explainable on the grounds that our estimates show the amount by which consumer "welfare" would increase if that industry acquired or divested itself of the appropriate amount of resources. Hence, we cannot interpret large "welfare losses" in a given industry as a sign that the industry is highly monopolistic. It may be that it is highly competitive. The more relevant figure for ranking of industries by monopoly power is Lerner's index. We have computed and shown such a ranking. Also of note is the negative correlation between absolute and relative "welfare losses" and the size of the total capital base. The implication that the smaller the industry, in asset terms, the larger the "welfare losses" is certainly interesting. This may be partially explained by the fact that larger firms may be able to hide "quasi-monopoly" elements and may have economies of scale.

We estimated average two-digit concentration ratios (CR) by utilizing available four-digit information. This was done for value-added and employment data for the 4, 8, 20 and 50 largest

firms. We needed the two-digit estimates since most of our data were in this form. (Of course, the intercorrelations among the CR were quite high--.90 being the lowest coefficient). Since these CR are presumed to reflect the degree of monopoly power in an industry we wanted to correlate these CR with a number of our findings.

Correlations of CR with fully adjusted data, whether they be for profit rates, welfare losses or Lerner's index, yielded higher results than unadjusted data. This is in line with our a priori expectations and justify our adjustment process--assuming the CR are accurate indices of the real monopoly power. High correlation of Lerner's index and CR was perhaps the more significant result since high "welfare losses" per se in a particular industry are not necessarily indicative of high concentration in that industry. It is also important to note that since both CR and Lerner's index purport to measure percentage deviations, their relationship is more significant than CR on, say, absolute "welfare losses." On the negative side, it should be mentioned that the marginal elasticity estimates did not always yield higher correlation coefficients on CR than the unity elasticity estimates. However, for most of the findings the expected results were obtained.

So as to not get lost amongst the wealth of secondary and even peripheral findings and conclusions, we want to reiterate that the most significant result, as far as the hypothesis we are testing here, is that the estimated "welfare losses" in the American economy are

of a significantly different and higher order of magnitude than previous studies had indicated.

Using what appears to be the most realistic estimates--based on after-tax income, fully adjusted with industry-by-industry elasticity data--we obtain a "welfare loss" of roughly six per cent of national income.

We say all of this subject to all the theoretical and statistical qualifications we discussed at the end of Chapter IV. Any interpretation or evaluation of our results or conclusions should be done in light of these shortcomings. Without going into these in any detail, we want to single out the imperfection of data problem as being especially unfortunate. This imperfection forces us to neglect certain elements which may be of a quite important character. The bias which may result from the imperfect nature of the existing data cannot be predicted a priori with any great accuracy. However, we do want to at least speculate on the relative magnitudes of some of the factors we neglected.

Although it is true in general that we tried to be more moderate in our estimates than Harberger, who tried to overestimate the losses on every occassion, on balance, we probably leaned toward overestimation. However, we feel this tendency is more than swamped by the fact that most of the more or less arbitrary adjustments which we neglected which would lead to underestimation of the losses far surpass in importance the items we neglected that would lead to overestimation of the loss. In particular, we feel

the underestimation caused by neglect of mergers, redistributional effects and monopoly gains to other factors would greatly increase our losses if it were possible to calculate them--net, of course, of the more important balancing items such as allocating but one-third of profits to monopoly power (in Harberger's case the change from an 100 per cent allocation to a one-third distribution to the highest profit industries until exhausted changed his estimates very little), constant costs and unity elasticity assumption. This last consideration is also reduced when we recall that elasticity only enters into our loss estimating equation as it is, while "excess" profit rates enter by a square of itself. Of course, we are not intimating that the magnitude of the bias resulting from the imperfect nature of the exisiting data can be predicted with any great precision a priori. However, we do feel that the direction of the bias can be speculated upon, and as indicated, we feel it is in the direction of underestimating our losses.[1]

In conclusion, we feel that the monopoly problem takes on a rather different perspective in the light of the present study. The problem of monopoly acquires aggregative significance in addition to its importance in studying particular industries. In short, monopoly does affect aggregative "welfare" in a significant way through its effect on resource allocation.

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[1] In this paper, we have not concerned ourselves with the question of how the reallocation would be carried out in practice. This is an interesting but secondary question here. For a brief taste of the lump-sum tax--subsidy, etc., methods of doing this see Joan Robinson, op. cit., Chapter 13, pp. 159-165.

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APPENDICES

APPENDIX A

MEASUREMENT AND ESTIMATION PROCEDURES

MEASUREMENT AND ESTIMATION PROCEDURES

In our analysis of the "welfare losses" we used a number of variables--some of which could only be estimated by rather crude methods. Our chief source of data was the comprehensive IRS Statistics of Income for Corporations (C) for 1956-57 to 1960-61 and Business [i.e., partnerships (P) and sole proprietorship (SP) in addition to C] for 1957-58 to 1960-61. The measurement and estimation procudeures employed on the relevant variables is discussed in the paragraphs below.

Industrial Classification

Since the industrial classification employed by IRS (basically a two-digit standard industrial classification) changed over the years studied and the fact that P and SP have different formats from C, made it necessary to reduce all three types of business establishments to a common denominator. We used the 1960-61 C industry proportions as our benchmark. When we could not establish the proper proportions for P and SP from other year's information we utilized the benchmark proportions.

Net Income

In computing profit rates, we used two different income figures for C--before-and-after corporation income taxes. This figure was then combined with the untaxed income figures of P and SP. The figures for all types of business were then more uniform in that they all neglected personal income taxes.

Capital Accounts

It was necessary to estimate capital figures for P and SP as it was for most of the balance sheet information on P and SP. Income statements were, in general, much more available and probably more reliable.

We utilized two different capital bases in computing profit rates, viz., equity (net worth or capitalization) and total capital. Under equity we included preferred and common stock, paid-in or capital surplus, surplus reserves and earned surplus and undivided profits. Total capital was computed by adding funded debt (capital borrowed from the general public and lending institutions through the sale of bonds, debentures and other forms of indebtedness--specifically, for IRS data, we included bonds, notes, mortgages of any length). Of course, in computing profit rates we used total profit, i.e., net income (net earnings after all business expenses and fixed charges including interest payments on funded debt have been deducted) plus interest payments on funded debt as the relevant income figure when we used total capital. The reason that the returns are computed to include funded debt is that these borrowed dollars perform much the same economic function as invested capital. In general, the return on total capital will be lower for most companies since earnings usually exceed the interest charged to the firm.

On both types of capital figures, we made adjustments since the data are shown for end-of-year assets rather than average (or possibly mid-year) assets. The difficulty is that when the rate of

growth of assets is very high, the rate of return is seriously underestimated. Although a constant geometric rate of increase of assets might be more plausible, we computed the return on a simple linear assumption in the following manner: Letting A_0 be the assets at the beginning, and A_1 assets at the end of the year and R be income, the average rate (AR) is $AR = R/[1/2(A_0+A_1)]$.

The capital figures for P and SP were estimated from two sources: (1) from the equity and total capital to business receipts (gross sales plus gross receipts from operations) ratios found in the available balance sheet data for P for the 1959-60 period; (2) from the total capital to business receipts ratio in small corporations for each of the years investigated.

The P Balance Sheet Approach

In this approach, we were forced to make some rather strong assumptions. First of all, balance sheet data were reported by only 44.5 per cent of the P filing income statements--although in some industries the percentages exceeded 90. So we have to assume the percentage not reporting in each industry had the same ratios as the reporting firms and "blow-up" our figures to 100 per cent in this manner. Thus, not only did we have to assume this period was representative of the other three years in P, but, we had to assume the same proportions applied to P and SP. Remember, however, that since it is the combined capital figures of C, P and SP that we are really interested in and since the known corporate sector is the largest component in most sectors, this crudeness can be somewhat justified.

The Small Corporation Balance Sheet Approach

As an alternative formulation, we have adopted the approach used by George J. Stigler in his Capital and Rates of Return in Manufacturing Industries, (National Bureau of Economic Research, 1963), pp. 7, 8, 114-118, 221, to estimate the capital of noncorporate enterprises--assuming annual industry data on sales (or business receipts) are available, as is the case. His estimate being based upon the ratio of capital to sales in small C assumes that noncorporated enterprises more closely resemble small rather than all C. It is felt that it would be undesirable simply to use the ratio found in the entire corporate sector because: (a) most noncorporate enterprises are small; (b) small corporations typically have relatively low ratios of capital to receipts--in fact, Stigler found that the ratio was almost twice as large in the asset class over $100 million as it was in the under $50,000 class. We computed the total capital to receipts ratio for the $0-25,000 total asset class and the total assets to receipts ratio for the $0-50,000 total asset class on an industry-by-industry basis for each of the four years studied. Since the former is the first enumerated class it may contain too much of a "catch-all" (residual) character. Since the ratios are significantly different, the latter is probably the more useful (we base part of this on the fact that in our brief survey this smaller asset class had what appeared to be "unreasonable" profit rates). Remember, however, although the larger the noncorporate sector the more unreliable the figure, the corporate sector usually dominates. Indeed, Stigler found only one three-digit industry dominated by the noncorporate sector--the fur-garment

industry, see ibid., p. 117. (Incidentally, no estimate of equity was made under this approach, but, we did in (1) by finding equity to total capital ratio in P).

Interest Paid

Although this information was complete for C, we had to estimate it for P and SP. Fortunately, for the 1959-60 period we had data for both P and SP. So we merely took the industry-by-industry ratio of interest paid to average total capital and made the proper multiplication to obtain our estimates. Of course, we have to again assume this period was representative.

Intangible Assets and Royalties

Here again the information on C was complete, but we had to estimate for P and SP assuming the industry-by-industry intangible assets to average total capital and royalties to net income ratios for 1959-60 period were representative and applicable to P and SP for the entire four-year period investigated.

Profit Rate and "Welfare Loss" Adjustments

In computing profit rates and hence "welfare losses," we made adjustments for intangibles, royalties and advertising. In each case we made the somewhat arbitrary assumption that each of these elements was a 100 per cent monopoly element. Therefore, in computing profit rates, our estimates became larger and larger as we made these cumulative adjustments. In using this information for estimating "welfare losses" we used a slightly different procedure.

We subtracted intangibles from the capital base and added advertising to the net income figures of each industry. This increases the industry profit rates. In the case of royalties, we subtracted them from the overall average or "normal" profit rate--alternatively, we could have employed the same method we utilized for advertising expenditures, but one was easier for computational purposes. When we came to estimating "welfare losses," we ran into some trouble as raising the profit rate of an industry earning less than "normal" profits meant the profit figure became larger as it became a smaller negative number; but, it declined in absolute value. And since the losses involve squaring "excess" profit rates our losses became smaller in those industries after adjustments--in fact, in some cases, they overcame the plus items resulting in a lower estimate adjusted than unadjusted! We got around this by merely reducing the industry profit rate by the corresponding difference in the negative cases, i.e., increasing the absolute value of the losses since a lower industry profit rate subtracted from a constant overall rate increases the "excess" profit rate makes a greater differential when squared. The profit rates found by making the minus adjustment for below average profit industries, we have numbered Methods I-VIII; while the other method, increasing the profit rates by the adjustment in all cases, as Harberger did, we have labeled Methods 1-8. In general, we used Methods I-VIII only for computing "welfare losses." Therefore, our tables of frequency distributions, etc., on profit rates utilize Methods 1-8 (in the raw form, one can easily check which method is being employed by observing whether the first-to-last column is

greater than or less than the preceding column--if it is greater Methods 1-8 are being utilized, if less Methods I-VIII).

Advertising Expenditures

Although the information on C is bountiful, it is non-existent for P and SP. Our use of the C advertising to business receipts ratios may be bias since, e.g., in retailing, which is more important in SP and P than C, "wasteful" advertising is less significant than in manufacturing, which is a quite important segment of C.

APPENDIX B

PROFIT RATE DATA FOR THE AMERICAN ECONOMY

1956-1957 TO 1960-1961

TABLE B-1

FREQUENCY DISTRIBUTIONS OF AVERAGE PROFIT RATES FOR CORPORATIONS, PARTNERSHIPS, AND SOLE PROPRIETORSHIPS*

Frequency Distribution of Profit Rates of Corporations Based Upon Average Returns for the Five-Year Period, 1956-1957 to 1960-1961

Profit Rate in Percentage Terms	Using Average (or Mid-year) Total Capital Base				Using Average (or Mid-year) Equity Base			
	After-Corporation Tax Income		Before-Corporation Tax Income		After-Corporation Tax Income		Before-Corporation Tax Income	
	Unadjusted (U)	Adjusted for (I), (R),&(A)**	(U)	(A)	(U)	(A)	(U)	(A)
	Number of Industries				Number of Industries			
0.00 - 1.99	1	1	1	1	5	1	1	1
2.00 - 3.99	12	3	0	0	8	4	1	0
4.00 - 5.99	16	10	12	4	15	9	6	2
6.00 - 7.99	18	9	5	6	16	5	6	3
8.00 - 9.99	9	16	11	6	9	10	9	8
10.00 - 11.99	3	9	10	8	5	11	6	4
12.00 - 13.99	0	8	7	9	2	9	7	3
14.00 - 15.99	0	1	9	9	0	4	8	9
16.00 - 17.99	1	3	2	6	0	4	6	10
18.00 - 19.99	0	0	2	3	0	2	7	5
20.00 - 21.99	0	0	1	5	0	0	1	3
22.00 - 23.99	0	0	0	3	0	1	2	2
24.00 - 25.99	0	0	0	0	0	0	0	6
26.00 and over	0	0	0	0	0	0	0	4
Total	60	60	60	60	60	60	60	60
Mean	7.013	8.886	11.019	12.889	6.691	9.288	12.320	14.967

TABLE B-1--(Continued)

Frequency Distribution of Profit Rates of Partnerships Based Upon Average Returns for the Four-Year Period, 1957-1958 to 1960-1961

Profit Rate in Percentage Terms	After-Tax Income					
	Using Partnership Balance Sheet Ratios to Estimate Capital				Using Small Corporations Balance Sheet Ratios to Estimate Capital	
	Average (or Mid-year) Total Capital Base		Average (or Mid-year) Equity Base		Average (or Mid-year) Total Capital Base	
	(U)	(A)	(U)	(A)	(1)	(A)
	Number of Industries				Number of Indusries	
0.00 - 2.99	3	3	3	4	1	1
3.00 - 5.99	8	8	3	4	0	0
6.00 - 8.99	7	6	8	6	3	3
9.00 - 11.99	5	1	3	4	3	1
12.00 - 14.99	10	6	7	2	3	3
15.00 - 17.99	3	5	9	3	7	5
18.00 - 20.99	3	5	1	3	6	1
21.00 - 23.99	7	3	2	3	8	7
24.00 - 26.99	5	7	2	4	5	2
27.00 - 29.99	2	4	4	5	3	5
30.00 - 32.99	2	2	4	3	2	3
33.00 - 42.99	2	6	8	9	11	16
43.00 and over	3	4	6	12	8	13
Total	60	60	60	60	60	60
Mean	12.746	14.148	18.600	20.910	25.986	29.055

TABLE B-1--(Continued)

Frequency Distribution of Profit Rates of Sole Proprietorships Based Upon Average Returns for the Four-Year Period, 1957-1958 to 1960-1961

Profit Rate in Percentage Terms	After-Tax Income					
	Using Partnership Balance Sheet Ratios to Estimate Capital				Using Small Corporation Balance Sheet Ratios to Estimate Capital	
	Average (or Mid-Year) Total Capital Base		Average (or Mid-Year Equity Base		Average (or Mid-year) Total Capital Base	
	(U)	(A)	(U)	(A)	(U)	(A)
	Number of Industries				Number of Industries	
0.00 - 2.99	6	4	4	4	0.00 - 11.99 9	6
3.00 - 5.99	9	10	6	4		
6.00 - 8.99	0	0	4	5	12.00 - 17.99 6	7
9.00 - 11.99	3	2	4	3	18.00 - 23.99 12	6
12.00 - 14.99	7	5	2	3	24.00 - 29.99 7	8
15.00 - 17.99	8	3	6	3		
18.00 - 20.99	3	5	5	1	30.00 - 32.99 4	1
21.00 - 23.99	3	4	3	5	33.00 - 35.99 5	4
24.00 - 26.99	4	5	1	2	36.00 - 38.99 4	9
27.00 - 29.99	2	4	2	4	39.00 - 41.99 2	2
30.00 - 32.99	5	5	3	1	42.00 - 44.99 1	5
					45.00 - 47.99 2	1
33.00 - 42.99	6	5	9	9	48.00 and over 8	11
43.00 and over	4	8	11	16		
Total	60	60	60	60	60	60
Mean	13.580	14.948	19.957	22.102	33.723	37.544

*These profit rates are for Methods 1-8, not I-VIII; see Appendix A' discussion "Profit Rate and 'Welfare Loss' Adjustments."

**(I) = intangible assets; (R) = royalties; (A) = advertising expenditures.

SOURCE: IRS Statistics of Income, Corporation Income Tax Returns, and Business Income Tax Returns for the relevant years.

TABLE B-2

AVERAGE PROFIT RATES IN CORPORATIONS USING BEFORE- AND AFTER-TAX INCOME AND USING EQUITY AND TOTAL CAPITAL BASES
1956-1957 to 1960-1961

Industry Number*	Unadjusted (U)	Adjusted for Intangibles (I)	Adjusted for (I) and Royalties(R)	Adjusted for (I), (R) and Advertising(A)
	After-Corporation Tax Income--Average (or Mid-year) Equity Base			
1	.07013	.07057	.07230	.08859
2	.03076	.03086	.03383	.04097
3	.03718	.03788	.04272	.04415
4	.02785	.02870	.03018	.03032
5	.02452	.02458	.02637	.02728
6	.04187	.04258	.05128	.05282
7	.04781	.04889	.05083	.05473
8	.05743	.05759	.05814	.06711
9	.06909	.06977	.07193	.09670
10	.06481	.06556	.06690	.16309
11	.07076	.07105	.07199	.13952
12	.09518	.09523	.09587	.16491
13	.04605	.04611	.04755	.05931
14	.05400	.05418	.05728	.09528
15	.06464	.06480	.06625	.07419
16	.06050	.06067	.06115	.09659
17	.07451	.07469	.07553	.08655
18	.08807	.09020	.09473	.10913
19	.09548	.09607	.10118	.15256
20	.03859	.03997	.04209	.04779
21	.07325	.07345	.07431	.10690
22	.05803	.05811	.05857	.08926
23	.07959	.07977	.08158	.09232
24	.06472	.06479	.06557	.07087
25	.06570	.06594	.06704	.08671
26	.07227	.07268	.07671	.09374
27	.08029	.08066	.08434	.12251
28	.07098	.07124	.07379	.08156
29	.10448	.10498	.10572	.12177
30	.09172	.09250	.09528	.13633
31	.05751	.05787	.05976	.08797
32	.04301	.04309	.04340	.04549
33	.02860	.02867	.02912	.03226
34	.06443	.06469	.06505	.06819
35	.04521	.04522	.04541	.04620
36	.04171	.04188	.04190	.04218
37	.06731	.06761	.06845	.11918
38	.06280	.06302	.06428	.08981
39	.06021	.06048	.06132	.08959

TABLE B-2--(Continued)

Industry Number*	Unadjusted (U)	Adjusted for Intangibles (I)	Adjusted for (I) and Royalties(R)	Adjusted for (I), (R) and Advertising(A)
40	.06142	.06160	.06313	.08961
41	.06438	.06460	.06591	.09137
42	.05410	.05428	.05447	.10982
43	.06288	.06307	.06332	.10637
44	.07014	.07022	.07027	.13117
45	.04220	.04234	.04242	.11632
46	.02705	.02710	.02719	.10831
47	.03115	.03120	.03125	.07801
48	.03894	.03985	.04102	.07774
49	.03801	.03806	.03826	.05775
50	.05549	.05590	.05628	.10052
51	.05216	.05244	.05300	.08672
52	.11401	.11442	.11691	.12101
53	.17038	.17155	.17170	.17793
54	.09626	.09635	.09638	.10016
55	.08124	.08141	.08904	.08920
56	.05859	.05870	.05903	.06632
57	.11986	.11997	.12020	.12252
58	.10689	.11111	.11132	.13265
59	.04475	.04489	.04510	.04815
60	.03591	.03604	.08464	.08487
61	.05450	.05557	.05896	.08603
62	.03040	.03051	.03070	.04883
63	.06610	.06709	.06768	.10797
64	.08469	.08605	.09387	.11391
65	.05873	.05914	.05948	.07386
66	.03108	.03294	.03873	.07874
67	.04952	.05036	.05319	.08803
68	.08219	.08375	.08675	.12958
69	-.00318	-.00323	-.00206	.00300
After-Corporation Tax Income--Average (or Mid-Year) Total Capital Base				
1	.06691	.06750	.06994	.09288
2	.02352	.02363	.02815	.03903
3	.03525	.03612	.04249	.04438
4	.02353	.02452	.02654	.02674
5	.01986	.01992	.02217	.02331
6	.04444	.04548	.05730	.05939
7	.04704	.04837	.05078	.05564
8	.06252	.06278	.06360	.07694
9	.07473	.07564	.07836	.10948
10	.07031	.07139	.07314	.19914
11	.07602	.07642	.07763	.16475

TABLE B-2--(Continued)

Industry Number*	Unadjusted (U)	Adjusted for Intangibles (I)	Adjusted for (I) and Royalties(R)	Adjusted for (I), (R) and Advertising(A)
12	.12678	.12687	.12784	.23245
13	.04378	.04385	.04562	.06018
14	.05011	.05033	.05446	.10489
15	.05442	.05457	.05613	.06467
16	.06096	.06117	.06176	.10533
17	.08407	.08431	.08540	.09955
18	.09600	.09883	.10439	.12206
19	.11642	.11739	.12424	.19316
20	.03893	.04058	.04312	.04992
21	.08497	.08528	.08646	.13116
22	.05671	.05680	.05739	.09649
23	.08537	.08559	.08774	.10056
24	.07042	.07052	.07154	.07847
25	.06834	.06865	.07000	.09429
26	.07731	.07786	.08289	.10414
27	.09072	.09127	.09609	.14610
28	.07878	.07919	.08275	.09362
29	.11176	.11237	.11321	.13136
30	.10405	.10520	.10881	.16219
31	.05854	.05902	.06145	.09773
32	.04677	.04692	.04748	.05121
33	.02156	.02165	.02238	.02746
34	.07888	.07936	.07991	.08479
35	.05410	.05412	.05453	.05620
36	.04489	.04527	.04531	.04591
37	.05569	.05596	.05691	.11377
38	.06834	.06868	.07048	.10690
39	.06511	.06551	.06669	.10621
40	.06423	.06448	.06651	.10162
41	.06734	.06767	.06947	.10458
42	.05458	.05483	.05508	.13028
43	.09851	.09906	.09951	.17719
44	.07359	.07369	.07376	.14814
45	.04114	.04131	.04142	.13504
46	.01593	.01597	.01609	.12973
47	.01229	.01232	.01240	.09093
48	.03762	.03917	.04122	.10553
49	.03130	.03135	.03159	.05570
50	.05715	.05774	.05826	.11938
51	.05304	.05343	.05418	.09955
52	.07677	.07714	.08053	.08610
53	.07014	.07064	.07078	.07720
54	.04190	.04202	.04212	.05444
55	.08473	.08492	.09314	.09331
56	.09146	.09196	.09297	.11516

TABLE B-2--(Continued)

Industry Number*	Unadjusted (U)	Adjusted for Intangibles (I)	Adjusted for (I) and Royalties(R)	Adjusted for (I), (R) and Advertising(A)
57	.11909	.11920	.11943	.12177
58	.12490	.13122	.13149	.15882
59	.04790	.04834	.04898	.05810
60	.03766	.03791	.12793	.12835
61	.06149	.06373	.06999	.11994
62	.00892	.00900	.00947	.05422
63	.07383	.07544	.07630	.13486
64	.10539	.10801	.12023	.15151
65	.07047	.07169	.07252	.10792
66	.02580	.02852	.03876	.10950
67	.05084	.05254	.05815	.12707
68	.09672	.09935	.10363	.16477
69	-.01833	-.01887	-.01691	-.00849
Before-Corporation Tax Income--Average (or Mid-year) Base				Total Capital
1	.11019	.11088	.11261	.12889
2	.05445	.05462	.05759	.06473
3	.07886	.08034	.08518	.08661
4	.07496	.07726	.07873	.07888
5	.04017	.04026	.04205	.04296
6	.09268	.09427	.10297	.10451
7	.08036	.08219	.08412	.08802
8	.10478	.10507	.10562	.11459
9	.12902	.13028	.13244	.15721
10	.12021	.12161	.12295	.21914
11	.13233	.13288	.13381	.20134
12	.16234	.16241	.16306	.23210
13	.08288	.08299	.08442	.09618
14	.09532	.09564	.09875	.13674
15	.09826	.09851	.09996	.10790
16	.12484	.12520	.12568	.16111
17	.13691	.13722	.13807	.14909
18	.16120	.16509	.16962	.18402
19	.14594	.14685	.15196	.20334
20	.05900	.06110	.06322	.06892
21	.14117	.14154	.14240	.17499
22	.10801	.10816	.10862	.13931
23	.15353	.15387	.15567	.16642
24	.11967	.11981	.12058	.12588
25	.12714	.12760	.12870	.14837
26	.14102	.14182	.14585	.16288
27	.15952	.16026	.16395	.20212
28	.14667	.14721	.14976	.15753

TABLE B-2--(Continued)

Industry Number*	Unadjusted (U)	Adjusted for Intangibles (I)	Adjusted for (I) and Royalties(R)	Adjusted for (I), (R) and Avertising(A)
29	.20935	.21036	.21110	.22715
30	.18083	.18236	.18514	.22620
31	.09934	.09996	.10186	.13006
32	.07174	.07187	.07218	.07427
33	.04487	.04498	.04543	.04857
34	.11838	.11885	.11920	.12235
35	.07314	.07315	.07334	.07413
36	.05862	.05885	.05887	.05916
37	.12176	.12229	.12314	.17387
38	.10264	.10299	.10426	.12979
39	.11649	.11700	.11784	.14611
40	.11608	.11642	.11796	.14444
41	.10076	.10111	.10242	.12789
42	.09618	.09650	.09668	.15204
43	.10640	.10673	.10697	.15002
44	.13206	.13222	.13227	.19317
45	.07289	.07314	.07322	.14712
46	.04690	.04698	.04707	.12819
47	.05050	.05058	.05063	.09738
48	.07563	.07741	.07858	.11530
49	.05603	.05611	.05630	.07579
50	.08470	.08533	.08571	.12995
51	.08433	.08478	.08534	.11906
52	.13079	.13126	.13375	.13785
53	.19674	.19809	.19824	.20447
54	.10674	.10684	.10687	.11065
55	.08609	.08627	.09390	.09406
56	.07829	.07843	.07876	.08604
57	.13733	.13746	.13768	.14001
58	.15178	.15778	.15799	.17932
59	.05552	.05569	.05591	.05896
60	.05149	.05167	.10028	.10050
61	.09031	.09209	.09548	.12254
62	.04748	.04765	.04784	.06597
63	.10038	.10189	.10248	.14276
64	.14378	.14607	.15390	.17394
65	.08063	.08119	.08153	.09591
66	.05687	.06026	.06605	.10606
67	.09473	.09633	.09916	.13400
68	.14421	.14695	.14995	.19278
69	.00768	.00782	.00899	.01405

TABLE B-2--(Continued)

Industry Number*	Unadjusted (U)	Adjusted for Intangibles(I)	Adjusted for (I) and Royalties(R)	Adjusted for (I), (R) and Advertising(A)
	Before-Corporation Tax Income Average (or Mid-Year) Equity Base			
1	.12320	.12428	.12673	.14967
2	.05951	.05979	.06432	.07519
3	.08979	.09201	.09838	.10027
4	.08746	.09114	.09316	.09336
5	.03950	.03962	.04186	.04300
6	.11307	.11570	.12752	.12961
7	.08741	.08988	.09230	.09716
8	.13282	.13336	.13418	.14752
9	.14983	.15166	.15438	.18549
10	.14263	.14481	.14656	.27256
11	.15536	.15619	.15740	.24452
12	.22850	.22866	.22964	.33424
13	.08935	.08950	.09127	.10583
14	.10491	.10538	.10950	.15994
15	.09061	.09086	.09242	.10096
16	.14001	.14050	.14109	.18465
17	.16413	.16461	.16570	.17985
18	.18523	.19070	.19626	.21393
19	.18396	.18550	.19235	.26127
20	.06314	.06582	.06835	.07516
21	.17802	.17867	.17985	.22455
22	.12037	.12057	.12116	.16026
23	.17352	.17397	.17613	.18895
24	.14225	.14246	.14348	.15041
25	.14414	.14479	.14614	.17043
26	.16297	.16412	.16915	.19039
27	.19438	.19556	.20038	.25039
28	.18454	.18550	.18906	.19993
29	.23027	.23153	.23236	.25051
30	.21961	.22203	.22564	.27902
31	.11225	.11316	.11560	.15187
32	.09817	.09849	.09906	.10279
33	.04785	.04804	.04878	.05386
34	.16235	.16335	.16390	.16879
35	.11319	.11323	.11364	.11532
36	.08076	.08145	.08149	.08209
37	.11668	.11725	.11820	.17506
38	.12507	.12569	.12750	.16391
39	.14364	.14452	.14570	.18522
40	.13663	.13716	.13920	.17430
41	.11745	.11801	.11981	.15492
42	.11168	.11219	.11244	.18764
43	.17685	.17784	.17829	.25597

TABLE B-2--(Continued)

Industry Number*	Unadjusted (U)	Adjusted for Intangibles(I)	Adjusted for (I) and Royalties(R)	Adjusted for (I), (R) and Advertising(A)
44	.14921	.14942	.14949	.22388
45	.07999	.08033	.08043	.17406
46	.04371	.04382	.04394	.15758
47	.04474	.04486	.04494	.12347
48	.10078	.10495	.10700	.17130
49	.05358	.05367	.05391	.07801
50	.09739	.09840	.09892	.16004
51	.09626	.09696	.09771	.14308
52	.09956	.10005	.10343	.10901
53	.09726	.09795	.09809	.10451
54	.07601	.07624	.07633	.08866
55	.08995	.09016	.09837	.09854
56	.15121	.15203	.15305	.17523
57	.13666	.13679	.13702	.13935
58	.18180	.19099	.19127	.21859
59	.07992	.08064	.08128	.09040
60	.06643	.06686	.15689	.15731
61	.12652	.13112	.13738	.18734
62	.05084	.05129	.05176	.09651
63	.12332	.12601	.12688	.18543
64	.19682	.20172	.21394	.24522
65	.12383	.12597	.12680	.16220
66	.06950	.07683	.08708	.15782
67	.13885	.14348	.14909	.21801
68	.18456	.18956	.19385	.25498
69	-.00048	-.00049	.00146	.00988

*For Industry Number see coding Table C-1.

SOURCE: See Table B-1.

TABLE B-3

AVERAGE PROFIT RATES FOR ALL BUSINESS ESTABLISHMENTS--PROFIT METHODS 1, 2, 3, 5, 7, 8*

Industry Number*	Unadjusted (U)	Adjusted for Intangibles(I)	Adjusted for (I) and Royalties(R)	Adjusted for (I), (R) and Advertising(A)
		Using Profit Method 1		
1	.08992	.09051	.09197	.10689
2	.05242	.05287	.05412	.05730
3	.02841	.02898	.03540	.03747
4	.03033	.03116	.03243	.03262
5	.02584	.02593	.02763	.02856
6	.02123	.02176	.03450	.03662
7	.08678	.08882	.09065	.09566
8	.18775	.18826	.18852	.20308
9	.07327	.07399	.07608	.10093
10	.06980	.07058	.07184	.16855
11	.07533	.07571	.07659	.14433
12	.09843	.09849	.09913	.16834
13	.04785	.04791	.04932	.06112
14	.08034	.08060	.08336	.12178
15	.07222	.07257	.07362	.08063
16	.08652	.08726	.08774	.12651
17	.07648	.07666	.07750	.08854
18	.10748	.10998	.11413	.12841
19	.09609	.09669	.10175	.15318
20	.03977	.04116	.04325	.04895
21	.07549	.07570	.07655	.10927
22	.06383	.06392	.06437	.09544
23	.08599	.08620	.08975	.10092
24	.06641	.06649	.06726	.07260
25	.07043	.07068	.07169	.09050
26	.07841	.07885	.08283	.09988
27	.08141	.08178	.08542	.12340
28	.19385	.19458	.19709	.20486
29	.10721	.10773	.10845	.12513
30	.09460	.09540	.09814	.13923
31	.05881	.05917	.06104	.08937
32	.04642	.04654	.04684	.04904
33	.03315	.03325	.03358	.03634
34	.06527	.06555	.06591	.06905
35	.04531	.04534	.04553	.04632
36	.04174	.04192	.04194	.04223
37	.12283	.12404	.12454	.16546
38	.10464	.10496	.10596	.13089
39	.12070	.12116	.12181	.15685
40	.07823	.07844	.07945	.09904

TABLE B-3--(Continued)

Industry Number*	Unadjusted (U)	Adjusted for Intangibles(I)	Adjusted for (I) and Royalties(R)	Adjusted for (I), (R) and Advertising(A)
41	.10611	.10645	.10752	.13310
42	.11755	.11823	.11838	.16324
43	.14718	.14819	.14833	.19140
44	.08291	.08303	.08313	.13456
45	.10412	.10444	.10449	.16770
46	.09372	.09425	.09431	.16232
47	.09337	.09369	.09377	.13011
48	.18804	.19214	.19267	.21871
49	.07688	.07697	.07708	.09376
50	.13630	.13804	.13820	.17072
51	.09971	.10009	.10049	.12813
52	.08916	.08951	.09135	.09519
53	.14634	.14719	.14731	.15270
54	.08658	.08668	.08671	.09030
55	.07657	.07673	.08385	.08402
56	.05644	.05696	.05722	.08142
57	.10941	.10952	.10975	.11212
58	.59659	.61361	.61373	.64140
59	.03725	.03741	.03779	.04150
60	.02101	.02105	.04900	.04912
61	.34218	.34765	.34920	.37398
62	.03384	.03404	.03420	.04586
63	.25276	.25551	.25567	.28147
64	.21747	.22069	.22670	.24529
65	.21007	.21111	.21129	.23145
66	.03184	.03319	.03736	.06992
67	.10530	.11369	.11608	.15934
68	1.25093	1.26767	1.26842	1.31414
69	.13891	.13982	.14026	.15135
		Using Profit Method 2		
1	.10949	.11037	.11216	.13035
2	.26045	.27194	.27837	.29473
3	.03462	.03547	.04333	.04586
4	.03261	.03357	.03495	.03514
5	.02757	.02767	.02949	.03048
6	.02921	.03022	.04791	.05087
7	.08681	.08885	.09068	.09569
8	.21523	.21589	.21620	.23290
9	.07420	.07494	.07706	.10222
10	.07133	.07214	.07343	.17229
11	.07609	.07647	.07736	.14578
12	.09833	.09839	.09903	.16817

TABLE B-3--(Continued)

Industry Number*	Unadjusted (U)	Adjusted for Intangibles(I)	Adjusted for (I) and Royalties(R)	Adjusted for (I), (R) and Advertising(A)
13	.04829	.04836	.04978	.06169
14	.08250	.08278	.08561	.12507
15	.08924	.08976	.09106	.09975
16	.07444	.07498	.07540	.10871
17	.07697	.07715	.07799	.08910
18	.11096	.11363	.11792	.13267
19	.09649	.09709	.10217	.15381
20	.04009	.04151	.04362	.04936
21	.07567	.07587	.07673	.10952
22	.06390	.06399	.06445	.09556
23	.08449	.08469	.08819	.09915
24	.06647	.06654	.06732	.07266
25	.07425	.07453	.07559	.09543
26	.07915	.07960	.08361	.10082
27	.08196	.08234	.08600	.12424
28	.19239	.19311	.19561	.20332
29	.10745	.10797	.10870	.12541
30	.09495	.09575	.09851	.13974
31	.05895	.05932	.06119	.08959
32	.04753	.04765	.04796	.05021
33	.04276	.04293	.04337	.04692
34	.06581	.06610	.06645	.06962
35	.04570	.04572	.04592	.04671
36	.04204	.04223	.04225	.04253
37	.14438	.14606	.14665	.19484
38	.10762	.10797	.10900	.13464
39	.12148	.12195	.12260	.15787
40	.09025	.09052	.09169	.11429
41	.10774	.10810	.10918	.13515
42	.14416	.14519	.14537	.20046
43	.16899	.17032	.17048	.21997
44	.09370	.09385	.09397	.15210
45	.11697	.11736	.11742	.18845
46	.12753	.12853	.12861	.22135
47	.12299	.12354	.12365	.17157
48	.18063	.18441	.18492	.20991
49	.09118	.09132	.09144	.11123
50	.18225	.18536	.18558	.22925
51	.11963	.12018	.12067	.15385
52	.11150	.11204	.11435	.11916
53	.17448	.17569	.17584	.18227
54	.09409	.09421	.09424	.09814
55	.08443	.08462	.09246	.09265
56	.13104	.13388	.13450	.19138

TABLE B-3--(Continued)

Industry Number*	Unadjusted (U)	Adjusted for Intangibles(I)	Adjusted for (I) and Royalties(R)	Adjusted for (I), (R) and Advertising(A)
57	.12165	.12178	.12204	.12467
58	.42972	.43848	.43856	.45834
59	.04965	.04993	.05043	.05539
60	.03807	.03821	.08893	.08915
61	.49581	.50737	.50964	.54581
62	.07046	.07134	.07167	.09611
63	.42530	.43314	.43340	.47714
64	.26290	.26763	.27490	.29745
65	.31455	.31690	.31717	.34743
66	.04185	.04422	.04978	.09315
67	.11677	.12646	.12912	.17724
68	1.43283	1.45484	1.45570	1.50817
69	.11374	.11435	.11470	.12377
		Using Profit Method 3		
1	.10485	.10586	.10798	.12957
2	.07275	.07365	.07546	.08004
3	.02574	.02644	.03510	.03789
4	.02905	.03017	.03198	.03224
5	.02251	.02260	.02477	.02595
6	.01776	.01836	.03541	.03826
7	.05488	.05652	.05885	.06520
8	.28434	.28559	.28602	.30972
9	.07989	.08088	.08350	.11469
10	.07705	.07817	.07982	.20634
11	.08207	.08260	.08374	.17115
12	.13161	.13172	.13269	.23747
13	.04619	.04627	.04801	.06263
14	.08596	.08634	.09000	.14111
15	.06852	.06889	.07007	.07797
16	.09212	.09309	.09368	.14140
17	.08664	.08690	.08797	.10215
18	.12004	.12347	.23857	.14610
19	.11711	.11808	.12486	.19375
20	.03974	.04140	.04389	.05069
21	.08805	.08837	.08954	.13439
22	.06410	.06422	.06479	.10432
23	.09263	.09289	.09713	.11044
24	.07263	.07275	.07376	.08073
25	.07454	.07487	.07611	.09925
26	.08500	.08560	.09055	.11178
27	.09223	.09279	.09755	.14728
28	.23365	.23481	.23809	.24822
29	.11536	.11599	.11681	.13565

TABLE B-3--(Continued)

Industry Number*	Unadjusted (U)	Adjusted for Intangibles(I)	Adjusted for (I) and Royalties(R)	Adjusted for (I),(R) and Advertising(A)
30	.10782	.10901	.11258	.16597
31	.06064	.06113	.06354	.09998
32	.05554	.05579	.05634	.06031
33	.04362	.04390	.04459	.05023
34	.07929	.07983	.08038	.08523
35	.05452	.05458	.05499	.05665
36	.04514	.04556	.04560	.04620
37	.13108	.13262	.13321	.18204
38	.12837	.12893	.13034	.16545
39	.14666	.14742	.14830	.19617
40	.08773	.08802	.08932	.11446
41	.12631	.12687	.12834	.16354
42	.13974	.14080	.14099	.19983
43	.21015	.21234	.21255	.27790
44	.08968	.08983	.08996	.15239
45	.11771	.11815	.11821	.19585
46	.10688	.10766	.10774	.19543
47	.11830	.11892	.11905	.17435
48	.22667	.23308	.23377	.26754
49	.08009	.08021	.08034	.10046
50	.16064	.16322	.16342	.20446
51	.11316	.11371	.11422	.14933
52	.07801	.07848	.08133	.08726
53	.06893	.06938	.06953	.07563
54	.03552	.03564	.03571	.04575
55	.08094	.08112	.08890	.08909
56	.11702	.11996	.12069	.18677
57	.11372	.11384	.11408	.11658
58	.83535	.87255	.87274	.91596
59	.05441	.05499	.05596	.06541
60	.01920	.01926	.06412	.06432
61	.53181	.54562	.54815	.58842
62	.04558	.04620	.04656	.07320
63	.33134	.33625	.33646	.37162
64	.30971	.31671	.32585	.35419
65	.35656	.35980	.36013	.39698
66	.03318	.03559	.04269	.09813
67	.16525	.19025	.19508	.28277
68	1.52184	1.54679	1.54771	1.60373
69	.20629	.20849	.20921	.22732

TABLE B-3--(Continued)

Industry Number*	Unadjusted (U)	Adjusted for Intangibles(I)	Adjusted for (I) and Royalties(R)	Adjusted for (I), (R) and Advertising(A)
		Using Profit Method 5		
1	.11741	.11818	.11965	.13456
2	.05324	.05370	.05495	.05813
3	.06031	.06152	.06793	.07000
4	.06925	.07114	.07242	.07260
5	.04003	.04015	.04186	.04279
6	.06371	.06530	.07804	.08016
7	.11635	.11909	.12092	.12593
8	.20787	.20843	.20869	.22326
9	.12816	.12943	.13152	.15636
10	.12186	.12323	.12449	.22120
11	.17104	.17190	.17278	.24052
12	.16467	.16477	.16541	.23462
13	.08378	.08390	.08530	.09710
14	.11694	.11733	.12008	.15850
15	.09549	.09595	.09700	.10402
16	.14974	.15102	.15150	.19027
17	.13802	.13834	.13918	.15022
18	.17273	.17675	.18090	.19518
19	.14597	.14687	.15194	.20336
20	.05987	.06197	.06406	.06975
21	.14248	.14286	.14371	.17643
22	.11266	.11282	.11327	.14434
23	.15842	.15880	.16235	.17352
24	.02336	.02339	.02416	.02950
25	.12663	.12708	.12809	.14690
26	.03125	.03142	.03540	.05245
27	.15938	.16012	.16376	.20174
28	.14847	.14903	.15154	.15931
29	.20847	.20947	.21020	.22687
30	.18247	.18400	.18675	.22783
31	.10004	.10066	.10253	.13086
32	.07399	.07418	.07448	.07668
33	.04523	.04537	.04571	.04846
34	.11856	.11908	.11943	.12257
35	.07291	.07295	.07314	.07393
36	.05847	.05872	.05874	.05903
37	.15056	.15205	.15254	.19347
38	.13522	.13564	.13664	.16157
39	.16258	.16320	.16384	.19888
40	.11368	.11398	.11499	.13458
41	.13472	.13515	.13622	.16180
42	.13703	.13783	.13797	.18283

TABLE B-3--(Continued)

Industry Number*	Unadjusted (U)	Adjusted for Intangibles(I)	Adjusted for (I) and Royalties(R)	Adjusted for (I), (R) and Advertising(A)
43	.16897	.17013	.17027	.21333
44	.13230	.13248	.13259	.18402
45	.12077	.12114	.12119	.18440
46	.10216	.10275	.10280	.17081
47	.10134	.10169	.10177	.13811
48	.19567	.19994	.20047	.22651
49	.08520	.08530	.08541	.10209
50	.14519	.14704	.14720	.17972
51	.11510	.11554	.11594	.14358
52	.09974	.10013	.10197	.10581
53	.16837	.16935	.16947	.17486
54	.09581	.09592	.09595	.09954
55	.08091	.08107	.18819	.08836
56	.06054	.06110	.06136	.08556
57	.12463	.12475	.12499	.12735
58	.61659	.63418	.63430	.66197
59	.04208	.04226	.04264	.04635
60	.02945	.02950	.05745	.05757
61	.35535	.36103	.36258	.38737
62	.03975	.03999	.04015	.05180
63	.26029	.26312	.26327	.28908
64	.25403	.25779	.26379	.28239
65	.21711	.21819	.21837	.23853
66	.05039	.05254	.05671	.08927
67	.13321	.14315	.14554	.18880
68	1.25848	1.27532	1.27607	1.32179
69	.14114	.14206	.14250	.15359
		Using Profit Method 7		
1	.14453	.14592	.14804	.16963
2	.07394	.07485	.07666	.08124
3	.06848	.07033	.07899	.08178
4	.08354	.08678	.08859	.08884
5	.04053	.04070	.04287	.04405
6	.07418	.07666	.09372	.09656
7	.09216	.09491	.09724	.10359
8	.31702	.31842	.31885	.34254
9	.14863	.15047	.15310	.18429
10	.14493	.14705	.14870	.27521
11	.20540	.20673	.20787	.29528
12	.23187	.23206	.23304	.33782
13	.09069	.09084	.09258	.10720
14	.13460	.13519	.13886	.18996

TABLE B-3--(Continued)

Industry Number*	Unadjusted (U)	Adjusted for Intangibles(I)	Adjusted for (I) and Royalties(R)	Adjusted for (I), (R) and Advertising(A)
15	.09470	.09520	.09639	.10428
16	.16977	.17156	.17215	.21986
17	.16560	.16609	.16717	.18134
18	.19971	.20542	.21052	.22805
19	.18378	.18530	.19208	.26097
20	.06358	.06623	.06873	.07553
21	.17978	.18044	.18161	.22645
22	.12619	.12643	.12700	.16653
23	.17892	.17943	.18367	.19698
24	.01636	.01639	.01740	.02437
25	.14362	.14425	.14549	.16863
26	.02636	.02654	.03150	.05273
27	.19417	.19534	.20010	.24983
28	.17450	.17536	.17864	.18878
29	.22970	.23095	.23178	.25062
30	.22173	.22416	.22773	.28112
31	.11358	.11449	.11690	.15334
32	.10520	.10569	.10623	.11020
33	.06833	.06876	.06945	.07510
34	.16140	.16249	.16304	.16789
35	.11269	.11282	.11322	.11488
36	.08047	.08122	.08126	.08186
37	.16410	.16604	.16663	.21546
38	.17139	.17214	.17355	.20866
39	.20379	.20484	.20573	.25360
40	.13318	.13362	.13492	.16006
41	.16563	.16637	.16783	.20304
42	.16525	.16650	.16669	.22553
43	.24310	.24563	.24584	.31118
44	.14962	.14987	.15000	.21243
45	.13815	.13866	.13873	.21636
46	.11775	.11862	.11869	.20638
47	.13042	.13110	.13122	.18652
48	.23651	.24320	.24389	.27766
49	.09012	.09026	.09039	.11050
50	.17182	.17457	.17478	.21581
51	.13270	.13334	.13385	.16896
52	.09432	.09489	.09773	.10366
53	.09389	.09451	.09465	.10075
54	.06127	.06148	.06155	.07159
55	.08568	.08587	.09365	.09384
56	.12805	.13127	.13199	.19807
57	.12978	.12991	.13016	.13266
58	.86610	.90468	.90487	.94809
59	.06663	.06734	.06831	.07777

TABLE B-3--(Continued)

Industry Number*	Unadjusted (U)	Adjusted for Intangibles(I)	Adjusted for (I) and Royalties(R)	Adjusted for (I), (R) and Advertising(A)
60	.03272	.03283	.07769	.07789
61	.55301	.56737	.56989	.61017
62	.05898	.05978	.06014	.08678
63	.34155	.34662	.34683	.38199
64	.36500	.37324	.38239	.41073
65	.36938	.37273	.37306	.40991
66	.06390	.06854	.07564	.13108
67	.21711	.24996	.25479	.34248
68	1.53106	1.55617	1.55708	1.61310
69	.20991	.21215	.21287	.23098
		Using Profit Method 8		
1	.14297	.14412	.14591	.16409
2	.26455	.27622	.28265	.29901
3	.07349	.07529	.08315	.08568
4	.07447	.07666	.07804	.07823
5	.04271	.04285	.04467	.04566
6	.08766	.09070	.10839	.11135
7	.11639	.11913	.12096	.12597
8	.23829	.23903	.23933	.25603
9	.12978	.13109	.13320	.15836
10	.12454	.12596	.12725	.22611
11	.17276	.17363	.17452	.24294
12	.16451	.16460	.16524	.23438
13	.08456	.08468	.08609	.09800
14	.12009	.12050	.12333	.16278
15	.11800	.11869	.11999	.12867
16	.12882	.12977	.13018	.16350
17	.13890	.13922	.14006	.15117
18	.17832	.18261	.18690	.20166
19	.14657	.14748	.15257	.20420
20	.06036	.06248	.06459	.07034
21	.14281	.14319	.14405	.17684
22	.11279	.11296	.11341	.14452
23	.15566	.15603	.15952	.17049
24	.02338	.02341	.02418	.02952
25	.13350	.13400	.13506	.15490
26	.03154	.03172	.03574	.05295
27	.16046	.16121	.16487	.20311
28	.14735	.14790	.15040	.15811
29	.20895	.20996	.21069	.22740
30	.18314	.18469	.18745	.22868
31	.10027	.10090	.10278	.13117

TABLE B-3--(Continued)

Industry Number*	Unadjusted (U)	Adjusted for Intangibles(I)	Adjusted for (I) and Royalties(R)	Adjusted for (I), (R) and Advertising(A)
32	.07576	.07595	.07626	.07851
33	.05836	.05859	.05903	.06258
34	.11953	.12006	.12042	.12359
35	.07353	.07357	.07376	.07456
36	.05889	.05915	.05917	.05946
37	.17698	.17904	.17962	.22782
38	.13908	.13953	.14056	.16620
39	.16363	.16426	.16491	.20018
40	.13114	.13153	.13270	.15531
41	.13679	.13724	.13832	.16430
42	.16806	.16925	.16943	.22452
43	.19400	.19553	.19569	.24519
44	.14952	.14975	.14987	.20800
45	.13567	.13613	.13619	.20722
46	.13903	.14011	.14019	.23293
47	.13349	.13409	.13420	.18211
48	.18796	.19190	.19241	.21740
49	.10105	.10120	.10133	.12111
50	.19413	.19745	.19766	.24133
51	.13810	.13874	.13922	.17241
52	.12473	.12534	.12765	.13245
53	.20075	.20214	.20229	.20872
54	.10412	.10425	.10428	.10819
55	.08921	.08941	.09725	.09744
56	.14056	.14361	.14423	.20111
57	.13857	.13872	.13898	.14161
58	.44413	.45317	.45326	.47303
59	.05609	.05640	.05691	.06186
60	.05336	.05355	.10427	.10449
61	.51490	.52691	.52917	.56534
62	.08277	.08380	.08413	.10856
63	.43796	.44603	.44630	.49004
64	.30709	.31262	.31989	.34244
65	.32509	.32751	.32779	.35805
66	.06624	.07001	.07556	.11894
67	.14702	.15923	.16188	.21001
68	1.44148	1.46362	1.46448	1.51695
69	.11556	.11618	.11654	.12561

*All business establishments refers to corporations (C), partnerships (P), and sole proprietorships (SP). The profit rates are based on average returns for the five-year period, 1956-1957 to 1960-1961 for C, and the four-year period 1957-1958 to 1960-1961 for P, SP. These profit methods are outlined in Table 7 and Appendix A's section "Profit Rate and 'Welfare Loss' Adjustments" explains the distinction between Methods 1-8 and I-VIII. For Industry Coding see Table C-1.
SOURCE: See Table B-1.

APPENDIX C

ELASTICITY ESTIMATES FOR THE AMERICAN ECONOMY, 1956-1957 TO 1960-1961

ELASTICITY ESTIMATES FOR THE AMERICAN ECONOMY, 1956-1957 TO 1960-1961

Dorfman-Steiner-Telser Proposition[1]

This proposition states that a profit maximizing firm selects a price and advertising budget such that the price elasticity of demand equals the value of the marginal sales effect of advertising (v.m.s.e.a.).

Assuming, as usual, continuous and differentiable functions:

Let (1) $C = g(q)$ represent total production cost (C) as a function of the rate of output (q), i.e., the quantity the firm can sell per unit of time

(2) $N = i(a)$ represent the number of consumers made aware of the product (N) as a function of the firm's advertising budget (a). Since the cost of making N consumers aware of the product is a, the marginal cost of awareness (m.c.a.), we get by implicit differentiation

(3) $\text{m.c.a.} = 1/(di/da)$ Since sales (q) of the firm may vary directly with N and inversely with price, p, the demand function is

(4) $q = f(p,N)$ The necessary conditions for maximizing net revenue, $(R = pq-C-a)$, means that the firm must select its p and a so that

(5) $dR/da = p\,[df/dN\ \ di/da]\ -\ dg/dq\ df/dN\ di/da\ -\ 1 = 0 = (p\ -\ dg/dq)\ \ df/dN\ di/da\ -\ 1$

(6) $dR/dp = p\ df/dp + q\ -\ dg/dq\ df/dp = 0 = (p\ -\ dg/dq)\ df/dp + q$

The elasticity of demand (η) is

(7) $-\eta = -\ p/q\ df/dp = p/\ \ (p\ -\ dg/dq)$

The v.m.s.e.a. (where m.s.e.a. $= p\ df/dN$ and df/dN is probably not constant since not all consumers made aware purchase the same amount--if at all).

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[1] R. Dorfman and P. O. Steiner, "Optimal Advertising and Optimal Quality," American Economic Review (Dec., 1954), pp. 826-836; Lester G. Telser, "How Much Does It Pay Whom to Advertise," American Economic Review, (May, 1961), pp. 194-205.

(8) v.m.s.e.a. = $p\ df/dN\ di/da = p/(p - dg/dq)$

Thus η = v.m.s.e.a. If we define the ratio of 1 - marginal production costs (m.p.c.) to the price to be the marginal advertising intensity (m.a.i.), we get

(9) m.a.i. = $(p - dg/dq) / p$ The rule for optimal advertising expenditure is at the intersection point of the marginal return from awareness curve [m.r.a. = (m.a.i.) (m.s.e.a.)] and the marginal cost from awareness curve (m.c.a.)--the former curve probably decreases as N increases while the latter increases.

(10) (m.a.i.)(m.s.e.a.) = m.c.a.

If we assume m.p.c. is approximately constant [= average variable cost (a.v.c.)], m.a.c. $\approx$ 1 - a.v.c./p. Also note that total revenue is equal to total variable cost + a + R. This means the advertising intensity can not be greater than the m.a.i.

(11) m.a.i. $\approx \frac{(p\text{-a.v.c.})q}{pq} = \frac{R + a}{pq} \geq a/(pq), \quad R \geq 0$

Since from (7) and (8) we know that m.a.i. and η vary inversely, η can not exceed the reciprocal of the advertising intensity as taking reciprocals reverses direction of the inequality.

(12) $\eta = 1/\text{m.a.i.} \leq 1/(a/pq)$

In economic terms, this means that if a.v.c. is constant, then the reciprocal of the advertising intensity is an upper bound to the price elasticity, e.g., if advertising expenditures are fifty per cent and one per cent of total sales, i.e., advertising intensities of fifty and one per cent, price elasticity at the optimal output is between one and two in the first case and less than 100 in the second. Although the proposition strictly applies only to differences between upper bounds of the price elasticities, it is not unreasonable to expect that there may be similar dispersions among the actual elasticities. We can also formulate the proposition for the case where m.p.c. $>$ a.v.c.

(13) $1/\eta$ = m.a.i. = $\frac{p - dg/dq}{p} < (p\text{-a.v.c.})/p = (R+a)/(pq)$

(14) $1/\eta < (p\text{-a.v.c.})/p > a/(pq)$ If we take reciprocals we must again reverse the direction of the inequality.

(15) $\eta > p/(p\text{-a.v.c.}) \lesssim (pq)/a$

Thus, because the average advertising intensity is probably closer to the m.a.i. under increasing a.v.c., the ratio of sales to advertising outlay may be even closer to η for increasing m.p.c. (although no longer an upper bound).

Again, in economic terms, the above analysis means we should expect to find lower price elasticities with heavily advertised products, such as drugs, tobacco, beverages and toilet preparations than with little advertised products such as lumber and textiles. Ideally, of course, we should like to have some independent estimates of product elasticities to see if our proposition yields useful results. Unfortunately, such information is in the nature of a scarce good.

There are a couple of things to be noted about our table of elasticities. First of all, we used the more easily obtainable figure for business receipts (gross sales and gross receipts from operations) as contained in the Statistics of Income in place of sales--the difference is typically quite slight. Secondly, we have computed the elasticities only for corporations and not for sole proprietorships and partnerships, since the above source does not contain this information. Thirdly, we have computed the elasticities on a three-year basis, July, 1958-June, 1959, July, 1959-June, 1960 and July, 1960-June, 1961 (as well as on a yearly basis), in order to

avoid, as much as possible, ephemeral factors while remaining within the substantially revised Standard Industrial Classification employed by the above source. Finally, we want to reiterate our statement, so as to avoid any misunderstanding, that our calculations involve maximum or upper bound elasticities and not the actual elasticities themselves which might be anywhere between one--the lower limit by classical arguments--and our upper bound estimates. Since advertising costs are typically well under two per cent of sales for most industries, we should not be surprised at what appears to be rather large numbers for our maximum elasticity estimates (a two per cent ratio is associated with a η of 50). What is important is not the absolute estimates but the relative dispersions among industries. Perhaps some sort of coding on the basis of known elasticities might make them useful for absolute purposes too. The elasticity estimates utilizing this approach are shown in Table C-1.

TABLE C-1

UPPER BOUND PRICE ELASTICITY OF DEMAND ESTIMATES USING THE DORFMAN-STEINER-TELSER ADVERTISING INTENSITY APPROACH*

Industry	η_a = Average Elasticity for the Three Periods	η_1 = Elasticity 1958-1959	η_2 = Elasticity 1959-1960	η_3 = Elasticity 1960-1961
1. All industrial groups	87.7	88.5	88.3	86.4
2. Agriculture, forestry and fisheries	178.6	164.1	170.9	200.8
3. Total mining	526.3	666.7	546.5	442.5
4. Metal mining	3,333.3	7,142.8	3,448.3	2,222.2
5. Bituminous coal and lignite mining	1,087.0	1,024.1	1,098.9	1,149.4
6. Crude petroleum and natural gas	454.5	666.7	490.2	335.6
7. Mining and quarrying of non-metallic minerals, and anthracite mining	259.7	273.2	261.8	245.1
8. Construction	450.6	483.1	425.5	450.4
9. Total Manufacturing	71.0	71.4	71.9	69.9
10. Beverage industries	20.0	20.0	20.5	19.6
11. Food and kindred products	52.5	57.0	52.0	49.2
12. Tobacco manufacturers	18.5	18.5	18.3	18.8
13. Textile mill products	149.9	146.8	160.8	142.8
14. Apparel and other finished products made from fabrics and similar materials	103.6	103.7	102.2	104.7
15. Lumber and wood products, except furniture	242.1	243.1	251.9	231.5
16. Furniture and fixtures	75.6	76.6	81.8	74.6
17. Paper and allied products	117.5	119.2	118.8	114.8
18. Printing, publishing, and allied industries	138.7	136.0	132.1	147.5

TABLE C-1--(Continued)

Industry	η_a = Average Elasticity for the Three Periods	η_1 = Elasticity 1958-1959	η_2 = Elasticity 1959-1960	η_3 = Elasticity 1960-1961
19. Chemicals and allied products	23.6	25.9	26.4	25.3
20. Petroleum refining and related industries	204.1	203.2	218.3	193.0
21. Rubber and miscellaneous plastics products	57.7	59.0	60.9	53.8
22. Leather and leather products	89.2	90.4	89.7	87.8
23. Stone, clay, and glass products	137.2	135.5	142.4	133.7
24. Primary metal industries	229.4	237.0	229.4	223.2
25. Fabricated metal products (including ordnance), except machinery and transportation equipment	105.6	102.4	111.8	102.6
26. Machinery, except electrical and transportation equipment	94.7	88.3	95.1	97.6
27. Electrical machinery, equipment and supplies	58.1	56.4	57.8	59.9
28. Transportation equipment, except motor vehicles	384.6	438.6	355.9	371.7
29. Motor vehicles and motor vehicle equipment	115.9	97.9	123.4	125.9
30. Professional, scientific, and controlling instruments; photographic and optical goods; watches and clocks	42.8	42.7	44.3	41.4
31. Other manufacturing industries	52.7	61.2	54.2	52.9
32. Total transportation, communication, electric, gas, and sanitary services	233.6	237.5	238.1	225.7

TABLE C-1--(Continued)

Industry	η_a = Average Elasticity for the Three Periods	η_1 = Elasticity 1958-1959	η_2 = Elasticity 1959-1960	η_3 = Elasticity 1960-1961
33. Transportation	205.8	205.8	207.5	204.9
34. Communication	187.6	188.3	191.6	156.5
35. Electric and gas companies and systems	423.7	421.9	409.8	438.6
36. Water supply and other sanitary services	840.3	704.2	833.3	1,010.1
37. Total wholesale and retail trade	98.5	98.8	99.0	97.8
38. Total wholesale trade	172.1	173.6	168.9	173.6
39. Groceries and related products	249.4	215.5	251.2	285.7
40. Electrical goods, hardware, and plumbing and heating equipment and supplies	148.4	177.3	142.2	138.1
41. Other wholesalers	162.7	165.0	159.7	163.4
42. Retail trade	68.0	67.9	68.9	67.2
43. Food	106.8	112.2	108.3	101.3
44. General merchandise	39.8	39.5	40.3	39.4
45. Apparel and accessories	42.0	41.7	42.6	41.9
46. Furniture, home furnishings and equipment	30.8	30.2	30 9	31.4
47 Automotive dealers and gasoline service stations	113.4	113.4	116.7	110.5
48. Eating and drinking places	107.2	115.5	103.3	105.3
49. Building materials, hardware and farm equipment	127.9	128.2	147.9	122.5
50. Other retail stores	74.5	79.0	73.5	71.9
51. Wholesale and retail trade not allocable	100.4	99.8	101.3	100.1
52. Total finance, insurance, and real estate	71.6	79.1	71.1	66.7

TABLE C-1--(Continued)

Industry	η_a = Average Elasticity for the Three Periods	η_1 = Elasticity 1958-1959	η_2 = Elasticity 1959-1960	η_3 = Elasticity 1960-1961
53. Banking	9.7	9.9	9.6	9.6
54. Credit agencies other than banks	16.6	18.2	16.1	15.7
55. Holding and other investment companies	49.4	56.4	33.2	66.4
56. Security and commodity brokers, dealers, exchanges, and services	18.8	35.7	15.8	12.4
57. Insurance carriers	523.0	595.2	500.0	492.6
58. Insurance agents, brokers, and service	74.4	65.8	75.9	80.4
59. Real estate, except lessors of real property other than buildings	26.4	30.3	22.4	27.2
60. Lessors of real property, except buildings	199.5	707.2	109.4	253.1
61. Total services	45.3	55.2	59.6	59.7
62. Hotels, rooming houses, camps, and other lodging places	40.2	40.8	38.8	41.1
63. Personal services	60.1	60.4	59.6	60.3
64. Business services	109.6	97.2	103.7	128.9
65. Automobile repair, services and garages, and other repair services	100.3	104.8	100.3	97.8
66. Motion pictures	28.1	28.6	31.1	24.9

TABLE C-1--(Continued)

Industry	η_a = Average Elasticity for the Three Periods	η_1 = Elasticity 1958-1959	η_2 = Elasticity 1959-1960	η_3 = Elasticity 1960-1961
67. Amusement and recreation services, except motion pictures	38.5	39.0	38.3	38.4
68. Other services	61.3	51.6	69.7	63.6
69. Nature of business not allocable	73.5	91.6	58.7	62.8

The coefficients of variation $V = \frac{\sigma}{\bar{X}}$, are: $V_1 = 321.0\%$; $V_2 = 337.9\%$; $V_3 = 174.6\%$

*η_1 = July 1958--June 1959

η_2 = July 1959--June 1960

η_3 = July 1960--June 1961

η_a = average for the three periods

These estimates are based on corporation data only.

SOURCE: Statistics of Income, Corporation Income Tax Returns, U. S. Treasury Department, Internal Revenue Service, for the relevant years.

Lerner-Robinson Proposition

Fortunately, we have another computationally easy and analytically reasonable method of estimating elasticity. This formulation follows right from the definition of elasticity, i.e.,

$$\eta_L = \frac{\text{average value(A)}}{\text{average value(A)} - \text{marginal value(M)}}$$

We have taken advantage of the fact that Lerner's index of monopoly power is the inverse of the elasticity under the appropriate conditions. We have proved all of this above. The great advantage of this approach over ηa is that η_L is an estimate of the <u>actual</u> elasticity rather than an <u>upper bound</u> to the actual elasticity. In fact, the Lerner-Robinson approach, η_L, is always less than the advertising approach, ηa. This can be seen from step (15) in the above proof:

> $p/(p\text{-a.v.c.}) < (pq)/a$ and since $\eta_L = p/(p\text{-a.v.c.})$ and $\eta a = (pq)/a$, under our scale assumption, we have $\eta_L < \eta a$. And since the sum of the firm elasticities is presumably greater than the industry elasticity, ηI, we probably again have slightly upward based estimates, i.e., $\eta I < \eta_L < \eta a$.

Before examining the estimates based upon this new approach, it is well to keep a few things in mind about these estimates. Firstly, our assumption of constant costs is necessary for profit data to give us the desired information. So we have assumed $(p\text{-a.v.c.})/p \approx (p\text{-mc})/p (= 1/\eta_L)$. Secondly, we have called the average profit rate of all industrial groups (the overall average) the "normal" profit rate in computing "excess" profits in the above formulation. To be sure, it

certainly appears reasonable to conceive of the typical entreprenuer's opportunity costs in this way. Thirdly, it should be emphasized that our estimates are based upon data for all business establishments, C, P, SP, based on average figures for 1957-58 to 1960-61 for P and SP and 1956-57 to 1960-61 for C. Since we are usually interested in elasticities for C rather than for all business types, it would be easy for an interested researcher to obtain this information without doing all the estimating we were forced to do to obtain information on all types of business establishments for the special problem we were primarily concerned with here. Fourthly, it is well to keep in mind that this approach suffers from the same fundamental defect as does the advertising approach, viz., the theory is strictly applicable only at the firm level, but, we applied it on a more aggregative industry level. Of course, the well-known fallacy of composition tells us this larger whole is not necessarily equal to the sum of the parts. Strict non-comparability of receipts and income data also limit the validity of our estimates. For instance, what constitutes receipts (or say capital) in, say, banking is quite different from receipts in some manufacturing concerns. A detailed investigation should examine these things. Finally, it is important to remember that since "excess" profits change everytime we make adjustments for intangibles, royalties and advertising, our estimated elasticities change. However, we shall only show the figures for what we think are the most relevant cases for other research purposes--the unadjusted estimates. All these estimates are averages in two senses: first, they are not shown on a yearly basis but rather on an average

for the four-or five-year period examined; second, we have assumed a linear increase of assets (but, a geometric rate is also feasible) so to obtain a linear increase of assets so to obtain average (or possibly mid-year) asset figures instead of possibly biased (if the growth rate of assets is high) end-of-year assets.

Despite all our qualifications and provisos, we think our six estimates are useful. Although it is true some industries show a great variance in elasticities depending upon the approach, they are for the most part consistent and more importantly at absolute levels much less repugnant to our previous a priori and empirical notions. For instance, the agricultural estimates although still on the high side are but one-tenth the level found by our previous approach. Once the researcher decides which of our six profit rate approaches is the most useful for his particular project, we think these elasticity estimates will, at least, give him some consistent, although admittedly rough, "first approximations" to the relevant elasticities.

In Table C-3, we have shown the Pearson product moment correlation coefficients as well as the Spearman rank correlation coefficients. Let us now turn to these statistical findings.

TABLE C-2

PRICE ELASTICITY OF DEMAND ESTIMATES USING THE LERNER-ROBINSON APPROACH*

Industry Number*	After-Corporation Tax Income of C With Untaxed Income of P, SP				Before-Corporation Tax Income of C With Untaxed Income of P, SP			
	Profit Methods							
	I	II	III	IV	V	VI	VII	VIII
2	11.15	11.26	13.77	18.73	6.52	12.56	17.09	8.52
4	9.47	7.68	7.89	10.42	11.71	8.51	8.86	12.95
5	16.96	13.24	14.15	16.77	14.04	10.78	11.56	13.28
6	10.07	9.90	11.86	10.55	12.89	12.52	17.22	13.06
7	329.07	40.79	45.57	20.07	974.79	34.40	38.89	24.87
8	31.86	27.45	33.79	28.21	34.46	28.08	37.49	29.35
10	96.57	44.84	52.03	91.11	436.61	75.12	107.73	6,332.43
11	239.15	90.51	105.51	197.36	65.06	156.14	118.30	73.86
12	187.70	88.70	142.98	90.35	33.80	126.49	74.08	27.68
13	40.57	25.45	28.15	36.03	50.76	25.75	29.50	39.26
14	411.53	138.12	150.00	277.34	8,388.27	156.21	176.95	527.58
15	92.54	93.56	99.95	50.71	74.73	75.60	81.06	36.97
16	859.55	83.84	71.73	281.97	90.40	333.56	177.68	142.22
17	99.36	33.97	41.32	94.10	64.80	101.38	330.20	81.33
18	117.60	823.41	1,450.35	166.01	37.33	70.95	60.31	45.70
19	220.73	68.00	105.19	148.48	47.69	240.88	379.87	46.38
20	22.39	14.86	16.31	20.45	19.51	12.37	13.70	16.45
21	137.67	48.97	58.87	161.92	79.24	219.18	12,444.48	77.17
22	104.82	52.56	60.06	85.35	575.76	70.78	90.73	189.63
23	375.92	45.76	58.06	144.04	36.02	370.76	114.39	51.18
24	56.93	26.72	31.14	54.30	14.23	10.39	11.20	13.65
25	99.71	49.17	58.14	78.81	210.78	114.67	216.35	2,625.08
26	138.62	43.91	53.08	99.95	18.52	13.45	14.45	16.79
27	374.68	63.14	79.20	224.33	51.60	260.85	124.66	57.03
28	29.32	39.52	36.49	30.84	98.12	773.07	690.60	132.56
29	113.33	221.83	962.76	210.53	21.52	34.41	29.77	25.98
30	374.57	82.20	121.01	765.16	26.94	56.38	43.80	49.02

TABLE C-2--(Continued)

Industry Number*	After-Corporation Tax Income of C With Untaxed Income of P, SP				Before-Corporation Tax Income of C With Untaxed Income of P, SP			
	Profit Methods							
	I	II	III	IV	V	VI	VII	VIII
31	71.89	39.09	44.36	64.95	128.76	43.46	52.50	92.78
33	10.49	10.53	11.52	19.88	8.25	8.28	9.08	15.98
34	23.54	11.52	13.39	34.98	504.58	17.88	24.96	53.00
35	7.48	4.75	5.28	13.97	7.50	4.28	4.85	22.09
36	5.00	3.26	3.60	8.53	.19	2.60	2.39	7.95
39	290.45	523.37	750.46	291.71	197.92	358.91	435.53	205.81
40	315.15	59.55	220.89	275.93	987.70	53.20	359.25	416.20
41	241.73	876.59	2,270.78	250.67	91.86	404.78	643.02	254.95
43	90.72	66.97	100.24	74.59	100.75	64.54	116.88	79.68
44	327.18	112.20	164.15	183.48	154.03	862.84	395.72	546.84
45	184.88	227.23	394.27	262.85	781.35	27,500.26	403.99	505.10
46	544.97	109.98	156.22	1,313.17	135.79	473.68	715.28	99.54
47	1,166.60	209.43	397.70	454.62	250.45	891.72	559.22	433.36
48	27.88	22.78	36.94	26.73	34.95	25.58	58.41	38.34
49	164.57	269.73	139.01	104.53	66.62	83.90	60.72	47.57
50	51.76	39.79	41.12	54.12	86.42	52.20	62.74	110.64
51	284.82	225.78	329.95	425.81	1,207.08	3,270.40	687.00	299.11
53	.92	1.07	.96	1.64	1.02	1.28	1.08	1.16
54	18.38	3.24	4.33	2.47	2.84	1.46	1.72	2.06
55	.49	.23	.28	.30	.18	.12	.13	.12
56	6.52	14.61	23.50	48.18	3.84	6.68	210.16	35.58
57	52.54	153.96	93.60	121.80	141.82	107.23	258.75	73.24
58	3.94	4.17	4.49	4.20	4.00	4.31	4.77	4.26
59	1.35	2.39	1.59	3.58	.95	1.56	1.09	2.32
60	.13	.21	.23	.17	.10	.17	.18	.13
62	8.73	32.18	26.12	18.74	6.30	20.14	16.94	12.98
63	8.90	7.38	7.72	8.68	10.14	7.76	8.26	9.98

TABLE C-2--(Continued)

Industry Number**	After-Corporation Tax Income of C with Untaxed Income of P, SP				Before-Corporation Tax Income of C With Untaxed Income of P, SP			
	Profit Methods							
	I	II	III	IV	V	VI	VII	VIII
64	16.76	16.51	16.85	15.78	15.65	15.36	15.15	14.67
65	12.44	10.19	10.92	10.81	14.99	11.13	12.29	12.10
66	15.13	16.31	17.08	20.29	13.11	14.29	15.05	18.04
67	96.43	97.85	232.17	47.97	96.92	98.83	417.33	39.92
68	2.46	2.42	2.48	2.46	2.51	2.45	2.52	2.54
69	23.84	34.18	225.05	18.73	49.23	267.16	34.90	29.06

The coefficients of variation, $V = \frac{\sigma}{\bar{X}}$ are:

$V_1 = 145.8\%$ $V_3 = 231.0\%$ $V_5 = 396.0\%$ $V_7 = 456.0\%$

$V_2 = 182.2\%$ $V_4 = 164.3\%$ $V_6 = 560.2\%$ $V_8 = 369.6\%$

*Using profit Methods I-VIII (see Table 7) for all business establishments [corporations (C), partnerships (P), and sole proprietorships (SP)],based upon unadjusted average returns for the five-year period, 1956-1957 to 1960-1961, for C, and the four-year period, 1957-1958 to 1960-1961 for P, SP.

**For Industry Number coding see Table C-1.

SOURCE: See Table B-1.

TABLE C-3

CORRELATION OF ELASTICITY ESTIMATES

Variables

X(1) = Lerner-Robinson Elasticity Estimate Based Upon Profit Method I
X(2) = Lerner-Robinson Elasticity Estimate Based Upon Profit Method II
X(3) = Lerner-Robinson Elasticity Estimate Based Upon Profit Method III
X(4) = Lerner-Robinson Elasticity Estimate Based Upon Profit Method IV
X(5) = Lerner-Robinson Elasticity Estimate Based Upon Profit Method V
X(6) = Lerner-Robinson Elasticity Estimate Based Upon Profit Method VI
X(7) = Lerner-Robinson Elasticity Estimate Based Upon Profit Method VII
X(8) = Lerner-Robinson Elasticity Estimate Based Upon Profit Method VIII
X(9) = Elasticity Estimate Based Upon Dorfman-Steiner-Telser Advertising Intensity Approach, 1958-1959
X(10) = Elasticity Estimate Based Upon Dorfman-Steiner-Telser Advertising Intensity Approach, 1959-1960
X(11) = Elasticity Estimate Based Upon Dorfman-Steiner-Telser Advertising Intensity Approach, 1960-1961

N=60

Zero Order Product Moment Correlation Coefficient Matrix

Variable	X(1)	X(2)	X(3)	X(4)	X(5)	X(6)	X(7)	X(8)	X(9)	X(10)	X(11)
X(1)	1.000000	.262065	.203075	.643309	.223605	.072368	.059271	.048502	-.128950	-.132069	-.172794
X(2)		1.000000	.935496	.281732	.062237	.134480	.020523	.004502	-.080619	-.008114	-.069516
X(3)			1.000000	.234875	.014873	.104611	.013875	-.004999	-.072132	-.083874	-.070626
X(4)				1.000000	.144215	.131421	.094945	.026234	-.119031	-.087139	-.166678
X(5)					1.000000	.074746	-.009166	.097586	-.044424	-.041518	-.056397
X(6)						1.000000	.015913	.044225	-.043290	-.048217	-.068925
X(7)							1.000000	-.012704	-.046221	-.040314	-.069752
X(8)								1.000000	-.061769	-.066669	-.097408
X(9)									1.000000	.618070	.894937
X(10)										1.000000	.670954
X(11)											1.000000

TABLE C-3--(Continued)

Rank Correlation Coefficient Matrix

Variable	X(1)	X(2)	X(3)	X(4)	X(5)	X(6)	X(7)	X(8)	X(9)	X(10)	X(11)
X(1)	1.000000	.864018	.853682	.919589	.773770	.844401	.771603	.780884	-.112387	-.032565	-.076799
X(2)		1.000000	.924924	.904974	.762378	.869464	.821506	.784218	-.079916	.008169	-.037677
X(3)			1.000000	.864573	.719422	.845124	.785329	.749875	-.149232	-.089747	-.125090
X(4)				1.000000	.742595	.839289	.832120	.840178	-.131567	-.045402	-.098861
X(5)					1.000000	.802834	.805502	.903584	.036621	.099639	.049680
X(6)						1.000000	.908030	.854237	-.101619	-.027785	-.086024
X(7)							1.000000	.884523	-.103863	-.042734	-.104362
X(8)								1.000000	-.065727	-.005168	-.058461
X(9)									1.000000	.960897	.974300
X(10)										1.000000	.962990
X(11)											1.000000

The correlation matrices point out a number of interesting things. First of all, it points out that we must be chary about making any remarks concerning the usefulness of the Dorfman-Steiner-Telser (D-S-T) estimates for even relative ranking purposes--assuming, as we do, that the Lerner-Robinson (L-R) estimates are more precise, not only with respect to absolute levels but to rankings as well. Indeed, there is generally a negative correlation between the D-S-T and L-R approaches for both the product moment and rank methods. Second of all, we should notice the striking increase in the coefficients in moving from the product moment to the rank estimates--between own estimates the product moment is less than .1 and sometimes negative while by ranks the lowest is .7 and all are positive. Since for many purposes, invariance of elasticity rankings is more important, the high rank correlations are certainly encouraging.

APPENDIX D

INDUSTRY-BY-INDUSTRY "WELFARE LOSSES" FOR PROFIT METHOD IV INCLUDING ALL INTERMEDIATE ADJUSTMENTS; UNADJUSTED AND FULLY ADJUSTED LOSSES USING METHODS II, III, V-VIII

TABLE D-1

INDUSTRY-BY-INDUSTRY "WELFARE LOSSES" FOR PROFIT METHOD IV INCLUDING ALL INTERMEDIATE ADJUSTMENTS
(thousand dollars)

Industry Number*	Unadjusted Profit Rates		Adjusted for Intangibles (I)		Adjusted for (I) and Royalties (R)		Adjusted for (I),(R) and Advertising (A)	
	$\pi = 1$	π_L	$\pi = 1$	π_L	$\pi = 1$	π_L	$\pi = 1$	π_L
1	46,752	875,481	48,210	889,028	54,541	945,602	69,738	1,069,258
2	9,861	102,746	9,412	100,379	9,933	103,119	9,998	103,458
3	4,264	71,519	4,240	71,314	4,458	73,130	4,584	74,151
4	26,487	279,529	25,140	272,328	26,358	278,850	28,058	287,701
5	1,519	39,604	1,528	39,720	1,655	41,336	2,070	46,223
6	31,415	886,207	31,576	888,469	32,314	898,792	41,234	1,015,295
7	489	44,593	514	45,720	592	49,040	15,266	249,056
8	622	122,669	642	124,715	763	135,950	15,050	603,617
9	279	25,191	281	25,273	326	27,248	6,954	125,801
10	5,202	187,450	5,198	187,382	5,577	194,081	8,579	240,720
11	80	22,125	82	22,471	101	24,919	1,164	84,507
12	1,665	84,418	1,681	84,822	1,878	89,676	2,720	107,911
13	32	8,975	36	9,558	48	11,023	776	44,315
14	628	59,118	642	59,785	797	66,582	2,273	112,448
15	235	39,088	334	46,583	414	51,836	1,411	95,692
16	556	82,531	637	88,328	855	102,349	25,794	562,217
17	43,350	886,528	41,381	866,152	44,045	893,599	53,242	982,475
18	130	21,080	134	21,403	169	24,028	1.880	80,097
19	260	22,182	260	22,206	288	23,347	1,061	44,820
20	235	33,829	244	34,450	332	40,247	1,216	76,989
21	4,581	248,731	3,865	228,467	5,218	265,465	7,544	319,190
22	1,497	117,965	1,516	118,733	1,731	126,870	5,043	216,540
23	1,317	131,585	1,311	131,325	1,602	145,149	6,172	284,900
24	203	45,539	219	47,275	294	54,807	5,321	233,144
25	8,374	258,306	8,442	259,350	8,717	263,541	10,107	283,776
26	269	56,703	299	59,777	423	71,045	2,482	172,140
27	5	3,717	9	5,150	21	7,750	1,917	73,851

TABLE D-1--(Continued)

Industry Number*	Unadjusted Profit Rates		Adjusted for Intangibles (I)		Adjusted for (I) and Royalties (R)		Adjusted for (I), (R) and Advertising (A)	
	$\pi = 1$	π_L	$\pi = 1$	π_L	$\pi = 1$	π_L	$\pi = 1$	π_L
28	917	59.533	922	59,712	1,011	62,517	3,198	111,195
29	40,593	807,058	40,451	805,649	43,261	833,155	51,272	907,027
30	5,292	185,106	5,444	187,746	6,355	202,852	8,735	237,812
31	42,062	587,731	42,070	587,787	45,649	612,283	48,600	631,763
32	2,608	22,243	2,596	22,193	2,781	22,968	2,834	23,189
33	196	57,129	201	57,867	221	60,722	950	125,794
34	95	26,101	97	26,454	122	29,645	639	67,845
35	800	200,646	835	204,970	1,002	224,518	6,064	552,226
36	4,483	334,384	4,576	337,825	4,756	344,425	12,118	549,779
37	387	71,058	394	71,640	509	81,460	10,694	373,398
38	85	22,386	99	24,195	133	28,015	4,868	169,236
39	3	3,613	5	4,964	16	8,674	5,641	163,590
40	123	55,908	136	58,789	180	67,563	3,508	298,623
41	10,000	267,305	8,936	252,684	9,231	256,822	14,635	323,367
42	584	61,001	588	61,208	691	66,374	707	67,136
43	4,413	238,798	4,679	245,895	5,021	254,742	14,148	427,589
44	47	19,941	53	21,158	81	26,173	1,425	110,017
45	273,422	449,251	276,671	451,912	309,544	478,006	415,679	553,925
46	180,230	445,247	179,663	444,546	190,692	457,988	247,902	522,189
47	697,045	206,999	704,433	208,094	832,602	226,234	844,086	227,789
48	373	17,990	548	21,788	710	24,817	16,644	120,117
49	676	82,317	693	83,344	1,054	102,813	1,581	125,897
50	96,637	406,197	97,822	408,679	98,358	409,796	109,712	432,804
51	215,111	769,785	215,477	770,441	233,581	802,153	324,081	944,855
52	726,841	125,161	723,248	124,851	759,123	127,910	762,585	128,201
53	5,661	106,068	5,629	105,761	6,030	109,470	7,392	121,196
54	49,845	432,727	50,520	435,649	51,441	439,603	68,099	505,798
55	19,238	303,663	19,676	307,101	20,068	310,145	25,736	351,225

TABLE D-1--(Continued)

Industry Number*	Unadjusted Profit Rates		Adjusted for Intangibles (I)		Adjusted for (I) and Royalties (R)		Adjusted for (I), (R) and Advertising (A)	
	$\pi = 1$	π_L	$\pi = 1$	π_L	$\pi = 1$	π_L	$\pi = 1$	π_L
56	26,599	287,614	26,799	288,696	27,243	291,074	35,613	332,802
57	3,178	64,500	2,794	60,476	2,959	62,238	3,820	70,712
58	607	29,124	1,214	41,178	1,274	42,191	5,108	84,473
59	1,400,264	3,452,707	1,450,009	3,513,501	1,454,236	3,518,618	1,569,256	3,655,119
60	1,777	33,287	1,855	34,009	1,931	34,698	2,649	40,641
Total "Welfare Loss"	4,000,496	14,989,985	4,056,966	15,080,923	4,315,317	15,630,044	4,961,630	20,947,663

*For coding of Industry Number see Table 9. See Table 7 and Appendix A's section "Profit Rate and 'Welfare Loss' Adjustments" for a description of Profit Method IV.

TABLE D-2

INDUSTRY-BY-INDUSTRY "WELFARE LOSSES" FOR PROFIT METHODS II, III, V-VIII, UNADJUSTED AND FULLY ADJUSTED RESULTS
(thousand dollars)

Industry Number*	Unadjusted ($\mathcal{N}=1$)	Unadjusted ($\mathcal{N}_L$)	Fully Adjusted ($\mathcal{N}=1$)	Fully Adjusted ($\mathcal{N}_L$)
		Method II		
1	129,354	1,456,258	161,625	1,627,805
2	18,149	139,389	17,533	137,003
3	6,841	90,585	7,259	93,312
4	30,080	297,888	31,813	306,348
5	621	25,310	1,083	33,400
6	33,179	910,742	43,210	1,039,343
7	2,021	90,617	21,423	295,029
8	2,956	267,495	23,188	749,249
9	289	25,658	7,082	126,956
10	10,430	265,420	15,092	319,276
11	322	44,424	1,868	107,047
12	489	45,754	1,101	68,667
13	360	30,186	1,697	65,526
14	4,820	163,747	8,526	217,780
15	10	7,881	382	49,785
16	2,652	180,207	37,621	678,991
17	82,157	1,220,445	95,927	1,318,764
18	1,423	69,694	4,886	129,142
19	685	36,022	1,827	58,804
20	2,327	106,479	4,613	149,934
21	18,922	505,521	24,781	578,519
22	3,845	189,079	8,909	287,793
23	6,822	299,531	15,839	456,409
24	2,563	161,800	11,991	350,000
25	5,102	201,627	6,521	227,942
26	243	53,816	2,397	169,174
27	421	34,603	3,856	104,726
28	2,530	98,911	5,869	150,651
29	144,796	1,524,255	166,553	1,634,764
30	48,786	562,034	59,078	618,480
31	364,026	1,729,020	391,970	1,794,157
32	17,880	58,242	18,862	59,821
33	61	31,843	571	97,544
34	2,031	120,929	3,718	163,631
35	65	57,377	3,384	412,538
36	5,561	372,436	13,813	586,969
37	1,036	116,197	13,411	418,150
38	114	25,895	4,985	171,274

TABLE D-2--(Continued)

Industry Number*	Unadjusted ($\eta = 1$)	Unadjusted (η_L)	Fully Adjusted ($\eta = 1$)	Fully Adjusted (η_L)
		Method II (Continued)		
39	392	43,135	8,627	202,308
40	579	121,360	5,101	360,087
41	13,771	313,675	21,232	389,497
42	88	23,641	943	77,559
43	8,164	324,816	20,287	512,035
44	130	33,196	1,775	122,756
45	642,659	688,751	859,185	796,371
46	104,856	339,614	172,936	436,145
47	1,190,892	270,567	1,411,536	294,567
48	4,059	59,321	30,128	161,608
49	423	65,122	1,115	105,716
50	98,216	409,501	111,778	436,860
51	483,323	1,153,871	652,382	1,340,570
52	467,648	100,394	491,472	102,920
53	1,919	61,745	6,428	113,023
54	69,046	509,301	89,896	581,067
55	17,585	290,324	23,885	338,358
56	29,925	305,066	39,414	350,109
57	4,919	80,246	12,301	126,895
58	146	14,276	2,543	59,607
59	1,448,148	3,511,246	1,567,867	3,653,501
60	533	18,236	1,037	25,420
Total "Welfare Loss"	5,541,386	20,354,723	6,776,113	26,441,727
		Method III		
1	86,494	1,190,809	113,528	1,364,269
2	17,197	135,658	10,132	104,150
3	5,988	84,750	6,370	87,417
4	20,968	248,709	23,009	260,532
5	497	22,652	915	30,728
6	21,892	739,784	30,341	870,921
7	1,501	78,089	1,767	84,731
8	2,175	229,450	20,860	710,645
9	111	15,917	6,021	117,062
10	8,523	239,939	12,724	293,159
11	273	40,906	1,743	103,417
12	429	42,830	1,001	65,456
13	492	35,279	1,971	70,622
14	3,258	134,617	6,361	188,117
15	3	4,474	581	61,404

TABLE D-2--(Continued)

Industry Number*	Unadjusted (η=1)	Unadjusted (η_L)	Fully Adjusted (η=1)	Fully Adjusted (η_L)
		Method III (Continued)		
16	1,107	116,493	29,053	596,682
17	68,171	1,111,719	81,026	1,212,016
18	985	57,976	4,030	117,282
19	525	31,521	1,554	54,237
20	1,445	83,919	3,313	127,057
21	13,931	433,757	18,932	505,662
22	2,750	159,912	7,175	258,282
23	4,667	247,753	12,418	404,115
24	1,629	128,990	9,822	316,765
25	5,985	218,363	7,491	244,311
26	13	12,400	1,357	127,272
27	194	23,506	3,367	97,867
28	1,965	87,174	4,871	137,247
29	120,993	1,393,345	140,636	1,502,198
30	36,092	483,412	44,855	538,912
31	295,109	1,556,772	319,225	1,619,131
32	14,633	52,689	15,488	54,207
33	30	22,207	601	91,331
34	148	32,604	763	74,135
35	10	22,149	2,819	376,571
36	2,482	248,827	8,672	465,093
37	484	79,423	11,124	380,829
38	38	14,924	4,373	160,404
39	194	30,368	7,583	189,668
40	165	64,724	3,641	304,219
41	5,237	193,435	10,264	270,811
42	330	45,872	1,570	100,066
43	6,640	292,929	17,842	480,188
44	78	25,734	1,566	115,326
45	808,046	772,307	1,044,494	878,061
46	58,622	253,933	110,705	348,957
47	753,418	215,207	883,610	233,061
48	1,569	36,885	22,326	139,118
49	1,144	107,086	2,150	146,820
50	84,675	380,225	97,445	407,890
51	1,091,478	1,733,988	1,346,716	1,926,090
52	395,803	92,361	416,759	94,774
53	2,912	76,070	8,150	127,264
54	63,065	486,741	83,079	558,663
55	16,883	284,475	23,047	332,369
56	26,100	284,906	35,061	330,213
57	4,489	76,659	12,797	129,427
58	26	6,017	1,864	51,033
59	1,389,295	3,439,156	1,507,344	3,582,290
60	12	2,770	166	10,178
Total "Welfare Loss"	5,453,365	18,765,575	6,608,370	24,630,725

TABLE D-2--(Continued)

Industry Number*	Unadjusted (η=1)	Unadjusted (η L)	Fully Adjusted (η=1)	Fully Adjusted (η L)
		Method V		
1	385,872	2,515,184	442,030	2,691,993
2	7,803	91,400	8,517	95,488
3	6,082	85,412	6,442	87,908
4	17,763	228,915	20,325	244,868
5	1	1,059	97	10,015
6	21,055	725,510	29,322	856,170
7	21	9,306	11,383	215,056
8	5,720	372,119	30,121	853,952
9	1.992	67,337	12,411	168,065
10	2,622	133,079	5,109	185,766
11	0	732	13	8,889
12	767	57,288	1,505	80,269
13	310	27,996	1,588	63,397
14	1,325	85,855	3,470	138,938
15	4,656	173,827	8,191	230,547
16	5,389	256,978	44,254	736,415
17	47,623	929,188	59,901	1,042,108
18	544	43,075	3,059	102,182
19	6	3,288	354	25,880
20	3,755	135,263	6,481	177,716
21	66,690	949,054	76,534	1,016,691
22	209	44,107	2,191	142,725
23	38,352	710,200	56,149	859,328
24	3,837	197,980	14,565	385,738
25	828	81,198	1,421	106,389
26	25,780	554,760	37,395	668,143
27	3,918	105,566	10,842	175,608
28	233	30,032	1,743	82,094
29	235,651	1,944,524	263,352	2,055,641
30	25	12,832	749	69,657
31	146,072	1,095,259	161,324	1,151,023
32	5,192,365	992,518	5,516,245	1,023,005
33	425	84,203	1,401	152,819
34	7	7,292	332	48,900
35	5,961	547,555	39,452	1,408,651
36	2,457	247,567	8,621	463,723
37	550	84,643	11,416	385,789
38	10	7,531	3,970	152,838
39	257	34,936	7,958	194,299
40	405	101,485	4,735	346,901
41	5,848	204,413	11,070	281,239
42	1,437	95,712	3,516	149,730
43	1,730	149,534	8,846	338,111
44	6	7,034	1,099	96,620
45	706,304	722,051	928,917	828,057
46	136,205	387,066	208,560	478,965

TABLE D-2--(Continued)

Industry Number*	Unadjusted (η=1)	Unadjusted (η_L)	Fully Adjusted (η=1)	Fully Adjusted (η_L)
		Method V (Continued)		
47	1,942,937	345,595	2,129,484	361,806
48	58,926	226,013	123,502	327,203
49	498	70,694	1,191	109,263
50	106,747	426,915	120,678	453,919
51	3,072,408	2,909,230	3,495,056	3,102,885
52	1,971,431	206,129	2,037,544	209,557
53	49,985	315,167	67,854	367,205
54	36,546	370,533	52,413	443,738
55	19,569	306,266	26,205	354,410
56	13,834	207,420	20,641	253,367
57	7,616	99,847	16,608	147,445
58	149	14,414	2,561	59,814
59	1,355,197	3,396,690	1,471,865	3,539,881
60	257	12,663	624	19,723
Total "Welfare Loss"	15,724,967	24,249,442	17,643,204	30,828,523
		Method VI		
1	103,990	1,305,699	135,253	1,489,094
2	14,770	125,747	15,630	129,355
3	10,337	111,355	10,848	114,073
4	18,815	235,593	21,472	251,677
5	872	30,005	1,452	38,717
6	31,698	890,186	41,579	1,019,535
7	720	54,090	907	60,690
8	993	155,051	16,955	640,683
9	142	17,992	6,259	119,351
10	10,186	262,301	14,817	316,356
11	251	39,281	1,700	102,126
12	749	56,629	1,492	79,915
13	23	7,587	618	39,537
14	541	54,872	2,165	109,736
15	1,289	91,457	3,545	151,669
16	211	50,874	23,393	535,413
17	118,445	1,465,396	135,317	1,566,293
18	71	15,573	1,669	75,474
19	378	26,746	1,263	48,904
20	35	13,143	675	57,351
21	125,012	1,299,379	139,162	1,370,949
22	707	81,079	3,533	181,230
23	72,664	977,571	96,832	1,128,486
24	150	39,163	5,161	229,608
25	13	10,306	171	36,874

TABLE D-2--(Continued)

Industry Number*	Unadjusted ($\eta=1$)	Unadjusted (η_L)	Fully Adjusted ($\eta=1$)	Fully Adjusted (η_L)
		Method VI (Continued)		
26	10,080	346,897	18,023	463,856
27	895	50,453	5,202	121,642
28	2,047	88,972	5,171	141,406
29	233,986	1,937,644	261,331	2,047,737
30	20,244	362,043	27,506	422,011
31	448,629	1,919,454	479,664	1,984,735
32	28,035	72,930	29,254	74,498
33	129	46,433	804	115,764
34	2,544	135,367	4,431	178,647
35	307	124,257	4,589	480,404
36	5,632	374,814	13,980	590,510
37	18	15,110	10,385	367,962
38	0	213	3,613	145,814
39	21	10,015	6,068	169,671
40	32	28,503	2,820	268,009
41	10,922	279,353	17,854	357,164
42	906	76,003	2,645	129,876
43	4,743	247,591	14,795	437,262
44	1	2,596	1,574	115,605
45	451,661	577,402	641,308	688,027
46	514,577	752,338	654,514	848,491
47	4,639,658	534,050	4,963,004	552,346
48	19,414	129,728	50,819	209,890
49	872	93,499	1,795	134,149
50	91,756	395,806	105,300	424,012
51	1,124,368	1,759,919	1,370,948	1,943,341
52	741,081	126,381	770,789	128,889
53	4,896	98,642	11,283	149,739
54	62,385	484,113	82,549	556,881
55	20,306	311,978	27,216	361,184
56	25,092	279,351	33,913	324,762
57	6,414	91,628	14,797	139,173
58	143	14,135	2,728	61,731
59	1,413,295	3,468,735	1,532,780	3,612,390
60	9	2,333	149	9,642
Total "Welfare Loss"	10,398,164	22,655,766	11,855,472	28,650,314

TABLE D-2--(Continued)

Industry Number*	Unadjusted ($\mathcal{H}$=1)	Unadjusted ($\mathcal{H}$ L)	Fully Adjusted ($\mathcal{H}$=1)	Fully Adjusted ($\mathcal{H}$ L)
		Method VII		
1	56,103	959,053	79,781	1,143,665
2	13,652	120,895	8,398	94,819
3	8,969	103,723	9,430	106,359
4	9,953	171,351	12,090	188,857
5	683	26,547	1,201	35,217
6	17,790	666,883	25,524	798,804
7	350	37,714	15,113	247,800
8	1,730	204,650	19,627	689,320
9	415	30,722	7,644	131,901
10	7,764	229,000	11,832	282,706
11	196	34,677	1,546	97,408
12	652	52,814	1,347	75,928
13	80	14,242	994	50,149
14	51	16,848	914	71,324
15	1,784	107,593	4,295	166,943
16	85	32,260	21,712	515,818
17	96,593	1,323,330	112,383	1,427,403
18	0	274	1,055	60,008
19	230	20,866	1,007	43,653
20	372	42,598	1,532	86,402
21	107,651	1,205,787	120,609	1,276,291
22	199	42,973	2,191	142,726
23	62,956	909,925	85,491	1,060,344
24	657	81,948	7,224	271,666
25	17	11,537	180	37,841
26	13,473	401,045	22,391	517,011
27	1,483	64,940	6,485	135,811
28	1,403	73,651	4,473	131,522
29	194,518	1,766,685	223,177	1,892,358
30	10,393	259,413	15,672	318,543
31	349,701	1,694,659	376,088	1,757,433
32	22,738	65,679	23,799	67,195
33	88	38,265	695	107,623
34	56	20,047	531	61,836
35	122	78,219	3,740	433,719
36	1,826	213,406	7,440	430,778
37	83	32,946	8,601	334,876
38	36	14,565	4,361	160,185
39	9	6,632	5,594	162,909
40	81	45,451	3,196	285,032
41	2,094	122,331	5,928	205,807
42	1,730	105,021	3,984	159,386
43	3,283	205,968	12,519	402,233
44	18	12,360	1,242	102,709

TABLE D-2--(Continued)

Industry Number*	Unadjusted ($\mathcal{H}=1$)	Unadjusted ($\mathcal{H}_L$)	Fully Adjusted ($\mathcal{H}=1$)	Fully Adjusted ($\mathcal{H}_L$)
45	638,701	686,627	868,312	800,590
46	373,082	640,605	493,015	736,407
47	3,467,307	461,673	3,750,185	480,137
48	20	4,125	13,890	109,730
49	150	38,748	0	1,321
50	74,890	357,582	90,876	393,903
51	2,300,762	2,517,528	2,688,736	2,721,527
52	623,092	115,884	653,778	118,704
53	6,928	117,330	13,951	166,503
54	55,024	454,653	76,827	537,233
55	19,323	304,335	32,841	396,756
56	20,587	253,034	29,112	300,898
57	5,777	86,961	15,489	142,393
58	8	3,347	2,140	54,676
59	1,337,649	3,374,627	1,499,642	3,573,127
60	512	17,865	1,030	25,334
Total "Welfare Loss"	9,915,876	21,104,421	11,512,863	27,329,557
		Method VIII		
1	226,086	1,925,240	242,486	1,993,847
2	6,384	82,672	7,051	86,885
3	6,803	90,333	7,204	92,959
4	17,283	225,799	19,779	241,552
5	1,669	41,507	2,319	48,925
6	29,013	851,645	38,540	981,573
7	0	642	10,577	207,305
8	4,438	327,781	27,214	811,689
9	2,970	82,218	14,693	182,866
10	4,382	172,048	7,533	225,567
11	22	11,630	900	74,315
12	3,132	115,787	4,542	139,437
13	125	17,795	1,136	53,608
14	841	68,403	2,697	122,482
15	3,107	141,994	6,253	201,441
16	5,697	264,219	45,424	746,084
17	67,009	1,102,203	80,621	1,208,979
18	573	44,230	3,144	103,587
19	53	9,983	565	32,709
20	1,860	95,202	3,958	138,877
21	72,487	989,443	82,893	1,058,084
22	1	3,542	1,158	103,775
23	46,658	783,344	69,925	958,970
24	3,141	179,125	13,267	368,153

TABLE D-2--(Continued)

Industry Number*	Unadjusted (η=1)	Unadjusted (η_L)	Fully Adjusted (η=1)	Fully Adjusted (η_L)
	Method VIII (Continued)			
25	453	60,104	927	85,951
26	17,687	459,509	27,800	576,088
27	1,184	58,027	9,839	167,289
28	449	41,677	2,287	94,043
29	62,869	1,004,374	76,124	1,105,197
30	2,305	122,173	4,963	179,258
31	16,834	371,813	21,152	416,781
32	3,002	23,863	3,272	24,917
33	393	80,973	1,349	149,922
34	42	17,304	488	59,306
35	774	197,280	6,027	550,590
36	3,928	313,013	11,249	529,696
37	44	23,842	8,188	326,729
38	23	11,649	4,221	157,594
39	479	47,659	9,072	207,455
40	135	58,651	3,580	301,631
41	4,861	186,376	9,837	265,118
42	2,818	134,050	5,607	189,084
43	1,056	116,809	7,354	308,825
44	95	28,388	1,658	118,638
45	543,436	633,354	740,477	739,312
46	259,930	534,707	339,079	610,715
47	4,222,740	509,490	4,565,751	529,779
48	685	24,362	18,524	126,721
49	1,869	136,885	3,253	180,595
50	94,289	401,231	107,684	428,785
51	513,082	1,188,864	673,046	1,361,636
52	1,238,642	163,389	1,283,974	166,352
53	11,795	153,098	20,787	203,241
54	37,717	376,422	54,501	450,617
55	22,281	326,801	29,440	375,650
56	21,225	256,922	29,425	302,511
57	4,022	72,563	10,969	119,827
58	877	34,997	6,343	94,131
59	1,322,939	3,356,020	1,506,480	3,581,264
60	738	21,454	1,332	28,821
Total "Welfare Loss"	8,919,432	19,174,880	10,299,487	25,297,199

*See Table 7 for an outline of these different profit methods as well as Appendix A's section "Profit Rate and 'Welfare Loss' Adjustments" for the distinction between Methods I-VIII and 1-8; also see Table 9 for Industry Number Code.

SOURCE: See Table B-1.

APPENDIX E

TWO-DIGIT VALUE-ADDED AND EMPLOYMENT CONCENTRATION RATIOS BASED UPON PERCENTAGES ACCOUNTED FOR BY 4, 8, AND 50 LARGEST FIRMS IN AMERICAN MANUFACTURING, 1958

APPENDIX E

TWO-DIGIT VALUE-ADDED AND EMPLOYMENT CONCENTRATION RATIOS BASED UPON PERCENTAGES ACCOUNTED FOR BY 4, 8, AND 50 LARGEST FIRMS IN AMERICAN MANUFACTURING, 1958

The concentration ratios for the various industries utilized above and shown below are based upon concentration ratios calculated for finer industrial subdivisions. In moving from four-digit manufacturing (443 industries for E, 446 for VA) to two-digit (20 industries), there are a number of problems in combining the industries. The interested reader should consult the brief but enlightening Appendix C in George J. Stigler's Capital and Rates of Return in Manufacturing Industries (National Bureau of Economic Research, 1963), pp. 206-215 for a description of some of the problems. To obtain our estimates we merely averaged the concentration ratios of the shipments (or employment) at the four-digit level with value-added (or employment) as weights. This will cause an overestimation of the correct concentration whenever the four-digit industries are highly competitive with one another. To illustrate our estimation procedure, let us take the following hypothetical and unrealistic example of a two-digit industry composed of two four-digit industries:

	1958	
Product	Value of Shipments	Concentration Ratio
9950	$ 80,000	40
995	20,000	90
99	100,000	?

The weighted average is .80 x 40 + .20 x 90 = 32 + 18 = 50. If the reader is interested in some kind of crude notion of what might constitute an appropriate figure for concentrated vs. unconcentrated industries, Stigler's benchmarks for three-digit industries are worth remembering. His criteria were: concentrated, if four largest firms ship over 60% of the product in the national market; unconcentrated, if over 50% in the national market, or under 20% in a regional market; ambiguous (not labeled) if outside both categories. His characterization of industries as national, regional, or local was based, with but slight modifications, on the National Resources Committee report on The Structure of the American Economy, Part I, Appendix 8. The excellent source for our estimates is contained in the note to the following table containing our estimated two-digit ratios.

TABLE E-1

TWO-DIGIT VALUE-ADDED AND EMPLOYMENT CONCENTRATION RATIOS IN AMERICAN MANUFACTURING, 1958

Standard Industrial Classification Code	Industry Grouping	Per Cent of Value of Shipments Accounted for by--				Per Cent of Employment Accounted for by--			
		4 Largest Companies	8 Largest Companies	20 Largest Companies	50 Largest Companies	4 Largest Companies	8 Largest Companies	20 Largest Companies	50 Largest Companies
20	Food and kindred products	32	43	56	67	25	34	45	56
21	Tobacco manufactures	74	93	97	99	59	82	92	98
22	Textile mill products	28	41	58	76	24	36	54	72
23	Apparel and other fabricated textile products	14	20	32	47	11	17	27	41
24	Lumber and products (except furniture)	11	17	25	35	9	14	22	31
25	Furniture and fixtures	19	26	37	51	15	22	33	47
26	Paper and allied products	26	38	57	74	23	35	53	68
27	Printing and publishing	18	25	37	50	15	22	31	44
28	Chemicals and allied products	46	61	78	88	42	58	74	85
29	Petroleum and coal products	34	56	82	94	35	56	78	90
30	Rubber products	52	65	77	84	46	58	71	79
31	Leather and leather products	24	33	45	61	22	30	41	56
32	Stone, clay, and glass products	38	49	62	72	35	46	61	72
33	Primary metal products	47	61	76	88	43	56	72	85
34	Fabricated metal products	27	35	47	60	22	29	41	55
35	Machinery (except electrical)	36	48	63	76	32	44	59	72
36	Electrical machinery	48	60	74	86	42	53	67	80
37	Transportation equipment	58	72	84	91	55	69	83	90

TABLE E-1--(Continued)

Standard Industrial Classification Code	Industry Grouping	Per Cent of Value of Shipments Accounted for by-- 4 Largest Companies	8 Largest Companies	20 Largest Companies	50 Largest Companies	Per Cent of Employment Accounted for by-- 4 Largest Companies	8 Largest Companies	20 Largest Companies	50 Largest Companies
38	Instruments and related products	48	63	76	88	44	58	73	87
39	Miscellaneous manufactures	22	31	43	57	20	29	42	55

The coefficients of variation, $V = \frac{\sigma}{\bar{X}}$ are:

$V_1 = 46.24\%$ $V_5 = 46.88\%$

$V_2 = 41.69\%$ $V_6 = 43.51\%$

$V_3 = 33.03\%$ $V_7 = 35.94\%$

$V_4 = 24.92\%$ $V_8 = 27.88\%$

SOURCE: Compiled from Concentration Ratios in Manufacturing Industry 1958, Report prepared by the Bureau of the Census for the Subcommittee on Antitrust and Monopoly of the Committee on the Judiciary, United States Senate, Parts I and II (Washington, D. C.: Government Printing Office, 1963, 1962).

APPENDIX F

RANKING OF INDUSTRIES BY LERNER"S INDEX OF MONOPOLY POWER, Zm = (P-MC)/P

TABLE F-1

RANKING OF INDUSTRIES BY LERNER'S INDEX OF MONOPOLY POWER, Zm = (P-MC)/P*

Ranking**	Using Profit Method I, Fully Adjusted, with $\eta = 1$	Using Profit Method IV, Fully Adjusted, with $\eta = 1$
	Industry Number***	Industry Number***
1	45	59
2	59	50
3	50	48
4	54	54
5	56	56
6	55	55
7	60	60
8	9	58
9	41	9
10	16	16
11	58	41
12	7	6
13	25	7
14	6	25
15	39	39
16	43	43
17	38	38
18	46	27
19	27	36
20	49	37
21	37	8
22	36	15
23	26	26
24	15	24
25	8	44
26	24	49
27	44	40
28	13	18
29	35	13
30	40	35
31	18	33
32	11	11
33	33	34
34	20	23
35	5	20
36	23	19
37	34	42
38	42	14

TABLE F-1--(Continued)

Ranking**	Using Profit Method I, Fully Adjusted, with $\eta = 1$	Using Profit Method IV, Fully Adjusted, with $\eta = 1$
	Industry Number***	Industry Number***
39	19	2
40	22	22
41	28	57
42	14	21
43	12	12
44	10	10
45	21	30
46	57	53
47	48	5
48	30	17
49	17	1
50	2	29
51	53	3
52	1	31
53	29	4
54	4	2
55	2	32
56	31	51
57	32	46
58	51	45
59	47	47
60	52	52

*Computed from profit Methods I and IV outlined in Table 7 and discussed in Appendix A, "Profit Rate and 'Welfare Loss' Adjustments."

**Rankings are from highest monopoly power to lowest.

***For Industry Number coding see Table 6.

SOURCE: See Table B-1.