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Profitability and Market Share*

M.A. Adelman1
Bruce Stangle2

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massachusetts
institute of
technology

50 memorial drive
cambridge, mass. 02139
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¹Department of Economics, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139, U.S.A.

²Analysis Group, Inc., Belmont, Massachusetts 02178, U.S.A.

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Over the past two decades there has been extensive research upon industry profitability, as determined by industry concentration, advertising, growth rates, etc. An excellent summary, now of course incomplete, has been provided by Weiss (1974). But more recently, much research has focused not on industry but upon individual firm profitability, as related to firm market share.\(^1\) An inquiry is typically formulated as follows. Let \(Pr_{ij}\) be the profitability for industry \(i\) and firm \(j\), let \(C_i\) be concentration in the industry, let \(MS_{ij}\) be the market share of firm \(j\), and let \(a\), \(b\), and \(c\) be coefficients to be estimated with an equation of the type:

\[
Pr_{ij} = a + bC_i + cMS_{ij}
\]

Equation (1) can be interpreted as a statement that market structure can and should be analyzed into the component parts of concentration (and other industry variables) and of market share. This involves an appeal to economic theory. Thus, concentration is a proxy for fewness of sellers, which is said to make it easier to control production and prices in a market, and increase profits. Similar statements can be made about industry advertising, or growth, or other variables.

These authors take market share as a proxy for economies of scale, or for the firm's own market power, or for some other factors which enable the firm to influence its costs or its prices or both, hence to influence its profits.

\(^1\) See for example Gale; Bothwell and Keeler; Kwoka; Ravenscraft; Shepherd; and Thomadakis. Recently, Martin also has investigated the problem and Rhoades provides a summary of studies in banking.
We submit that any statement in the form of equation (1) is inadequate to support any proposition about market structure, even the most tentative and limited. Hence any conclusion drawn from it, that once we make allowance for market shares, concentration does or does not have much effect on profitability, must be dismissed as altogether unfounded.

The reason is that profitability, as we hope to demonstrate, has a strong effect upon market share. Therefore a profitability:share correlation will probably be found, and will be statistically robust, even in the absence of any economies of scale or any market power. A single equation cannot capture both the profitability:share effect and the share:profitability effect. An econometric approach must be by way of simultaneous equations, or else it had better not be attempted.

A quick look at three studies will show the problem. Shepherd analyzed a sample of 231 "Fortune 500" firms in various industries. He found market share variation to explain so much of profitability variation that there was little left for inter-industry concentration to explain. Shepherd's sample and methods were criticized by Weiss and by Scherer. But after making corrections, Bothwell and Keeler confirmed the relation between share and profitability, then asked: why the association?

Scherer and Ravenscraft suggest that superior profitability in any industry must be partitioned into two elements: the price effect, which is determined by concentration, and the efficiency effect, which is determined by economies of scale. They use market share as a proxy for scale economies, and Scherer summarizes the results:
Ravenscraft's simulation studies show that... the two structural variables do rather well disentangling price-raising and scale economy effects....

The main point for the moment is that profit differences associated with market share appear to embody a complex mixture of scale economy, materials cost, selling price, and product differentiation advantages.¹

In business and popular discourse, market share will often be assumed as an indicator of scale economy.² Nevertheless, market share is rarely a valid proxy. It has no direct relation with the basic economic concept of increasing returns to scale: over some range, an additional dose of a bundle or module of inputs brings more than a proportional increase in output. Operation in some markets may require large economies of scale, but if the market itself is very large, a very large firm need be only a small portion. There may be great economies of scale, but the firms achieving them may have small market shares. Hence using market share as a proxy for scale economies would in such a case be not inadequate but directly contrary to fact.

II.

Thus far, we have only tried to show what these studies aim to do. We do not deny them validity for any purpose whatever. For example, a stock market analyst might look for companies likely to show unusually high profits among those with high market


² See for example, Buzzell, Gale, and Sultan; and Porter; for discussions of the so-called "experience curve."
shares in a concentrated industry. He would not care about the
direction of cause and effect, only about correlation, and we see
no error in such an inquiry.

But Equation (1) is inadequate to show the effect of market
share upon profitability because market share at any time is
largely a function of previous investment, determined by expected
profitability, a proxy for which is observed profitability.

We suggest a simple hypothesis to explain the observed
connection between profitability and market share: profits
attract investment, losses repel. Weak assumptions permit strong
conclusions, and we have only two. First, we assume rational
conduct, profit-seeking even short of strict profit maximizing.
In any given market, the firm which expects the higher return on
a given investment will invest more. Our second assumption is
that the traditional supply curve and quasi-rents apply.

If these profit discrepancies persist; that is, if variations
in profitability are anything more than an endless stochastic
jiggle; then the more profitable firm will grow faster, or shrink
less, than its less profitable rivals. If firms invest more than
rivals, anticipating higher profit, or disinvest to avoid loss,
then market shares reflect these past expenditures: In the
limit, with profits below the cost of capital, the firm quits and
market share is zero. Therefore, even without any price raising
power, nor any economies of scale, more profitable firms will
have a higher market shares because the expectation of those
profits induced the investment in capacity.

There is an additional reason why some regression studies
would tend to show a positive association between market share
and profitability. The class of firms with very small market shares is like the lobby of a building, crowded with people coming in or going out, but with nobody staying in that place for long. Many firms with low market shares are just entering the market, and are (or appear to be) less profitable because they have not yet paid their dues and absorbed all their start-up costs. Many others are persistent losers, not long for this world. Bad performance has cut off investment, and the owners are squeezing the last bit of value from plant and equipment, inventory, and organization, simply covering variable costs before giving up altogether.

III.

The simplest way to test our proposition is to find a data set where there are neither economies of scale nor market power, and test for the existence of the market share:profitability correlation. This would serve like a crucial experiment, compatible with one hypothesis, contradicting another.

We have one small body of data on profits and market share for a single retail firm (A&P) which operated in over 40 local markets during the years 1932-41. We can almost certainly eliminate differentials in market power, economies of scale, risk, or entry as explanations of differentials in profitability across local markets.

First, scale economies (and other entry barriers) in food retailing are generally acknowledged to be rather low.\(^1\) Perhaps
economies cease with a single store, or perhaps with a group of stores and a warehouse. But we need not even reach the issue, because each of the 44 units in our sample consists of many food stores grouped around a warehouse, and there is no evidence in a voluminous company history of any hint of variations among units in scale economies. Average sales per store might indeed differ widely, but this was attributable to better or poorer management and luck.

Second, A&P's market shares were low. The mean share is approximately 10.2 percent in a typical year, with a standard deviation of 3.9 percent. At such low levels, the price raising power of the individual firm is negligible.

The market share estimates were made by the firm, for its own purposes, not for any public record. They knew their own sales, and sales in the area were from published estimates by the Department of Commerce. We have no data for concentration in these markets during this period. A&P was presumably one of the larger competitors in each of its markets, but there were many food retailers both locally and nationwide. By 1954 mean concentration in SMSAs for grocery stores was 45 percent at the four-firm level (See NCFM, p. 51). Our guess is that a comparable figure for 1935 might have been 10 percentage points lower. (Consider that if the largest four firms were of approximately equal size, then on the average the concentration ratio would have been four times the A&P market share, or 41

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1 For analyses of the industry in the 1930's see Wilcox; and Adelman, pp. 60-61, 70. Also a more recent study is National Commission on Food Marketing (NCFM).
percent. This at least sets a plausible upper bound, suggesting a real ratio rather lower.) It is possible, but unlikely in our opinion, that there is some systematic relation between market share and concentration in the 44 sample markets. Unfortunately, this hypothesis cannot be tested.

The profit measure used is the net profit rate on sales, i.e., sales less cost of goods (gross profit) less expenses (the sum of wages, rents, fuel and power, and miscellaneous operating costs), divided by sales or simply \((G-E)\).¹ The gross profit rate, \(G\), was in effect the price of retail services. Too high a gross profit rate, i.e. misjudging demand response, led to lost sales and a higher expense rate, \(E\), thereby yielding a lower net profit.

Table 2 shows that the average net profit rate fell in 1932-37, and then recovered dramatically. Over the entire period, 1932-41, mean net profits are approximately 2.0 percent of sales, with a standard deviation of 1.4 percent. The market share

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¹ This measure would be wholly inadequate for an inter-industry analysis, except with a term registering capital intensity, but it is appropriate for the single firm in a single industry.

An important controversy has developed over the use of accounting measures of profitability. See Franklin M. Fisher and John J. McGowan and the comment by Stephen Martin. We need only maintain that the discrepancy between the accounting fact--return on sales--and the true economic rate of return on prospective investment was so highly correlated among the units that the one may properly be used as a proxy for the other. Certainly it was the number which was used by management in judging performance. (We also tested a second profit variable, net dollar profit per store, treating a store as a proxy for investment. The results were not greatly different from those reported here and are available from the authors.)
variable is fairly steady over the ten year period, averaging 10.2 percent with a standard deviation of 3.9 percent, again 1937 is the low point.

Table 3 gives results for the pooled sample for the years 1933-41. Variations in market share in year $t$ are explained by variations in net profit in the current year. The coefficient and the constant term are both highly significant.

In equation (2) of Table 3, the profit variable is lagged by one year. Lagged profits may serve as a proxy for the profits which were expected at the time of the investment decision. Market share in turn is a proxy for investments made in earlier periods. The one-year lag is a crude guess; in this industry buildings could be erected and equipped in a matter of months. The results are virtually the same.

Table 4 gives more detailed results for 10 ordinary least squares, cross section regressions for each year 1932-41. The variation in market share explained by the net profit rate ranges between 21.1 and 46.9 percent, the low point occurring in 1937. In each year, the coefficients on both the constant term and net profit rate are positive and significantly different from zero as determinants of market share.

Table 4 provides much more information than Table 3. We even confess to some doubts about the validity of pooling in this case, when the universe changes so much from year to year. (Indeed, a Chow test indicates that pooling of time series is inappropriate.) The years 1933-34 were the nadir of the Great Depression; 1934-39 saw a painfully slow and incomplete recovery,
while 1940-41 were a brisk approach to full employment. Furthermore, the company in question was shaken by management mistakes in the 1930's and their rectification starting in 1936. This too must have distorted relationships, and the strength of Table 4 is that it permits these various factors to be examined separately.

For both a test and an interpretation of the results, set market share to zero. At that point, profit is equal to minus \((a/b)\), where \(a\) is the constant and \(b\) the coefficient. It takes a certain level of loss, \(-(a/b)\), to shake the firm out of that market. Thus, \(-(a/b)\) is an estimate of the firm's shutdown point, which is also equal to fixed costs as a percent of sales. A profit rate of less than \(-(a/b)\) would mean the firm was not covering its out of pocket costs.

Table 5 shows that this number diminishes considerably, from 4% to 6% in the first half of the 1930's to 1% in 1941. (In every year except 1941, the estimate of the shutdown point is significantly different from zero.) A loss rate which is not unusual and therefore tolerable in bad years is abnormal and intolerable in better times. Table 5 also shows that fixed costs as a percent of sales declined dramatically in conjunction with A&P's recovery and management shakeup, suggesting that early in the decade, during the Depression years, there was considerable excess capacity. Figure 1 further illustrates the relationship: as output expands, fixed costs are spread over a growing sales base, consequently average costs flatten out.

These changing sales-profit relationships are to be expected, hence strengthen the credibility of the results of Table 4. But they are hidden by pooling; hence our distrust.
IV.

Another test of data and implications is less direct. Schmalensee points out that the familiar Lerner index relating price and marginal cost,

\[(P - MC) / P = 1 / Ef\]  \hspace{1cm} (2)

where \(Ef\) = the absolute value of the price elasticity of demand facing the firm, under some simplifying assumptions, can be restated for the \(j\)th firm as:

\[(P - MC) / P = MS_j / Em\]  \hspace{1cm} (3)

where \(MS_j\) = the \(j\)th firm's market share and \(Em\) = the elasticity of market demand.\(^1\) Thus, a given market share may confer market power in one industry, not in another. If demand is relatively elastic then price will approach marginal cost, even if a firm's share is large. Recall \(MS\) rarely exceeds 10 - 15 percent in our sample.

Let us assume that the net profit rate is approximately equal to the Lerner index, i.e., average cost equals marginal cost such that all operating units are at or beyond minimum efficient scale, and at or near minimum long run average costs.\(^2\) Under such conditions the coefficient on \((G-E)\) is an estimate of the elasticity of demand for food bought in grocery stores. The

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\(^1\) Landes and Posner have subsequently developed a similar, but more restrictive model for the case of the dominant firm cum competitive fringe.

\(^2\) In this sample, it is likely that average cost and marginal cost are not equal. In the case where MC is underestimated, then the resulting elasticity is also understated. Conversely when MC is overstated so too is the elasticity.
years 1932-38 yield rather plausible estimates for this elasticity, i.e., ranging between approximately 1.2 and 1.8, but values in 1939-41 are implausibly high. If the early years are at all accurate, then the demand elasticity faced by A&P was considerably higher, ranging approximately between 12 and 18. These estimates are in surprisingly close agreement with calculations based on an altogether independent method, i.e., the management expectation in 1937 of response to price reductions.¹

V.

In our sample, where by prior knowledge both market power and scale economies are ruled out, a single equation confirms that profitability variations determine market share variations, as in theory they should, for this simplest case.

Hence in the more complex case, if trying to test the additional hypothesis that market share has some effect on profitability, whether through economies of scale, market power, or anything else, one must somehow allow for, or remove, the effects of profitability upon market share. Without prior knowledge, two-way or mutual causation must be the initial hypothesis. A single-equation system is simply wrong. It assumes

¹ See Adelman, p. 472, where a subjective long-run elasticity is reported for A&P of 10-14. These estimates are not to be confused with the elasticity of demand for food from all sources, including e.g., restaurants, institutions, and other retail distributors. One would expect the elasticity for food from all sources, including grocery stores, to be considerably lower.
away a pervasive relationship: even competitive industries with constant returns to scale should in equilibrium exhibit a positive association between share and profit if, as we contend, profits attract capital and losses repel. Where the profit-market share relation does not exist, it is prima facie evidence of new forces entering the market, e.g., innovations or some other disturbance of the old regularities.

We saw that lagging the data made little difference to the results. Since lagging is a frequently used expedient to offset simultaneity, this may not bode well for its use here. However, that may be, until some creative econometrics is done, the strong association between profitability on one side and market share on the other only confirms that profitability strongly influences market share, as in theory it should. In the meantime, statements about the effect of market share on profitability, whether slogans in the business press—get market share somehow, and profits will follow—or more cautious statements in the economic literature—these must all be set aside as logically insufficient.
Table 1

Variable Definitions

\[(G - E) \quad = \quad \text{gross profit rate minus expense rate (rate of return on sales expressed as a decimal)},\]

\[MS \quad = \quad \text{A&P market share (expressed as a decimal)},\]

### Table 2

**Summary Statistics**

<table>
<thead>
<tr>
<th>Year</th>
<th>Net Profit Rate (G - E)</th>
<th>Market Share (MS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td>1932</td>
<td>0.025</td>
<td>0.018</td>
</tr>
<tr>
<td>1933</td>
<td>0.025</td>
<td>0.019</td>
</tr>
<tr>
<td>1934</td>
<td>0.021</td>
<td>0.016</td>
</tr>
<tr>
<td>1935</td>
<td>0.019</td>
<td>0.015</td>
</tr>
<tr>
<td>1936</td>
<td>0.020</td>
<td>0.012</td>
</tr>
<tr>
<td>1937</td>
<td>0.011</td>
<td>0.013</td>
</tr>
<tr>
<td>1938</td>
<td>0.019</td>
<td>0.013</td>
</tr>
<tr>
<td>1939</td>
<td>0.020</td>
<td>0.011</td>
</tr>
<tr>
<td>1940</td>
<td>0.019</td>
<td>0.011</td>
</tr>
<tr>
<td>1941</td>
<td>0.018</td>
<td>0.007</td>
</tr>
<tr>
<td>1932-41</td>
<td>0.020</td>
<td>0.014</td>
</tr>
</tbody>
</table>
Table 3

Regression Results for Pooled Sample
(t-statistics in parentheses)

Equation 1:  
\[ MS_t = 0.075 + 1.400 (G-K)_t \]  
\[ (22.55) (10.17) \]

Range: 1933-41  
\[ R^2 = 0.233 \]  
\[ N = 342 \]  
\[ S.E. = 0.034 \]

---

Equation 2:  
\[ MS_t = 0.075 + 1.335 (G-E)_{t-1} \]  
\[ (23.58) (10.52) \]

Range: 1933-41  
\[ R^2 = 0.246 \]  
\[ N = 342 \]  
\[ S.E. = 0.034 \]
<table>
<thead>
<tr>
<th>Eqtn.</th>
<th>Dependent Variable</th>
<th>Year</th>
<th>Constant</th>
<th>(G - E)</th>
<th>R**2</th>
<th>N</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MS</td>
<td>1932</td>
<td>0.065</td>
<td>1.487</td>
<td>0.439</td>
<td>43</td>
<td>0.031</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(8.06)</td>
<td>(5.66)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>MS</td>
<td>1933</td>
<td>0.056</td>
<td>1.160</td>
<td>0.343</td>
<td>43</td>
<td>0.030</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(8.53)</td>
<td>(4.63)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>MS</td>
<td>1934</td>
<td>0.077</td>
<td>1.316</td>
<td>0.286</td>
<td>43</td>
<td>0.034</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(8.83)</td>
<td>(4.05)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>MS</td>
<td>1935</td>
<td>0.070</td>
<td>1.675</td>
<td>0.365</td>
<td>44</td>
<td>0.034</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(8.45)</td>
<td>(4.91)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>MS</td>
<td>1936</td>
<td>0.062</td>
<td>1.778</td>
<td>0.323</td>
<td>44</td>
<td>0.032</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(6.55)</td>
<td>(4.48)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>MS</td>
<td>1937</td>
<td>0.101</td>
<td>1.288</td>
<td>0.211</td>
<td>42</td>
<td>0.034</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(12.15)</td>
<td>(3.27)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>MS</td>
<td>1938</td>
<td>0.072</td>
<td>1.492</td>
<td>0.251</td>
<td>42</td>
<td>0.035</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(7.61)</td>
<td>(3.66)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>MS</td>
<td>1939</td>
<td>0.055</td>
<td>2.267</td>
<td>0.387</td>
<td>40</td>
<td>0.032</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(5.11)</td>
<td>(4.89)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>MS</td>
<td>1940</td>
<td>0.058</td>
<td>2.561</td>
<td>0.469</td>
<td>40</td>
<td>0.031</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(5.89)</td>
<td>(5.80)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>MS</td>
<td>1941</td>
<td>0.040</td>
<td>3.895</td>
<td>0.345</td>
<td>39</td>
<td>0.037</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2.29)</td>
<td>(4.42)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5

<table>
<thead>
<tr>
<th>Year</th>
<th>Estimate of Fixed Cost as a Percent of Sales</th>
<th>Real Sales (billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1932</td>
<td>4.37% (3.49)</td>
<td>1363</td>
</tr>
<tr>
<td>1933</td>
<td>5.69% (3.15)</td>
<td>1263</td>
</tr>
<tr>
<td>1934</td>
<td>5.85% (2.91)</td>
<td>1176</td>
</tr>
<tr>
<td>1935</td>
<td>4.18% (3.27)</td>
<td>1148</td>
</tr>
<tr>
<td>1936</td>
<td>3.49% (2.76)</td>
<td>1191</td>
</tr>
<tr>
<td>1937</td>
<td>6.29% (2.76)</td>
<td>1119</td>
</tr>
<tr>
<td>1938</td>
<td>4.82% (2.58)</td>
<td>1198</td>
</tr>
<tr>
<td>1939</td>
<td>2.43% (2.58)</td>
<td>1377</td>
</tr>
<tr>
<td>1940</td>
<td>2.26% (3.03)</td>
<td>1526</td>
</tr>
<tr>
<td>1941</td>
<td>1.05% (1.53)</td>
<td>1681</td>
</tr>
</tbody>
</table>

Notes:

1 Estimate derived from Table 4 regressions by dividing constant term by coefficient on profit variable.

2 From Adelman, pp. 436, 440.

3 We thank both Raymond Hartman and Neil Buchanan for the following approximation for the variance of the estimate (a/b):

\[ V(a/b) = V(a)/b + (a^2/b^4)V(b) - 2(a/b^3)\text{Cov}(a,b) \]
Fixed Costs vs. Real Sales
1932-1941

Source: Table 5
REFERENCES


