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THE SOCIAL COSTS OF MONOPOLY POWER*

In 1954, Arnold Harberger estimated the welfare losses from monopoly for the United States at 0·1 of 1 % of GNP. Several studies have appeared since, reconfirming Harberger's early low estimates using different assumptions (e.g. Schwartzman, 1960; Scherer, 1970; Worcester, 1973). These papers have firmly established as part of the conventional wisdom the idea that welfare losses from monopoly are insignificant.

The Harberger position has been, almost from the start, subject to attack, however (e.g. Stigler, 1956); Kamerschen (1966) followed essentially the Harberger methodology, but assumed an elasticity of demand consistent with monopoly pricing behaviour at the industry level and obtained welfare loss estimates as high as 6 %. Posner (1975) made some rough estimates of the social costs of acquiring monopoly power, but, using Harberger's calculations, concluded that the real problem was the social cost imposed by regulation rather than of private market power.

The most sophisticated critique of Harberger's approach has been offered by Abram Bergson (1973). Bergson criticises the partial equilibrium framework employed by Harberger and all previous studies, and puts forward a general equilibrium model as an alternative. He then produces a series of hypothetical estimates of the welfare losses from monopoly, some of them quite large, for various combinations of the two key parameters in this model, the elasticity of substitution in consumption and the difference between monopoly and competitive price. Not surprisingly Bergson's estimates, suggesting as they do that monopoly can be a matter of some consequence, have induced a sharp reaction (see Carson, 1975; Worcester, 1975).[1]

The present paper levels several objections against the Harberger-type approach. It then calculates estimates of the welfare loss from monopoly using procedures derived to meet these objections, and obtains estimates significantly greater than those of previous studies. Although several of the objections we make have been made by other writers, none has systematically adjusted the basic Harberger technique to take them into account. Thus all previous estimates of monopoly welfare losses suffer in varying degrees from the same biases incorporated in Harberger's original estimates.

We do, however, employ a partial equilibrium framework as followed by Harberger and all subsequent empirical studies. Although a general equilibrium framework would be preferable, such an approach requires simplifying assump-

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[1] In addition to the points Bergson (1975) raises in his own defence, we have serious objections to the arguments made by Carson (1975) and Worcester (1975). Some of these are presented below in our critique of previous studies.

tions which to our mind are just as restrictive as those needed to justify the partial equilibrium approach. For example, Bergson must assume that social welfare can be captured via a social indifference curve, and further that this indifference curve is the CES variety. The assumption that the elasticity of substitution (σ) is constant further implies, for a disaggregated analysis, that the elasticity of demand for each product (η_i) is the same, since $\eta_i \to \sigma$ as the share of the ith product in total output approaches zero. But the assumption that η_i is the same for all i is the same assumption made by Harberger and most other previous studies. It introduces a basic inconsistency between the observed variations in price cost margins and the assumed constant elasticities in demand, which the present study seeks to avoid. Given such problems, we have adopted the partial equilibrium framework, with all the necessary assumptions it requires (see Bergson, 1973). We present estimates for both the United States and the United Kingdom based on data gathered at the firm level.

I. THEORETICAL ANALYSIS

We have four substantive criticisms of the Harberger approach:

(1) In the partial equilibrium formula for welfare loss $\frac{1}{2}dp\,dq$, where dp is the change in price from competition to monopoly and dq is the change in quantity, dp and dq were considered to be independent of each other. Generally low values of dp were *observed* and low values of dq were *assumed*. In Harberger's case he assumed that price elasticities of demand in all industries were unitary. This must inevitably lead to small estimates of welfare loss.

(2) The competitive profit rate was identified with the mean profit rate and thus automatically incorporated an element of monopoly. In fact the underlying approach was a "constant degree of monopoly" – one in which distortions in output were associated with deviations of profit rate from the mean, rather than from the competitive return on capital.

(3) The use of industry profit rates introduces an immediate aggregation bias into the calculation by allowing the high monopoly profits of those firms with the most market power to be offset by the losses of other firms in the same industry. Given assumption (1), a further aggregation bias is introduced, which can easily be shown to result in additional downward bias in the estimates.

(4) The entire social loss due to monopoly was assumed to arise from the deviation of monopoly output from competitive levels. To this should be added the social cost of attempts to acquire monopoly positions, existing or potential.

We now seek to justify each of these four criticisms.

(A) *Interdependence of dp_i and dq_i*

Assuming profit maximising behaviour we can define the implied price elasticity of demand for a specific firm by observing the mark-up of price on marginal cost:

$$\hat{\eta}_i = p_i/(p_i - mc_i). \tag{1}$$

For a pure monopolist or perfectly colluding oligopolist $\hat{\eta}_i$ is the industry elasticity of demand. In other cases $\hat{\eta}_i$ reflects both the industry demand elas-

ticity and the degree of rivals' response to a change in price the ith firm perceives (Cubbin, 1975). Using (1) we shall obtain welfare loss estimates by individual firms from their price/cost margins. These estimates indicate the amount of welfare loss associated with a single firm's decision to set price above marginal cost, given the change in its output implied by $\hat{\eta}_i$.[1] To the extent other firms also charge higher prices, because firm i sets its price above marginal cost, the total welfare loss associated with firm i's market power exceeds the welfare loss we estimate. To the extent that a simultaneous reduction to zero of all price cost margins is contemplated, however, $\hat{\eta}_i$ overestimates the net effect of the reduction in p_i on the ith firm's output. What the latter effect on output and welfare would be is a matter for general equilibrium analysis and is not the focus here. Rather, we attempt an estimate of the relative importance of the distortions in individual firm outputs, on a firm by firm basis, on the assumption that each does possess some monopoly power, as implied by the price cost margin it chooses, and uses it.

This approach emphasising the interdependence of observed price distortions and changes in output contrasts with the methodology of Harberger (1954), Schwartzman (1960), Worcester (1973) and Bergson (1973), who observe (or, in Bergson's case, assume) $(p_i - mc_i)/p_i$ and then *assume* a value of η_i.[2] Harberger observed generally low values of dp_i and yet chose to assume that $\eta_i = 1$, and therefore that dq_i was also very small. But, it is inconsistent to observe low values of dp_i and infer low elasticities unless one has assumed that the firm or industry cannot price as a monopolist, i.e. unless one has already assumed the monopoly problem away.[3] Assuming interdependence we obtain the following definition of welfare loss:

$$dW_i = \frac{1}{2}\frac{dp_i}{p_i}\frac{dq_i}{q_i}p_i q_i, \tag{2}$$

where

$$\frac{dp_i}{p_i} = \frac{1}{\hat{\eta}_i} \quad \text{and} \quad \frac{dq_i}{q_i} = \hat{\eta}_i \frac{dp_i}{p_i} = 1,^4$$

therefore

$$dW_i = \frac{dp_i}{p_i}\frac{p_i q_i}{2}. \tag{3}$$

Assuming constant costs we can rewrite (3) in terms of profits:

$$dW_i = \frac{\Pi_i}{p_i q_i}\frac{p_i q_i}{2} = \frac{\Pi_i}{2}. \tag{4}$$

[1] We need here an assumption of perfect competition everywhere else, of course. We shall ignore problems of the second best, along with the general equilibrium issue more generally, throughout the paper.

[2] The Harberger and Schwartzman estimates are at the industry level.

[3] This position is questioned by Wenders (1967) and others who attempt to show how implausible the implied η_i's are. However, their calculations are erroneous because they fail to recognise (*a*) that the degree of collusion is a variable – we need not assume perfect joint profit maximisation and (*b*) that entry is conditional on the same variables (plus others) that determine $(p_i - mc_i)/p_i$, for example η, the degree of concentration and, for differentiated products, advertising also.

[4] This is true so long as the firm is in equilibrium, i.e. that the firms' expectations about the behaviour of rivals are actually borne out. If this were not the case then the elasticity on which the pricing decision was made would not correspond to the elasticity implied by the change in output. We assume firm equilibrium in our calculations.

This formulation obviously contrasts sharply with Harberger's:

$$dW_i = \tfrac{1}{2} p_i q_i \eta_i t_i^2, \tag{5}$$

where

$$t_i = dp_i/p_i, \quad \eta_i = 1.$$

It is obvious that if t_i is small the welfare loss is going to be insignificant. If t_i were a price increase due to tariff or tax then it might be assumed to be independent of η_i,[1] and equation (5) would give a reasonable estimate of welfare loss. But where t_i is a firm decision variable, η_i and t_i must be interdependent, and formulae for calculating welfare losses should take this interdependence into account. Interesting here is the Worcester (1975) critique of Bergson for doing essentially this with his hypothetical general equilibrium calculations when Worcester himself followed the Harberger line without demure (Worcester, 1973).[2] In contrast to Harberger and Worcester, Bergson (1973) allowed himself to pick some combinations of t_i and η_i, which implied high values of welfare loss.

Harberger defended his choice of a demand elasticity of 1·0 across all products on the grounds that what was "envisage[d was] not the substitution of one industry's product against all other products, but rather the substitution of one great aggregate of products (those yielding high rates of return) for another aggregate (those yielding low rates of return)" (p. 79). Thus, the use of $\eta = 1{\cdot}0$ was an attempt at compensating for the disadvantages of employing a partial equilibrium measure of welfare loss to examine a general equilibrium structural change. But certainly this is a very awkward way of handling the problem which neither answers the criticisms raised by Bergson (1973) against the partial equilibrium approach, nor those we have just presented. For this reason we have chosen to define the partial equilibrium methodology properly and obtain the best estimates we can with this approach, recognising that it leaves unanswered the issues raised by general equilibrium analysis and the theory of second best regarding the net effect of a simultaneous elimination of all monopoly power. We return to this point below in Subsection E.

(B) *The Measurement of Monopoly Profits*

The obvious measure of monopoly profit is the excess of actual profits over long-run competitive returns. For an economy in equilibrium, the competitive profit rate is the minimum profit rate compatible with long-run survival, after making appropriate allowances for risk. Monopoly profit is thus the difference between actual profits and profits consistent with this minimum rate.

Harberger (1954) and all subsequent studies have based their monopoly profit estimates on the size of the deviation between actual profit rates and the mean rate. To the extent that observed profits contain elements of monopoly

[1] But not necessarily so. Taxes and tariffs may be applied according to elasticity expectations.

[2] Worcester (1975) also offers some empirical support. His collection of industry price elasticities is either irrelevant (including many agricultural products and few manufacturing ones) or suspect (no allowance having been made in the studies quoted for quality change over time), and is certainly not comprehensive.

rent, the mean profit rate exceeds the minimum rate consistent with long-run survival. The deviations between profit rates above the mean and the mean rate underestimate the level of monopoly returns, and the estimate of monopoly welfare is biased downwards.[1] Indeed, if all firms and industries were in long-run equilibrium, all would earn profits equal to or greater than the minimum and the use of deviations from the mean would minimize the size of the measured monopoly profits.

It is unreasonable to assume that the time periods investigated in Harberger's study, the others which followed, or our own, are long enough or stable enough so that all firms and industries are in equilibrium. The presence of firms earning profits less than the competitive norm creates a methodological problem for a study of monopoly welfare losses. All studies to date have implicitly assumed that a monopolist's costs are the same as those of a firm in competitive equilibrium, and that all welfare loss is from the loss of consumers' surplus from a monopoly price above marginal cost. But, what is the appropriate assumption to make for a firm experiencing losses? It seems unrealistic to assume that its costs are at competitive levels and its prices below them. More reasonable seems the assumption that these firms are in disequilibrium, probably with costs currently above competitive levels. When calculating monopoly welfare losses, therefore, we simply drop all firms (or industries where relevant) with profits below the competitive return on capital, in effect assuming that they will eventually return to a position where they are earning normal profits or disappear. In either case, they represent no long-run loss to society. (It is possible that some of these losses represent expenditures by firms hoping to secure monopoly positions from other firms in the industry, as discussed below. These losses are then part of the social costs of monopoly. We attempt to account for them in one of our welfare loss formulae.)

Previous studies, to the extent we can ascertain, have followed Harberger and treated deviations in profits below and above the mean symmetrically. That is, an industry whose profit rate was 5 % below the mean profit rate was considered to have created as large a welfare loss as an industry whose profits are 5 % above the mean.[2] Thus, these studies have not actually estimated welfare loss under monopoly using perfect competition as the standard of comparison, but have effectively compared welfare loss under the present regime with that which would exist were the degree of monopoly equalised across all firms and industries. Under their procedures, a constant degree of monopoly power, however high, would result in no welfare loss. While such an approach has some theoretical support, it raises practical difficulties. How is this elusive concept of a constant degree of monopoly defined and measured? How is such a world created without an omniscient planner or regulator? In addition,

[1] Worcester (1973) makes some allowance for this bias by using 90 % of the median profit rate, but this adjustment is obviously rather *ad hoc*.

[2] One might believe that the losses by firms earning profits below the norm represent a form of *factor surplus loss* which must be added to the consumer surplus loss to obtain the full losses from monopoly. But, as Worcester (1973) has shown, these factor-surplus losses, if properly measured, are *an alternative way* of estimating the consumer surplus losses and should be used *instead of* the consumer surplus measure, rather than in addition to it, if used at all.

monopoly in product markets could be expected to induce distortions in factor markets. Finally, as developed below, the existence of monopoly power in product markets attracts resources to its acquisition and protection, which are part of the social cost of monopoly apart from the distortions in output accompanying it. For these reasons, and because it appears to be most directly in the spirit of the analysis, we have compared monopoly profits to competitive returns, and considered only deviations above the competitive rate when estimating welfare losses.

Following Harberger and other previous studies we have attempted to minimise the transitory component in our estimates by using averages of firm profits over several years.[1] Nevertheless, some of the companies earning profits above competitive levels in our samples are in temporary disequilibrium, and the welfare losses associated with these firms can be expected to disappear over time. Thus, our estimates of monopoly profits are a combination of both long-run monopoly profits and short-run disequilibrium profits. To the extent the time periods we have chosen are representative of the U.K. and U.S. economies under "normal" conditions, our calculations are accurate estimates of the annual losses from monopoly, both permanent and transitory, that can be expected in these countries. A further effort to eliminate the transitory monopoly components from the data would require a specification of what is meant by "permanent" and "transitory" monopolies. Many economists would take it for granted that in the "long run" all monopolies are dead and thus monopoly like unemployment is a "short run" phenomenon. As with unemployment, the question is how serious is the problem when it exists, and how long does it last. Our paper addresses the first of these questions. A full answer to the second question is clearly beyond the scope of our essentially cross-section analysis.

(C) *The Aggregation Biases from Using Industry Data*

Previous studies of monopoly welfare losses with the exception of Worcester (1973) used industry data at a fairly high level of aggregation. At any point in time some firms in an industry are likely to be earning profits below the competitive level. We have already discussed the methodological issues raised in a study of monopoly welfare losses by firms earning negative economic profits. If our interpretation of these firms as being in short-run disequilibrium is correct, then they should be dropped from an industry before calculating the industry's profit rate. Previous studies which have based their calculations solely on industry data have effectively combined the negative profits of some firms with the positive profits of others in estimating the welfare losses from monopoly. Thus they have implicitly assumed that the monopoly profits earned by the most profitable firms in the industry are somehow offset or mitigated by

[1] Harberger chose 5 years of "normal" business activity in the 1920s for his original study of the United States. Following his lead we have chosen 4 years in the 1960s for the U.S. estimates falling between a recession and the Vietnam War boom. The results reported below for the United Kingdom are for only two years, 1968/9. The U.K. results for 1970/4 indicate that averaging profits over five years does not change the nature of the outcome.

those experiencing transitory losses. But if there is a monopoly problem in an industry, it is represented by the positive rents earned by those firms with profits above the norm, and the losses of firms that are temporarily unable to compete successfully in no way alleviates the social costs arising from the monopoly positions of the other firms. The present study therefore measures monopoly welfare losses using firm level monopoly profit estimates.

A second aggregation bias is introduced into the estimates of all previous studies other than Kamerschen's (1966) through the assumption of a constant elasticity of demand across all industries. This results in the profit margin's appearance as a squared term in the welfare loss formula. The use of average firm profit margins (including firms with negative profits) implicit in the use of industry data, further biases the welfare loss estimates downwards. The extent of this bias is measured below.

(D) *Welfare Loss in the Acquisition of Monopoly Power*

Tullock (1967) and Posner (1975) have argued that previous studies understate the social costs of monopoly by failing to recognise the costs involved in attempts to gain and retain monopoly power. These costs could take the form of investment in excess production capacity, excessive accumulation of advertising goodwill stocks, and excessive product differentiation through R and D.[1] Efforts to obtain tariff protection, patent protection and other types of preferential government treatment through campaign contributions, lobbying or bribery are parts of the social costs of the existence of monopoly as defined by Tullock and Posner. To the extent that these expenditures enter reported costs in the form of higher payments to factor owners and legitimate business expenses, firm costs in the presence of monopoly exceed costs under perfect competition. Estimates of welfare loss based on those profits remaining *net* of these expenditures *under*estimate the social cost of monopoly in two ways: first, by understating monopoly rents they understate the distortions in output monopoly produces; secondly, by failing to include these additional expenditures as part of the costs of monopoly.

Three adjustments to the usual welfare triangle measure of monopoly welfare loss are made to account for the additional expenditures to redistribute monopoly rents, monopoly power induces. First, advertising is added to monopoly profit in calculating the welfare triangle loss to allow for the understatement of monopoly profit expenditures of this type produce. Second, all of advertising is added to the welfare loss. This takes the extreme view of advertising as merely an instrument for securing market power. To the extent advertising provides useful information to consumers, this measure overstates the cost of monopoly.[2] Thirdly, all of measured, after-tax profits above the competitive cost of

[1] See Spence (1974). It is interesting to note that this type of activity generally dominates the entry-limiting pricing response. Entry-limiting pricing can be thought of as having extra capacity because of potential entry and actually using it to produce output. Thus the profits associated with restricting output are lost. From this viewpoint we cannot accept Posner's position that the elimination of entry regulation would eliminate waste. As the probability of entry increases so would the optimal degree of excess capacity. Monopoly pricing would be maintained but social waste would still occur.

[2] There will always be an inherent bias in the information provided given the interests of the agent

capital are used as the estimate of the expenditures incurred by others to obtain control of these monopoly rents. Obviously this estimate is but a first approximation. It is an underestimate, if the firm has incurred expenditures in the acquisition and maintenance of its monopoly position, which are included in current costs. It is an overstatement if actual and potential competitors can successfully collude to avoid these wasteful outlays. This type of argument can always be rebutted, however, by carrying the Tullock/Posner analysis one stage back and positing expenditures of resources to enter the potential competitor's position, and so on. The arguments that after-tax profits underestimate the additional costs associated with monopoly seem at least as reasonable as those suggesting overestimation.

(E) *An Objection and Alternative Estimating Technique*

The assumption that demand elasticity equals the reciprocal of the price–cost margin, equation (1), can give rise, when price–cost margins are small, to firm level elasticity estimates much greater than existing industry level estimates, and imply large increases in output from the elimination of monopoly. This has led several observers to criticise the use of the Lerner formula, and the underlying assumption that firms set price as if they possess and utilise market power. Worcester (1969) has made the argument most forcefully.

> Serious error...arise[s] if the "monopolist" is only an oligopolist who fears entry, unfavourable publicity, government regulation or a weaker position at the bargaining table should profits be too high, and for such reasons prices at P_0 (Fig. 1) and sells output Q_E in spite of the fact that the marginal revenue is far below zero at that point. [1969, p. 237, note that our Fig. 1 and Worcester's are drawn to scale.]

The elasticity of demand is lower at P_0 than at P_M, and the expansion in output following a reduction in price to competitive price P_c is obviously much smaller if we assume the "monopolist" sets price equal to P_0. Thus Worcester's depiction of the problem does meet the objections many have raised against the use of the Lerner formula to estimate demand elasticities. We observe only that if one assumes from the start that "monopolists" are so constrained in their behaviour that they must set price so low that marginal revenue is negative, it can be no surprise that calculations incorporating this assumption indicate insignificant welfare losses. But any estimates of welfare losses within a partial equilibrium framework, which impose demand elasticities significantly below those implied via the Lerner formula, must implicitly be assuming that firms set price in such an environment, if the data on price/cost margins are accepted at face value.

The latter assumption may not be valid, however, and its abandonment allows a reconciliation of existing profit-margin data with lower demand

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doing the advertising so the argument for advertising as a provider of information should not be taken too seriously. Even if we base our welfare measures on post-advertising preferences it is still possible to demonstrate that monopolies (and *a fortiori* oligopolies) invest in too much advertising (see Dixit and Norman, 1975).

elasticity figures without also introducing the assumption that monopolists are either irrational or impotent. The preceding section discusses several business outlays that are made to maintain or preserve monopoly positions. Conceptually these are best treated as *investments* out of current profits made to secure future monopoly rents than as current production costs as is done for accounting purposes, and is carried through into the economist's calculations based on accounting data. A rational monopolist will not take these into account in making his short-run pricing decision. We can thus reconcile the monopoly pricing assumption with small demand elasticity estimates by assuming that average costs contain much investment-type expenditure and that marginal production costs are below these.

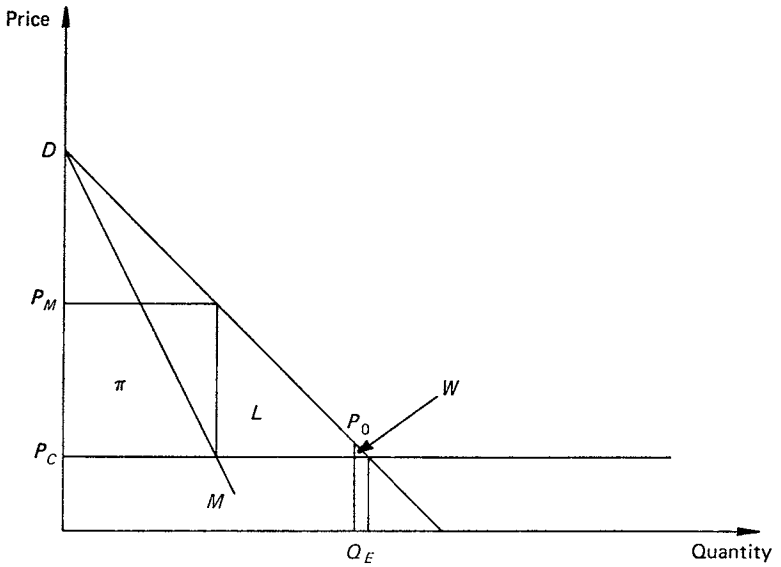

Fig. 1. π, Monopoly profit rectangle. L, Deadweight loss assuming firm exercises monopoly power. W, Worcester's proposed deadweight loss.

In Fig. 2 let C_0 be observed costs, including investment-type outlays, and P_0 observed price. For such price and cost figures to be consistent with monopoly pricing behaviour the firm's demand schedule would have to be D_0. Price P_0 would be consistent with a much more inelastic demand schedule, D_a say, if actual production costs were at C_a. Note that both profits (π), and the welfare triangle losses (L) are much larger under the more inelastic demand schedule assumption.

Thus, an alternative procedure for calculating the welfare losses from monopoly to the one described above would be to estimate price/cost margins from data on demand elasticities, where now we estimate demand elasticities from data on price/cost margins. We do not pursue these calculations here. First, because we do not have demand elasticity data applicable to firms, and the imposition of any constant η across all firms is obviously *ad hoc*. Secondly, the choice of any η in line with existing industry estimates would lead to welfare

loss estimates far greater than those calculated here. The highest of the elasticities used in previous studies has been $\eta = 2{\cdot}0$. This implies a profit margin of 50 % and a welfare triangle loss equal to one-quarter of sales. These estimates exceed those reported here, whenever the firm's profits are *less* than one-half of sales. Since this is true for all our firms, our welfare loss estimates are all smaller than under the alternative procedure.

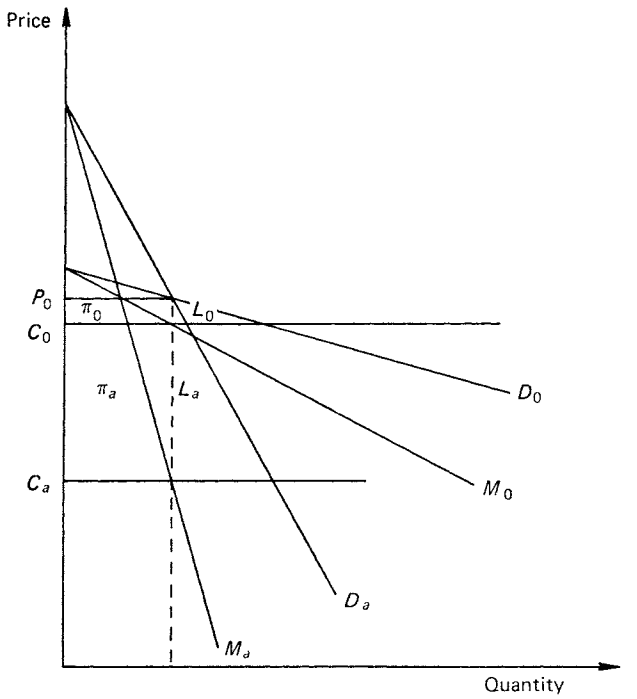

Fig. 2

We believe that reported costs do contain large amounts of investment-type expenditures beyond the advertising we allow for, that production costs are lower therefore, and that individual firm demand elasticities are typically lower than we implicitly estimate. We emphasise, however, that any attempt to take these costs into account, and adjust demand elasticities accordingly, while maintaining the assumption that companies do possess and exercise market power, will lead to larger estimates of welfare loss underlining again the conservative nature of our calculations.

II. EMPIRICAL ESTIMATES

Empirical estimates of the social cost of monopoly power were obtained for both the United States and United Kingdom. We provide two sets of estimates, one based on our assumptions (ΔW^k_{CM}), the other based on Harberger-type assumptions (ΔW^k_H), both measured at the firm-level. For each approach we give a range of four estimates defined in Table 1.

Thus for $k = 1$ we define two alternative estimates of the welfare triangle,

the one (ΔW^1_{CM}) based on interdependence of dp_i and dq_i, the other (ΔW^1_H) based on the Harberger methodology. This latter estimate is included for comparison with previous results especially from the viewpoint of bias due to aggregation. For $k = 2$, the same calculations are performed but in calculating dp_i, advertising expenditure (A_i) is deducted from cost. For $k = 3$ we add in advertising expenditure as a social cost, and for $k = 4$ we also add in monopoly profits *after tax* as a further element of social cost. It should be noted at this point that in calculating dp_i the appropriate profit measure is *before tax*

Table 1

Alternative Definitions of Social Cost

k	ΔW^k_{CM}	ΔW^k_H
1	$\Pi/2$	$(R/2)\,(\Pi/R)^2$
2	$(\Pi+A)/2$	$(R/2)\,[(\Pi+A)/R]^2$
3	$A+(\Pi+A)/2$	$(R/2)\,[(\Pi+A)/R]^2+A$
4	$\Pi'+A+(\Pi+A)/2$	$(R/2)\,[(\Pi+A)/R]^2+A+\Pi'$

Π, before tax profit; Π', after tax profit; A, advertising; R, total revenue.

profit since the price and quantity choice of a monopolist should not be affected by a tax on profits. Thus, in contrast to most previous studies, we use before-tax profits to measure the distortion between price and costs under monopoly (the ΔW's for $k = 1, 2, 3$). However, it is *after-tax* monopoly profits which provide an inducement to additional expenditures to gain monopoly, and it is these that are added in to obtain our fourth measure of welfare loss.

To estimate monopoly profits an estimate of the return on capital of a firm in a competitive industry is needed. Any estimates based on actual returns earned in existing industries run the danger of including monopoly rents. The stock market might be regarded as coming fairly close to satisfying the free-entry and -exit requirement of a competitive industry, however. The returns on corporate stock will include monopoly rents to the extent that they become capitalised over the period for which the rate is estimated. The use of these returns for the United States is therefore equivalent to assuming that (1) all existing monopoly rents are fully capitalised at the beginning of the period, and (2) changes in monopoly rents over the period are accurately anticipated.

For the United States we use as our estimate of the competitive return on capital the Fisher–Lorie index of returns on a fully diversified portfolio of listed stocks for the same period for which our monopoly profit estimates are made (1963–6). This estimate was 12% which might be compared with the average return on capital earned by the firms in our sample of 14%.

For the United Kingdom we use the pre-tax real cost of capital as calculated by Flemming *et al.* (1976). These estimates avoid the newly capitalised monopoly rent problem mentioned above entirely. For the 1968/9 period they yield an estimate of the cost of capital of 8·15 %.[1]

[1] It may be argued that because of inflation we are undervaluing land or capital. This should not be a serious problem for the United States since our data follow a period of quite modest price increases.

The firms in our samples include companies operating in both intermediate and final goods markets. To justify the addition of triangular type measures of welfare loss for final and intermediate products, we must assume that the demand schedule for an intermediate product represents a derived demand schedule as in traditional Marshallian analysis. Under this assumption, triangular measures of welfare loss calculated from intermediate product demand schedules fully capture the loss in consumer welfare monopoly distortions in the intermediate markets cause, as Wisecarver (1974) has recently demonstrated. Assuming advertising and other efforts to obtain monopoly power are as wasteful when undertaken in intermediate markets as in final goods markets, the formulae presented in Table 1 can be applied for both intermediate and final good producers.

(A) *U.S. Estimates*

The range of welfare loss estimates for the United States are presented in Table 2. They refer to the 1963–6 period and the sample comprises the 734 firms on the COMPUSTAT tape with useable information.[1] The firms are ranked according to the size of welfare loss as measured by ΔW^4_{CM}. General Motors leads the list with an annual welfare loss of over $\$1\frac{3}{4}$ billion, which alone is over $\frac{1}{4}$ of 1% of average GNP during the period, and exceeds Harberger's original welfare loss estimate for the entire economy. Most of the other members of the top 20 are names one also might have expected. One possible exception is AT & T. AT & T's gross profit rate was, in fact, less than our estimate of the cost of capital ($\approx 0{\cdot}12$). Its advertising entry on the COMPUSTAT tape (and in this case we did have a COMPUSTAT figure, see appendix) was $\$\frac{3}{4}$ billion, and it is AT & T's advertising which leads to the high ΔW_{CM} estimate we have for it. Advertising also weighs heavily in the ΔW^4_{CM} estimates for Unilever, Proctor and Gamble, Sears Roebuck, Genesco, Colgate–Palmolive, Pan Am and Pacific Tel. At first sight this might seem surprising, particularly with respect to regulated firms like AT & T and Pacific Tel. But, as Posner (1975) has argued, this is precisely what one expects to find in industries with high market power, and, as Posner himself stresses, firms under regulatory constraint can be expected to engage, if anything, in more wasteful dissipation of their

Given that inflation in the United Kingdom in 1968/9 was substantial, although very much less than in the seventies, we have corrected our data at the company level. Using data from Walker (1974), we multiplied the profit figure derived from the company accounts by the ratio of the average rate of return at replacement cost to the average rate of return at historical cost and subtracted from this the estimated book value of assets times the cost of capital. The ratio of rates of return used was 9·4:13·4 in 1968 and 8·2:12·4 in 1969. We should in fact be using the ratio of the rate of return at replacement cost to the rate of return at book value but the latter rate was not available on a comparable basis (see Walker, 1974, table 3). This means that our measure of excess profits and therefore of welfare loss will tend to be biased down, given that (*a*) asset revaluations generally take place at merger, when acquired assets are given a current market valuation, and (*b*) revaluations, of land and buildings especially, do take place periodically, their frequency being related to the rate of inflation. The cost of capital measure used was the forward-looking, pre-tax measure which was estimated at 8·15% for the period 1968/9 (Flemming *et al.* 1976).

[1] The COMPUSTAT tape contains data on a sample of large firms, mostly in manufacturing, listed on U.S. stock exchanges. The data definitions used in making the estimates are discussed in the appendix.

monopoly rents than non-regulated firms through expenditures like advertising. It is interesting to note in this regard that 6 of the 40 largest welfare losses are accounted for by regulated firms (3 telephone companies and 3 airlines) in which advertising made up all or most of the losses.

At the bottom of Table 2 the losses are summed over the firms with positive profit margins as defined for the ΔW^1 and ΔW^2 measures (see table notes), and then expressed as a proportion of our estimate of the Gross Corporate Product originating in the 734 firms in the sample. It should be stressed here, again, that the totals do not represent the estimated gains from the simultaneous elimination of all monopoly power. The answer to this question could be obtained only via a general equilibrium analysis. What we estimate via our partial equilibrium analysis is the relative cost of monopoly for each firm, and the column totals present average estimates of these costs for our sample of firms. Note, however, that the *additions* to our cost estimates that occur in moving from the W^2_{CM} to the W^3_{CM} and W^4_{CM} columns do sum across all firms, since these are estimates of the wasted expenditures made in pursuit of monopoly. If we see product market power as a ubiquitous characteristic of the economy, then it might be reasonable to assume that this estimate of monopoly welfare loss could be generalised to the entire economy. To the extent one believes monopoly power is more (e.g. see again Posner, 1975) or less pervasive in other sectors our estimates must be raised or lowered. Assuming the social costs of monopoly are the same across all sectors, we obtain estimates for our preferred model (ΔW^k_{CM}) ranging between 4 and 13 % of GCP. Thus, all losses are significant, but the range is considerable depending upon what components of social cost one includes. For the Harberger approach, the range is between 0·4 and 7 %. The lowest of these follows the Harberger assumptions most closely, but nevertheless we estimate a welfare loss four times as big as he did. This difference in large part is explained by the aggregation bias incorporated into the industry level estimates.

The extent of this bias can be seen by considering Table 3. Its entries are made by assigning each firm to an industry at the appropriate level of aggregation, and aggregating over the firms in each industry. Just as negative profit firms were excluded in calculating welfare losses at the firm level, negative profit industries are excluded in calculating welfare losses across industries. For the ΔW^k_{CM} measures aggregation bias is due simply to the inclusion of losses by some firms in the calculation of each industry's profits. Table 3 shows how this bias varies with the level of aggregation and with the choice of measure. Industry estimates are between 78 and 98 % of the firm level estimates in aggregate. For the ΔW^k_H estimates, a further cause of bias is introduced by the squared term, $(\Pi/R)^2$, in the formula. It can be seen from Table 3 that for the ΔW^1_H measures, the 2-digit industry estimates aggregate to only 40% of the firm level estimates.[1] Note, however, that the biases are much smaller for the ΔW^3 and ΔW^4 measures and in the case of the ΔW^3_H measure at the

[1] Worcester (1973) plays down the extent of the bias by focusing on the *absolute* differences between the measures. Given that the absolute values of losses are small using ΔW^1_H, even very large relative biases result in small absolute distortions, as one would expect. For additional evidence on the importance of aggregation bias in previous studies, see Siegfried and Tiemann (1974).

Table 2

Monopoly Welfare Losses by Firm (yearly averages in $ millions): U.S. 1963/6

Company	ΔW^1_{CM}	ΔW^2_{CM}	ΔW^3_{CM}	ΔW^4_{CM}	ΔW^1_H	ΔW^2_H	ΔW^3_H	ΔW^4_H
1. General Motors	1,060·5	1,156·3	1,347·8	1,780·3	123·4	146·2	337·8	770·2
2. AT & T	0·0	257·3	1,025·0	1,025·0	0·0	13·4	781·1	781·1
3. Unilever	0·0	160·0	490·5	490·5	0·0	19·5	350·0	350·0
4. Procter & Gamble	56·7	180·1	427·0	427·0	3·3	33·0	279·9	279·2
5. Dupont	225·1	241·9	275·4	375·3	36·3	41·7	75·2	175·2
6. Ford Motor	160·4	217·5	331·7	331·7	5·2	9·3	123·5	123·5
7. IBM	251·7	264·0	288·7	319·8	36·8	40·5	65·2	96·3
8. Reynolds, R. J.	73·1	138·5	269·3	278·8	10·8	38·5	169·3	178·8
9. Sears Roebuck	36·2	115·0	272·5	272·5	0·5	4·4	162·0	162·0
10. Eastman Kodak	136·3	157·9	201·1	258·5	27·7	36·8	80·0	137·4
11. American Cyanamid Co.	27·6	98·7	240·8	240·8	1·9	23·6	165·8	165·8
12. Genesco, Inc.	0·0	67·5	202·6	292·6	0·0	14·9	150·0	150·0
13. Exxon Corp.	115·6	143·0	197·8	197·8	2·4	3·7	58·5	58·5
14. Colgate-Palmolive Co.	3·9	56·7	160·3	160·3	0·0	7·6	111·8	111·8
15. Chrysler Corp.	39·8	78·4	155·5	155·5	1·1	3·0	80·1	80·1
16. General Electric Co.	83·4	105·2	148·8	148·8	2·6	4·0	47·6	47·6
17. Pan Am Airways	1·1	49·8	147·2	147·2	0·1	7·5	104·9	104·9
18. Pacific Tel. & Tel.	0·0	18·4	138·1	138·1	0·0	0·8	128·5	128·5
19. Gillette Co.	27·8	56·0	112·3	129·2	4·7	18·9	75·3	92·2
20. Minnesota Mining & Mfg.	62·5	77·7	107·1	129·1	8·2	12·6	42·3	64·3
Totals all firms*	4,527·1	7,454·9	14,005·4	14,997·6†	448·2	897·8	7,448·3	8,440·1†
Total/GCP‡	0·0396	0·0652	0·1227	0·13137	0·0040	0·0079	0·0652	0·0739

* The ΔW^1's for all firms having monopoly profits (Π) less than zero were set equal to zero. The ΔW^2, ΔW^3, and ΔW^4's for all firms with $(\Pi+A)<0$ were set equal to zero. The latter was based on the assumption that these firms would not survive in the long run and hence represent no *long run* welfare loss to society. There are 421 firms with $\Pi > 0$ and 525 firms with $(\Pi+A) > 0$ in the sample of 734 firms.

† When profits, after deducting taxes and the cost of capital (Π'), are less than zero, $\Delta W^4 = \Delta W^3$.

‡ The total welfare loss for all firms by each ΔW measure is first divided by the total sales of the 734 firms in the sample, and then multiplied by the ratio of corporate sales to gross corporate product over all industries (2·873) as given in Laffer (1969).

Table 3

Comparison of Firm and Industry Welfare Loss Estimates: U.S. 1963/6

	ΔW^1_{CM}	ΔW^2_{CM}	ΔW^3_{CM}	ΔW^4_{CM}	ΔW^1_H	ΔW^2_H	ΔW^3_H	ΔW^4_H
(1) Summation over firms	4,527·1	7,454·9	14,005·4	14,997·6	448·2	897·8	7,448·3	8,440·1
(2) Summation over 4 digit industries	3,767·8	6,902·5	13,752·6	14,052·8	276·9	628·8	7,478·9	7,790·2
(3) Summation over 3 digit industries	3,619·0	6,680·5	13,355·4	13,512·8	237·4	577·7	7,252·5	7,410·4
(4) Summation over 2 digit industries	3,515·2	6,634·5	13,262·7	13,287·9	178·9	485·3	7,113·5	7,148·8
(5) (2)/(1)	0·832	0·926	0·982	0·937	0·618	0·700	1·004	0·923
(6) (3)/(1)	0·799	0·896	0·954	0·901	0·530	0·643	0·974	0·878
(7) (4)/(1)	0·776	0·890	0·947	0·886	0·399	0·541	0·955	0·847

4-digit level the bias goes slightly the other way. This comes about because of the inclusion in the industry estimates of advertising for firms earning less

Table 4

Monopoly Welfare Losses by Firm (£ million): U.K. 1968/9

Company	ΔW^1_{CM}	ΔW^2_{CM}	ΔW^3_{CM}	ΔW^4_{CM}	ΔW^1_H	ΔW^2_H	ΔW^3_H	ΔW^4_H
1. British Petroleum	74·1	74·4	75·1	82·7	5·1	5·1	5·8	13·4
2. Shell Transport & Trading	49·4	50·8	53·6	53·6	2·2	2·3	5·1	5·1
3. British American Tobacco	26·8	27·0	27·5	49·1	1·0	1·1	1·6	23·1
4. Unilever	2·8	11·3	28·2	29·0	0·0	0·2	17·2	18·0
5. I.C.I.	17·6	18·8	21·1	27·9	0·5	0·5	2·9	9·6
6. Rank Xerox	13·9	14·0	14·2	27·5	3·4	3·4	3·5	16·9
7. I.B.M. (U.K.)	11·1	11·2	11·3	21·9	2·2	2·2	2·4	12·9
8. Great Universal Stores	9·6	10·0	11·0	21·6	0·5	0·5	1·5	12·1
9. Beecham	6·2	8·9	14·3	20·4	0·6	1·3	6·7	12·8
10. Imperial Group	2·8	8·6	20·1	20·1	0·0	0·1	11·7	11·7
11. Marks & Spencer	9·8	9·8	9·8	18·6	0·6	0·6	0·6	9·5
12. Ford	7·2	7·8	8·8	16·6	0·2	0·2	1·3	9·1
13. F. W. Woolworth	7·3	7·4	7·8	15·9	0·3	0·4	0·7	8·9
14. J. Lyon	0·0	0·7	2·8	14·2	0·0	0·0	2·1	13·4
15. Burmah	5·3	5·5	5·9	13·9	0·2	0·3	0·7	8·7
16. Distillers	5·6	6·1	7·1	13·4	0·2	0·2	1·2	7·5
17. Rank Organisation	11·5	11·7	12·1	12·5	1·2	1·2	1·7	2·1
18. Thorn	5·6	6·1	7·1	12·5	0·3	0·3	1·4	6·7
19. Cadbury Schweppes	1·8	5·0	11·4	12·3	0·0	0·3	6·7	7·6
20. Reckitt & Coleman	2·9	4·7	8·3	10·4	0·1	0·3	3·9	6·0
Total all firms (102)	385·8	435·0	537·4	719·3	21·4	24·2	118·8	304·4
Total ÷ GCP	0·0386	0·0436	0·0539	0·0720	0·0021	0·0024	0·0119	0·0305

No. of firms with $\Pi > 0 = 82$.
No. of firms with $\Pi + A > 0 = 86$.

than normal profits. Thus in future work along these lines, when data are limited to industry level observations, the ΔW^3 and ΔW^4 measures have an additional advantage over the other two measures.

(B) *U.K. Estimates*

These have been calculated on the same basis as the U.S. estimates, but since no convenient computer tape was available we contented ourselves with an analysis of the top 103 firms in the United Kingdom for the periods 1968/9 and 1970/4.[1] Over the periods in question these firms were responsible for roughly one-third of the GNP and were therefore proportionally more important than the 734 firms sample from the COMPUSTAT tape for the United States. The time-periods used have been dictated by the availability of data. The basic source has been EXTEL cards but advertising expenditure was estimated by aggregating up from the brand level, using estimates of press and TV

[1] The top 100 varies somewhat over time.

advertising contained in MEAL. We can therefore expect that our advertising expenditure figures will be biased down by the amount of non-media advertising, as is true also for the United States. Table 4 gives the results for 1968/9, with firms again being ranked by ΔW^4_{CM}. The two major oil companies, BP and Shell, dominate the table. The social cost associated with BP alone is roughly a quarter of 1 % of GNP. The other members of the Top Ten are industry leaders plus British–American Tobacco. Two interesting features of the Top Twenty are the high ranking of Rank Xerox despite its size (explained presumably by its U.K. patent rights) and, in contrast to the United States, the low ranking of motor-car manufacturers (absent from the Top Twenty in 1970/4). We have computed estimates of welfare loss for the 1970/4 period, but we have not reported these results here. It is well known that the early seventies was a period of very rapid inflation in the United Kingdom and this undoubtedly raises problems such as how to account for stock appreciation and the revaluation of capital adequately. Despite these problems, it is somewhat reassuring to note that the 1970–4 results look very much like the 1968/9 results except that the oil companies become even more dominant.[1]

The aggregate estimates of welfare loss for ΔW^k_{CM} range between 3·9 and 7·2 % of GCP for the 1968/9 period. The estimate for ΔW^1_{CM} is almost identical with that for the United States but in each of the other cases the value for the United Kingdom is well below that for the United States. The obvious and important difference between the two sets of results is the apparent greater expenditure on advertising in the United States. Taking direct account of advertising quadruples the welfare loss estimate for the United States but in the case of the United Kingdom welfare loss goes up by only about 40 % (compare ΔW^1_{CM} with ΔW^3_{CM}).[2] Using the Harberger approach estimates of welfare loss vary between 0·2 and 3 % of GCP for the United Kingdom in the same 1968/9 period.

Again, we must conclude that our evidence suggests significant welfare loss due to monopoly power. One other point is also brought out particularly by the U.K. results (e.g. in the case of the oil companies) and that is the international distribution of these social costs. Monopoly power held by U.K. companies in foreign markets may be advantageous to the U.K. economy whilst being disadvantageous in the global sense. Thus the issue is a distributional one and adds an international dimension to the distributional issues already implicit in our analysis. In any national evaluation of the social costs imposed by the actions of a particular company, the international distribution of these costs would presumably gain some prominence.

[1] Indeed, comparing the results for the two periods indicates the large extent to which oil companies have benefited from the recent "oil crisis". However, this inference has to be qualified by the problems raised for the measurement of profit by stock appreciation during a period of rapid inflation of oil prices.

[2] This does not of course mean that advertising implies no additional social costs, since profit-margins and the level of excess profits may both be partly determined by advertising in so far as elasticities of demand and entry barriers are influenced by the level of advertising in monopolistic industries. We should also note that in some cases our direct adjustment for advertising is very significant (e.g. Unilever, Imperial Group and Beecham Group).

III. IMPLICATIONS AND CONCLUSIONS

Previous studies of the social costs of monopoly have generally (and often unconsciously) assumed that "monopolies" set prices as if they did not possess market power, that the only important distortions in output are brought about through the deviations in one firm's market power from the average level of market power, that the losses of some firms (perhaps incurred in unsuccessful attempts to obtain monopoly power) legitimately offset the monopoly rents of others, and that all of the expenditures made in the creation and preservation of monopoly positions are part of the normal costs which would exist in a world without monopolies. With the problem so defined, it is not surprising that most of these studies have found the welfare losses from monopoly to be small.

Since we know from general equilibrium analysis that monopoly allocation distortions may be offsetting, the conclusion that partial equilibrium analysis yields small welfare loss estimates has seemed all the more impressive. Yet each of the studies that has come up with low estimates has done so in large part because it has made assumptions (e.g. demand elasticities equal to 1·0, monopoly profits are deviations from mean profits) that can be rationalised only as *ad hoc* attempts to answer the general equilibrium question. In contrast, the present study defines a procedure for estimating the costs of monopoly that is consistent with a partial equilibrium analysis that assumes market power does (or may) exist. Our results reveal that the costs of monopoly power, calculated on an individual firm basis, are on average large. The conclusion that "even" a partial equilibrium analysis of monopoly indicates that its costs are insignificant no longer seems warranted.

This conclusion has potentially important policy implications. Antitrust policy consists typically not of a frontal attack on all existing market power, but of selective assaults on the most flagrant offenders. Our partial equilibrium estimates of monopoly welfare losses indicate the most significant contributors to these losses. The tops of our lists of the largest welfare losses by firm are logical starting points for intensified enforcement of antitrust policy. Our figures and supporting analysis further demonstrate that "the monopoly problem" is broader than traditionally suggested. A large part of this problem lies not in the height of monopoly prices and profits *per se*, but in the resources wasted in their creation and protection. These costs of monopoly should be considered when selecting targets for antitrust enforcement.

One might argue that the high profits of some firms reflect economies of scale advantages, and, therefore, these firms should not be the victims of antitrust policy. This argument points to some form of regulatory or public enterprise solution to the monopoly problem. With respect to this type of policy, our estimates of the losses from monopoly represent a still further understatement of their potential magnitude. If a policy were adopted forcing the most efficient size or organisational structure upon the entire industry, the welfare loss under the existing structure would have to be calculated using the profit margin of the most efficient *firm and the output of the entire industry*, rather than the profit margins of the individual firms and their outputs.

These considerations suggest the difficulty in estimating the social gains from the elimination of all monopoly power, since one almost has to know what form of policy is to be used (antitrust, regulation), and what the underlying cause of monopoly power is, before answering this question. Nevertheless, this has been the question that has traditionally been asked in studies of monopoly welfare losses, and the reader who has persisted to this point can justifiably ask what light our figures cast on this question. By their very nature partial equilibrium calculations cannot give very *precise* estimates of these gains, but they may establish orders of magnitude. As stressed above, we regard the Harberger-type calculations based on uniform demand elasticities of 1·0 as essentially efforts to solve the general equilibrium problem inherent in this question. As such, we regard them as the most conservative estimates of what the elimination of all monopoly would produce. Thus, we would expect the elimination of all monopoly to yield gains at least as large as the 7 and 3 % of gross corporate product we estimate for the United States and United Kingdom, respectively, using ΔW_H^4. To the extent that firms sell differentiated products, and operate in separate markets, i.e. to the extent that they have and utilise market power, these gains are pushed in the direction of our ΔW_{CM}^4 estimates of 13 and 7 %. Further upward pressure on these estimates is created by considering some of the other factors ignored in our calculations. We have already emphasised that reported profits understate true profits to the extent that firms compete for monopoly power by investing in excess plant capacity, advertising, patent lawyers, and so on. But much of the competition for *control* over monopoly rents may take place within the firm itself among the factor owners. Such competition will lead to an understatement of actual monopoly rents both through the inflation of costs that wasteful competition among factors owners brings about, and through the inclusion of part of the winning factor owners' shares of monopoly rents as reported costs. A large literature now exists on the variety of objectives managers have and the ways in which these objectives are satisfied through their discretionary control over company revenues. To the extent that managerial control over firm revenues is the reward for competing against other factor groups and potential managers successfully, reported profits understate the true profitability. By ignoring these possibilities we have erred in being conservative when estimating the social cost of monopoly. It is our reasoned guess that these additional costs would at least equal the "washing out" effect of the simultaneous elimination of all monopoly power on our partial equilibrium estimates and, therefore, that these latter figures are, if anything, underestimates of the true social costs of monopoly.

In this respect, it is useful to note an alternative, aggregative approach to the question. Phillips, in an appendix to Baran and Sweezy (1966), isolated several categories of expenditure dependent on the existence of "Monopoly Capitalism" (e.g. advertising, corporate profits, lawyers' fees). Their sum came to over 50 % of U.S. GNP. Although the assumptions upon which these calculations were made are rather extreme, they do suggest both an alternative method of analysis and the potential magnitude of the problem. Here too it should be noted that our approach has been essentially micro-orientated and

neoclassical in that we have taken the returns on corporate stocks as our cost of capital. From a more aggregative view it could be argued that profits are not required at all to generate the savings required to sustain a given rate of growth, since alternative macro policies are available. From this perspective, all profits are excess profits and our estimates of social cost are too conservative. Still further weight would be added against the position that monopoly power is unimportant if the link with the distribution of political power were considered.

Of course, any public policy has its own sets of costs and inefficiencies. For Tullock–Posner reasons a concerted effort to apply or strengthen the anti-trust laws induces large, defensive expenditures on the part of business. Price and profit regulation leads to efforts to change, influence, or circumvent the application of the rules. The public enterprise solution raises the same sort of problems, with members of the bureaucracy participating in the competition for monopoly rents. Thus it might be that any alternative for dealing with existing monopoly power would involve higher costs than the monopolies themselves create. The present study does not answer this question. What it does do is dispel the notion that it need not even be asked, since the costs of monopoly within the present environment are necessarily small. The question of what the costs and benefits from alternative antimonopoly policies are still seems worth asking.

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REFERENCES

Baran, P. and Sweezy, P. (1966). *Monopoly Capital.* New York: Monthly Review Press.
Bergson, A. (1973). "On Monopoly Welfare Losses." *American Economic Review*, vol. 63 (December), pp. 853–70.
Carson, R. (1975). "On Monopoly Welfare Losses: Comment." *American Economic Review*, vol. 65 (December), pp. 1008–14.
Cubbin, J. (1975). "Apparent Collusion, Price–Cost Margins and Advertising in Oligopoly." Mimeo, University of Warwick.
Dixit, A. and Norman, V. (1978). "Advertising and Welfare." *Bell Journal of Economics* (June).
Flemming, J. S., Price, L. D. D. and Byers, S. A. (1976). "The Cost of Capital, Finance and Investment." *Bank of England Quarterly Bulletin*, vol. 16 (June), pp. 193–205.
Harberger, A. C. (1954). "Monopoly and Resource Allocation." *American Economic Review*, vol. 45 (May), pp. 77–87.
Kamerschen, D. R. (1966). "An Estimation of the Welfare Losses from Monopoly in the American Economy." *Western Economic Journal*, vol. 4 (Summer), pp. 221–36.
Laffer, A. B. (1965). "Vertical Integration by Corporations, 1929–65." *Review of Economics and Statistics*, vol. 51 (February), pp. 91–3.
Posner, R. A. (1975). "The Social Costs of Monopoly and Regulation." *Journal of Political Economy*, vol. 83 (August), pp. 807–27.
Scherer, F. M. (1970). *Industrial Market Structure and Market Performance.* Chicago: Rand McNally.
Schwartzman, D. (1960). "The Burden of Monopoly." *Journal of Political Economy*, vol. 68 (December), pp. 627–30.
Siegfried, J. J. and Tiemann, T. K. (1974). "The Welfare Cost of Monopoly: An Inter-Industry Analysis." *Economic Inquiry*, vol. 12 (June), pp. 190–202.

Spence, M. (1974). "Entry, Capacity, Investment and Oligopolistic Pricing." Technical Report 131, Institute for Mathematical Studies in the Social Sciences, Stanford University.
Stigler, G. J. (1956). "The Statistics of Monopoly and Merger." *Journal of Political Economy*, vol. 64 (February), pp. 33–40.
Tullock, G. (1967). "The Welfare Costs of Tariffs, Monopolies and Theft." *Western Economic Journal*, vol. 5 (June), pp. 224–32.
Walker, J. L. (1974). "Estimating Companies' Rate of Return on Capital Employed." *Economic Trends*, November, pp. xx–xxix.
Wenders, J. L. (1967). "Entry and Monopoly Pricing." *Journal of Political Economy*, vol. 75, pp. 755–60.
Wisecarver, D. (1974). "The Social Costs of Input-Market Distortions." *American Economic Review*, vol. 64 (June), pp. 359–72.
Worcester Jr., D. A. (1969). "Innovations in the calculations of welfare loss to monopoly." *Western, Economic Journal*, vol. 7 (September), pp. 234–43.
—— (1973). "New Estimates of the Welfare Loss to Monopoly: U.S. 1956–69." *Southern Economic Journal*, vol. 40 (October), pp. 234–46.
—— (1975). "On Monopoly Welfare Losses: Comment." *American Economic Review*, vol. 65 (December), pp. 1015–23.

APPENDIX

Data: Definitions and Sources

United States

All data on individual firms with one exception were taken from the COMPUSTAT tape of 1969, and all definitions conform therefore to those given in the COMPUSTAT manual. The numbers in brackets { } refer to the variable numbers assigned on the COMPUSTAT annual industrial file.

The competitive return on capital used in calculating monopoly profits was 0·1197, the geometric mean of the monthly Fisher–Lorie index of returns on the market portfolio between January 1963 to December 1967. The firm's capital was measured as Total Assets/Liabilities and Net Worth less Intangibles (goodwill, patents, etc.). The latter were deducted on the grounds that they largely represent capitalised monopoly rents (see Stigler, 1956; Kamerschen, 1966). Thus, the firm's opportunity cost of capital was estimated as:

$$CC = 0{\cdot}1197\ (DATA\{6\} - DATA\{33\}).$$

Two estimates of monopoly profits were formed to compute the triangle-type measures. The first is gross profit flow (net income + interest expense + income taxes) less the cost of capital (CC).

$$\Pi = DATA\{18\} + DATA\{15\} + DATA\{16\} - CC.$$

The second is the first plus advertising ($A = DATA\{45\}$). For roughly 85 % of the sample firms the COMPUSTAT entry for advertising was missing, however. The product of the firm's Sales ($DATA\{12\}$) and the industry advertising to sales ratio for the firm's industry as given in *Advertising Age* (7 June 1965, pp. 101–3) was substituted for this entry in these cases.

To calculate the ΔW^4 measures, income taxes ($DATA\{16\}$) were subtracted from Π to obtain Π'.

United Kingdom

All the data on individual firms with the exception of advertising has its origin in the data tabulations of the Exchange Telegraph Statistics Service (EXTEL). Most of the relevant data in a summarised form was available in various issues of *The Times Review of Industry and Technology*. In the case of advertising the firm data had to be estimated via a process of aggregating estimates of press and TV advertising

of the various products produced by each firm. These data were extracted from various issues of *MEAL* (*Advertisers' Annual Analysis of Media Expenditure*) and, in the case of 1968, from the *Statistical Review of Press and T.V. Advertising* (Legion Publishing Company). *Who Owns Whom* was used in the process of aggregation.

Each firm's capital was measured as total tangible assets less current liabilities (excluding bank loans, overdrafts and future tax). Profit was measured before interest and tax and then adjusted for the estimated cost of capital (taken from Flemming *et al.* 1976).