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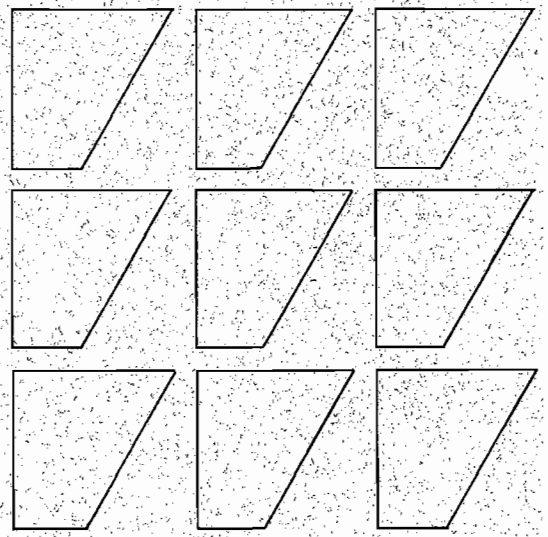
Market, Firm, and Economic Performance

By Stephen Martin



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Biographical Note

Stephen Martin is an Associate Professor of Economics at Michigan State University. He received a B.A. in mathematics from Michigan State University and a Ph.D. in Economics from the Massachusetts Institute of Technology. His research interests include industrial organization and the impact of military spending on the economy.

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The representations and conclusions presented herein are those of the author and have not been adopted in whole or in part by the Federal Trade Commission, its Bureau of Economics, or any other entity within the Commission. The Manager of The Line of Business Program has certified that he has reviewed and approved the disclosure avoidance procedures used by the staff of the Line Business Program to ensure that the data included in this paper do not identify individual company line of business data.

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TABLE OF CONTENTS

Summary and Conclusions

Diversification of firms across industries is an increasingly important characteristic of the economies of developed countries. This has created problems on two levels for research into differences in firm and market performance.

The mainstream conceptual framework employed by economists for industrial analysis has emphasized differences in market structure and in firm conduct as the causes of differences in performance. Since the financial statements of diversified firms rarely permit the analysis of a firm's activity on an industry-by-industry basis, there is a fundamental mismatch between firm-level performance data and industry level structural data. In this sense, firm diversification creates measurement problems for students of industrial economics.

But firm diversification has also evoked a fundamental modification of the mainstream framework for industrial analysis. It is now generally recognized that differences in the characteristics of parent firms will contribute to differences in performance of operating units within an industry. Market structure and firm structure, in this view, interact to determine the conduct of divisions of firms in different industries, which (appropriately aggregated) determines industry and firm performance.

Measurement problems are, if anything, more serious for this revised analytical framework: even with firm level data, it is difficult to obtain useful measures of firm structure.

A solution lies in the specification of studies at the divisional level. By segmenting firm operations on an industry-by-industry basis, measures of firm structure and performance can be obtained which are consistent with available information on industry structure.

As indicated above, it is not possible to do this with publicly available financial information. But it is possible with the confidential data collected by the Line of Business Program of the *U.S. Federal Trade Commission*. In this monograph, I report the results of a study of the impact of industry and firm structure on line-of-business (LB) conduct and performance. Using LB data, I am able to avoid the measurement problems associated with the use of firm or industry data in a world of diversified firms. I am also able to construct explicit quantitative measures of firm structure, which can be used to test the impact of firm structure on LB performance.

I employ a measure of profitability as the primary index of LB performance. Some of the results for the effects of industry structure on LB profitability are consistent with expectations based on studies of industry profitability: LBs with large market shares are more profitable, all else equal; so are LBs which are large in an absolute sense. LBs which operate in industries for which minimum efficient plant scale is large, or for which advertising is large, are for those reasons more profitable. Unexpectedly, LBs in more concentrated industries are on average less profitable than other LBs, as are LBs which employ large amounts of capital per dollar of sales.

Other results confirm the importance of firm characteristics and firm structure for LB profitability. LBs which are components of highly diversified firms are more profitable than would otherwise be the case. LBs which are components of firms which benefit from corporate administration are also more profitable.

Some facets of industry and firm structure are the results of market forces. I explore factors behind differences in two measures of relative LB size. Market share (LB sales as a fraction of industry sales) measures LB size relative to the industry; firm share (LB sales as a fraction of firm sales) measures LB size relative to the firm. Industry or firm characteristics which increase market share will of course increase industry concentration; industry or firm characteristics which decrease firm share will increase firm diversification.

Profitability has effects on these measures of relative firm size which are consistent with the economist's view of profit as the engine of resource allocation in a market economy. Firms expand the operations of more profitable divisions (increasing the firm shares of those LBs). But profitability also attracts entry (reducing the market shares of profitable LBs).

Firm structure and industry structure also have significant effects on relative LB size. LBs which are divisions of absolutely large firms tend for that reason to have larger market shares than would otherwise be the case. LBs which operate in absolutely large industries tend for that reason to have larger firm shares than would otherwise be the case.

I also investigate causes of differences across LBs in two sorts of promotional activity: LB expenditures on advertising per dollar of sales and LB expenditures on all other sorts of sales efforts per dollar of sales. Both types of promotional activity increase as LB profitability falls, suggesting that LBs turn to nonprice competition when price competition is intense. LBs with large market shares, and LBs which are components of diversified firms, spend more on non-advertising sales efforts than would otherwise be the case. LBs which

operate in industries which sell primarily to final consumer demand spend more for that reason on both types of promotional activity. Large LBs spend less per dollar of sales on promotional activity, suggesting economies of scale in promotional activity.

Some of these results suggest areas for future research. The positive effect of LB market share on LB profitability reflects some combination of market power and efficiency of large scale. Industry studies will probably be required to separate the two effects. Industry concentration has a negative effect on LB profitability. Increased ability to collude or to reach tacit understandings does not automatically translate into greater profit. Time series studies, or a series across time of cross-section studies, may explain when industry concentration enhances profitability and when it does not.

Market structure alone does not determine performance: firm structure also has effects. The positive effect of corporate supervision on LB profitability represents a social as well as a private return. Such a return should be considered, for example, in evaluating the advisability of antitrust remedies which involve divestiture.

LBs turn to promotional activity—advertising and nonadvertising—when conventional price competition is strong. LB advertising (like firm non-advertising promotion) has a positive effect on LB profitability. This presumably reflects artificial product differentiation and the creation of endogenous impediments to competition. Injunctions against such activity may well improve market performance. The results of this study suggest economies of large scale in promotional activity: absolutely large LBs spend less per dollar of sales on promotional activity than otherwise identical smaller LBs. These results, together with the positive effect of LB size on profitability (and the positive effect of firm size on LB market share) suggest that special attention should be paid to nonprice competition when it is employed by large firms.

I. Introduction

A. Scope of the Study

In this monograph I report the results of an empirical test of a model of industrial structure, conduct, and performance. The interrelationships among profitability, market share, firm structure, and promotional activity are explored.

I have been fortunate enough to have access to data generated by the Federal Trade Commission's Line of Business Program. Although this data base is relatively unfamiliar to students of industrial organization, it is a rich source of information about the structure of American industry. Much of the data collected by the Line of Business Program is unique, at least among sources which describe the entire range of manufacturing industry. This is particularly true with respect to data describing the internal structure of firms. I take advantage of these unique properties of the Line of Business data base to examine issues which researchers have until now been unable to approach on a cross-section basis.

B. Line of Business Data

Empirical studies of industrial organization constitute a large literature. Weiss' observation [1974, p. 201] that "The concentration-profits relationship has been one of the most thoroughly tested hypotheses in economics" is, if anything, an understatement.[1] Empirical studies of advertising, of changes in market share or concentration, and of subjects on the border between industrial organization and other fields (labor economics, international trade) abound.

About a half dozen data sources underlie the vast majority of these studies. Cross-sectional studies of U. S. manufacturing at the industry level rely in whole or in part on the Census of Manufactures, Input-Output Tables, or the IRS Sourcebook of Statistics of Income. Firm-level studies often employ samples of Fortune 500 firms (frequently with data from Compustat tapes).

There are well known limitations inherent in the information available from each of these sources (Scherer [1980, pp. 269-272]). The Internal Revenue Service reports data as if all of a company's operations occur in the company's primary industry. In an age of diversified firms, this is a serious weakness.[2] The Bureau of the Census avoids this problem by collecting data at the plant level—data which are combined and reported in industry aggregates. Since plants tend to be more specialized than firms, Census data are less open to criticism due to the combined reporting of primary and secondary economic activity.[3] However, even with relatively "clean" industry-level data, it is not possible to address certain fundamental questions in industrial organization. For example, with industry-level data it is not possible to separate the effect of market share on profitability from the effect of market concentration on profitability (Martin and Ravenscraft [1982]). As is shown below, these effects can be separated at the line of business level. Similar problems arise with firm-level data when firms operate in several industries.

An important new source of information appeared in the early 1970s—the PIMS data set of the Strategic Planning Institute (Gale and Branch [1982, p. 871]):

> SPI now has in excess of 200 participating companies (a substantial percentage of which are among Fortune's 500) supplying detailed information on one or more of their businesses; over 2,000 businesses are represented in the SPI data base. SPI uses the term "business" to refer to a company component that competes in a well-defined served market containing that component's relevant competitors.

The PIMS data base clearly avoids some of the problems associated with information reported at the firm or industry level. However (Scherer [1980, p. 271]),

> The principal limitations of the PIMS data are twofold. First, there is an element of self-selection for both the cooperating companies and the businesses on which they choose to report, and in some quantifiable respects the sample is clearly not representative. Second, the data are subject to stringent confidentiality restrictions so that an analyst cannot ascertain what companies and industries are being studied or what the absolute size of any given business is.

The Federal Trade Commission's Line of Business (LB) data base avoids these problems. The term "LB" in FTC parlance corresponds to the "business" of the PIMS program. As noted by Ravenscraft [1983, p. 24]:

> The FTC sought to obtain information from the top 250 Fortune 500 corporations, the top two enterprises in each industry catego-

[1] Scherer [1980, p. 267] succinctly notes "Statistical testing of structure-performance hypotheses became the closest thing industrial organization economists had to sausage production.

[2] Using the Census Link Project, this weakness can be dealt with; see Liebowitz [1982]. A remaining deficiency which cannot be corrected for is the use of arbitrary accounting conventions for tax purposes.

[3] The extent of such contamination is described by the "specialization ratio". For discussion and a clever interpretation, see Caves [1981].

ry, and additional companies to give adequate coverage for most industry categories. Because the sampling is nonrandom, the data are not perfectly representative of the U. S. manufacturing universe. Still, the sample is larger and more broadly representative than previous firm or LB studies (. . .).

The complete 1975 sample contains 4,527 LBs, which are components of 475 firms and 275 industries (of which 261 are manufacturing and 14 are nonmanufacturing; the industry classification scheme is a modification of the Standard Industrial Classification). For each line of business, a wide range of data is reported: sales, operating expenses, expenditures on advertising, expenditures on other kinds of promotional activity, expenditures on research and development, administrative expenses, and value of assets. LB specific and common (to the firm) costs are distinguished; the accounting conventions which are employed are identified. This rich body of information will support quantitative tests of a number of hypotheses which have been developed by students of industrial organization; results of some such tests are presented below.

C. Structure of the Paper

In Section II, I outline a model of profitability, market share, structure within the firm, and promotional activity. In Section III, I discuss problems involved in the use of accounting data in studies of industrial organization and define the variables used to test the model. In Section IV, I present and discuss the results obtained when the model is tested against the LB sample. Section V contains a brief conclusion.

II. Model Specification

The theoretical model of firm behavior on which the empirical model tested below is based is derived as much from the theory of monopolistic competition as from the theory of oligopoly.[4]

Suppose that each LB of a multiproduct firm has a pool of customers—the behavior of which is summarized by a demand curve—which in the short run it may call its own. The LB sets price along this demand curve; a price above the industry average induces a loss, over time, of market share. Advertising by the LB will shift the demand curve out—increase the price consumers are willing to pay for any given quantity—and also reduce the rate at which share is lost to rivals if price is set above the industry average. The rate at which share responds to price will vary with industry characteristics (including concentration) and with firm characteristics. The firm allocates tangible and intangible common assets (brand names; R & D program; corporate management) among the divisions of the firm.

In such a model, each LB will hold current marginal revenue below current marginal cost, because of the present discounted value of future losses of market share engendered by a marginal increase in current market price. In contrast, advertising per dollar of sales will exceed the level called for by a static Dorfman-Steiner rule, because current advertising reduces future losses of market share. As might be expected, common assets are allocated to each LB of the firm until the present discounted value of reductions in cost for the LB equals the marginal cost of common assets.

Especially in the most complex versions of this model, there are few unambiguous comparative static predictions. This problem is typical of theoretical models of industrial behavior. Comanor and Wilson's [1979, p. 457] remarks on advertising are of general validity:

> While these theoretical models are important for their explanations of how advertising might work, it is evident that no consensus has developed. At the end of this discussion as at the beginning, much depends on the effect of advertising on demand elasticities, and there appears to be no general rule. There are plausible models on both sides of the issue, so that any resolution of this controversy depends on the empirical evidence.

[4]A formal mathematical exposition appears in the working paper version of this monograph (Martin [1982b]).

In the remaining Sections of Chapter II, I outline the expected effects of various industry, firm, and LB characteristics on LB profitability, relative LB size, and promotional activity. For compactness, the model is (except when I discuss the measurement of profitability) developed by reference to the literature rather than by mathematical techniques.[5] When the literature suggests a clear-cut prediction concerning the effect of differences in firm or industry characteristics on profitability, I try to present a compact form of the argument which yields the prediction. When, as is too often the case in industrial organization, no clear-cut prediction emerges, I try to present the gist of arguments on all sides, and then report the evidence yielded by the LB sample analyzed here.

A. Profitability

There are many elements to the notion of "market performance": productive efficiency, technological progressiveness, adequate flow of information to consumers, and so on. Beyond doubt, however, the single most widely studied index of market performance is profitability. For economists, this stems from the view of profit as the engine of resource allocation among alternative uses. In the absence of impediments, capital will flow toward the activities which promise the greatest return (and in so doing, by competition, will reduce that return). In the absence of impediments, capital will withdraw from activities which yield the lowest returns (which will increase the return earned by remaining producers in those fields). In the long run, in a world where resources can move without impediment, and in the absence of risk, all productive activity would yield the same rate of return.

It is this view which leads to the expectation that differences in profitability (across industries, across firms)will be explained by differences in what Williamson [1975, p. 8] calls the outer environment—". . . market structure measures such as concentration, barriers to entry, excess demand, and so forth." Many of these market structure variables control for differences in the extent to which real world markets depart from the idealized, long-run model of the economist. Differences in profitability which remain after these factors have been controlled for have been taken to indicate resource misallocation. To the extent that such remaining differences have been explained by differences in market concentration, they have been attributed to the exercise of market power.

[5]It can also be argued that mathematical expositions of economic theory are sometimes less suitable than nonmathematical expositions of economic theory; see Martin [1983c].

It is now recognized that competing producers will use different assets (broadly defined) and pursue different strategies, even in the long run. Short-run differences in profitability may well reflect returns (which the economist calls rents) to unique firm assets (such as a superior management team or an effective R & D laboratory). Before the exercise of market power can be tested, it is necessary to control for differences across lines of business in the "inner environment" of the firm (Williamson [1970, p. 180; 1975, p. 81]). Previous studies of the impact of internal firm organization on performance have relied largely on qualitative evaluations of firm structure.[6] Using the Line of Business data base, I construct quantitative measures of firm characteristics, including expenditures on promotional activity, expenditures on research and development, overhead administrative cost, and diversification across industries. These variables are used to explain differences in profitability across LBs.

The economist interprets profitability as an index of market performance. Differences in profitability which cannot be explained by differences in short-run disequilibrium, differences in risk, differences in market structure, or differences in firm structure, and which are explained by differences in concentration may (subject to limitations which are discussed below) be attributed to the exercise of market power. Investors, of course, are also interested in profitability, because of their role in the resource allocation process described above. It has always been a purpose of the LB program to contribute to this process (Anderson and Long [1981, p. 4]):

> Managers and directors of corporations will be able to evaluate the performance of their own enterprises against industry averages. By pinpointing industries of persistently high profitability, the LB reports will help trigger the search process from which new competitive entry decisions emerge and thereby contribute to the long-run efficiency of resource allocation. Investment analysts and investors are likely to find the LB reports useful in evaluating the prospects of particular industries.

In the sections which follow, I outline the expected impact of different firm, industry, and LB characteristics on LB profitability.

1. Market Structure/Size

Strickland and Weiss [1976, p. 1113] succinctly state the familiar concentration-profitability hypothesis:

There are strong theoretical grounds for believing that market

[6]For a survey, see Caves [1980].

structure will affect price-cost margins. Concentration is probably the most important element of market structure in this regard. Although there are many oligopoly theories, virtually all of them predict an increase in the effectiveness of collusion (a decrease in the cost of collusion) as concentration rises.

The market concentration measure employed in this study is the Herfindahl index, the sum of the squares of the market shares of all lines of business in the industry:

$$(1) \qquad HERF_j = \sum_{i=1}^{N_j} MS_{ij}^2$$

(where MS_{ij} is the market share of firm i in industry j and N_j is the number of firms in industry j).[7] This measure of concentration has been incorporated in the 1982 Department of Justice Merger Guidelines. Because I measure market share as a fraction ranging from zero to one, the Herfindahl index also ranges from zero to one. Greater values of the Herfindahl index indicate more concentrated markets. The concentration profitability hypothesis predicts a positive coefficient for the Herfindahl index in the profitability equation. That is the presumption adopted here.[8]

The Herfindahl index of industry concentration is in principle computed from the market shares of the LBs which make up the industry. But market share should itself be expected to influence profitability (Gale [1972, p. 413]):

> Large market share may be expected to yield high profitability (1) by giving the firm a share-based product differentiation advantage, (2) by allowing the firm to participate in an oligopolistic group tight enough to effect some joint restriction of output, (3) by increasing the firm's bargaining power in this oligopoly situation and (4) by allowing the firm to take advantage of economies of scale.

From a policy point of view, the first three effects, which relate in one way or another to market share as an index of LB-specific market power, are quite different from the fourth, which suggests market share as an LB-specific efficiency index. Scherer [1980, pp. 282-285] surveys attempts to distinguish the market power aspects of market share from the scale economy effect. However market share affects profitability, the theoretical prediction is unambiguous: LBs

[7]I employ the approximate Herfindahl index (MINL) of Schmalensee [1977]. This is a national measure. To control for regionality of some markets, various measures of transportation cost (surface, air, and pipeline) are included as explanatory variables. For compactness, the coefficients of these variables are not reported here. Copies are available from the author on request.

[8]The results reported below do not depend on the choice of concentration measure. Appendix II reports results obtained if concentration is measured by the four-firm seller concentration ratio.

with larger market shares should be more profitable than otherwise identical LBs with smaller market shares.[9]

Market share is a measure of LB size, relative to the market. The impact of absolute size on profitability has been a subject of recurring interest (Hall and Weiss [1967]; Marcus [1969]; Shepherd [1972a,b]). It is generally expected that larger LBs will enjoy capital cost advantages with respect to smaller operations in the same industry. I measure LB size by the natural logarithm of LB assets (Hall and Weiss [1967, p. 322]; Shepherd [1972a, p. 29]), and expect larger LBs to be more profitable, all else equal, than would otherwise be the case.[10] The caveat of Caves and Pugel [1980, p. 14] should, however, be noted:

> It should perhaps be stressed, in light of the common expectation that a large firm can do anything a small firm can but not vice versa (. . .), that the concept of mobility barriers explains why smaller firms might be systematically more profitable than large. For instance, efficiently supplying small (and profitable) but specialized niches of a differentiated-product market may not be consistent with the best use of a large firm's strategic assets.

2. Scale Economies

As indicated by Caves, Khalilzadeh-Shirazi, and Porter [1975],

> The theory underlying scale-economy entry barriers is familiar from Modigliani's (1958) synthesis of the Sylos-Bain model. It starts from the assumption that production cost curves are J-shaped, or at the least approximiately flat over a significant range of outputs beyond minimum efficient scale (MES). It also assumes that potential entrants expect the established firms to react to entry by holding their outputs constant and letting the market price fall (Wenders, 1971). The minimum entry-forestalling output is then shown to be greater, the smaller is MES relative to the industry's output under pure competition, the less is the cost disadvantage of production units smaller than MES, and the more price-elastic is demand facing the industry (. . .).

I estimate minimum efficient scale as the average output of plants accounting for at least half of industry output, as a percentage of industry output. LBs which operate in industries with larger MES

[9]The observation of Gale and Branch [1982, p. 92] that ". . . no recognized theory of market power asserts that high share facilitates a higher relative price when products are identical . . ." is perhaps beside the point; as noted by Scherer [1980, p. 284], ". . . product differentiation is widespread in modern industry, and so the homogeneity assumption must be relaxed."

[10]Ornstein et al [1973] emphasize the importance of avoiding approximately tautological relationships. For this reason, I exclude LB size and industry size from the market share equation, and I exclude LB size and firm size from the firm share equation. On the same basis, I exclude absolute firm size and industry size from the profitability equation, which contains one measure of absolute LB size and two measures of relative LB size (market share and firm share).

should be more profitable, all else equal, because entry into such industries will be more difficult than entry into industries with small MES. But this effect should be less if enterprises which operate below minimum efficient scale are nearly as efficient as MES operations. Following Caves, Khalilzadeh-Shirazi, and Porter [1975], I control for this effect by including as an explanatory variable in the profitability equation the cost disadvantage ratio (CDR). The CDR is defined as the average value added per worker in larger plants accounting for at least half of industry output, divided into value added per worker in remaining smaller plants. This variable (by construction) lies between zero and 100; when it attains its maximum value, smaller plants are as efficient, at least in terms of labor, as larger plants. Larger plants should then gain no scale economy advantage over smaller plants, even if MES is large. For this reason, the expected sign of CDR in the profitability equation is negative.[11]

3. Industry Demand Characteristics

Scherer [1980, p. 245] describes the role of market price elasticity in the Sylos-Bain model:

> . . . the more elastic market demand is—i.e., the more readily the market will absorb an increment of supply without a large fall in price—the less price can be held persistently above the competitive level without attracting new entry, ceteris paribus.

Particularly for large cross-sections of industries, it is difficult to obtain direct estimates of the price elasticity of demand. Further, as pointed out by Caves et al [1975, p. 133, fn. 1], the relevant elasticity is the price elasticity which is perceived by a potential entrant, and this probably cannot be estimated in any event. I have argued elsewhere (Martin [1982a]) that this factor can be controlled for by assuming that the relevant price elasticity of demand varies across industries with the shares of industry output going to different types of consumers. From the 1972 Input-Output Tables for the United States, I have computed the fractions of industry output going to final consumer demand (CONS), to the Federal government (FEDSR), and to state and local governments (SLSR).[12]

It is natural to suppose that profitability will rise, all else equal, the greater are sales to final consumer demand. Such industries

[11]Caves et al [1975] employ an interactive specification, which combines MES and CDR. For simplicity, I confine myself here to a linear specification.

[12]The residual demand category, which is omitted to avoid perfect collinearity with the constant term, is sales to industrial consumers.

are likely to be more susceptible to product differentiation[13], and less likely to face market power on the buying side (Weiss [1974, pp. 226-7]). Weiss [1974, pp. 226-7] finds such a positive effect, on industry profitability, for an interaction variable which is the product of the four-firm seller concentration ratio and the percentage of sales going to final consumer demand. Industry-level studies for 1967 have found a positive impact of CONS on profitability when this variable is entered linearly (Martin [1979a, 1982a]), while industry-level studies using 1972 data have found a negative effect for the same specification (Martin [1983a]).

Models of the impact of government-industry relationships on profitability have emphasized the relative bargaining power of government and industry (Agapos and Dunlap [1970]; Poirier and Garber [1974]). Potentially, the Federal government has great bargaining power with respect to firms in the private sector, especially firms producing primarily defense-related products. If this power is realized, LBs in industries which depend on the Federal government for a large portion of their sales should be less profitable, all else equal, than would otherwise be the case. On the other hand, if those who view the Federal government-private sector relationship as symbiotic (for example, Marfels [1978]) are correct, then sales to the Federal government should have a positive impact on profitability.

In contrast to the Federal government, no single state or local government is likely to exert much bargaining power with respect to national suppliers. For this reason, profitability is likely to be higher (or at least, no lower) when a large fraction of output goes to state and local governments.

Existing firms will be more profitable, in the short run, if demand increases unexpectedly. The impact of the growth rate of industry sales between 1974 and 1975 (GR7475) on LB profitability should be positive.

The industry average ratios of export sales (EXSR) and import sales (IMSR) to sales by domestic producers will influence the price elasticity of demand to individual domestic producers. With respect to exports, Pugel [1978, p. 16] argues that

> . . . exporting increases the rewards to innovation by expanding the market for innovation. These greater rewards may be protected from the competitive process by barriers to entry based on patents, secrecy, or capital costs. Export profits may be enhanced by the lesser antitrust restrictions on export marketing collusion among domestic producers.

For these and other reasons, Pugel expects a positive effect of export

[13]For a cogent statement of the contrary view, see Caves and Khalilzadeh-Shirazi [1977, p. 116].

sales on profitability (which his results confirm). A similar effect should be expected at the LB level.

When an important part of domestic sales is imported, the ability of customers to find alternative sources of supply if prices rise is greater than would otherwise be the case. To the extent that importers have different interests than domestic producers, it will be more difficult to maintain any sort of oligopolistic coordination (the comments of Newman [1978] on goal congruence are relevant here). The expected impact of industry import share on LB profitability is negative.

4. Promotional Activity

The expected impact of promotional activity on performance is ambiguous. Boyer [1974, pp. 541-2] summarizes the alternative positions:

> It is argued that advertising can, independently of industry concentration, increase barriers to entry into an industry. This is due to "buyer inertia and loyalty," (. . .), induced by advertising or the "accumulated preferences of buyers (. . .) for established brand names and company reputations," (. . .). Advertising, which has the effect of encouraging buyer inertia and loyalty, will be called goodwill advertising. But it is clearly possible for advertising to have the opposite effect. Goodwill advertising is far from Stigler's (. . .) description of advertising as a means of decreasing the cost of market information. For him, one of advertising's principal effects is to perfect markets by lowering the costs of identifying potential buyers, sellers and the terms of sale.
>
> The lowered cost of information encourages participants to comparison shop and thus reduces the opportunity for long-term price disparities. Advertising of this variety . . . will be termed informative advertising.

In a recent comprehensive survey, Comanor and Wilson [1979, p. 454] indicate "We find the theoretical studies of advertising and competition are not compelling and that our conclusions must rest on the empirical results." Industry-level studies have often found a positive impact of advertising on profitability (for example, Comanor and Wilson [1967]; Martin [1982a, 1983a]). These empirical results suggest that promotional activity should have positive effects on profitability, although neutrality is perhaps called for in principle.

With the Line of Business sample, I am able to distinguish two sorts of expenditures on promotional activity—those on advertising and those on all other sorts of promotional activity.

Because I expect LB profitability to be influenced by LB, firm, and industry characteristics, I include three different advertising

intensity variables in the profitability equation. LB advertising per dollar of sales (LASR) includes all expenditures on media advertising which can be traced to the individual LB. Firm advertising per dollar of sales (FASR) includes all expenditures on media advertising—those traceable to individual LBs and those common to the firm. The industry average advertising-sales ratio (IASR) is taken from the 1972 Input-Output Table for the United States.

Non-advertising sales efforts include salesmen, displays at the point of sale, coupons, and trade allowances to distributors (Weiss, Pascoe, and Martin [1983]). I include LB expenditures on such sales efforts (LOSR) and firm expenditures on such sales efforts (FOSR) (each as a percentage of the relevant sales figure) as explanatory variables in the LB profitability equation.

5. Research and Development

The expected impact of research and development on profitability is subject to the same sort of ambiguity which characterizes promotional activity. If research and development either reduces cost or creates a product differentiation advantage, then the effect on profitability should be positive. However, in one of the few empirical studies of the effect of research and development on profitability, Caves, Porter, and Spence [1980, p. 234] find a negative effect. They employ a sample of Canadian firms, and interpret their finding as indicating that research and development expenditures reflect a defensive reaction to international competition. Scherer [1980, p. 408] similarly suggests that heavy investment in research and development may signal a market environment in which actual and potential competition is intense. If this is a general phenomenon, profitability should be lower, the greater are expenditures on research and development. Under this interpretation, expenditures on research and development are viewed as an index of one element of market structure.

Even if a line of business does not benefit from its own R & D operations, it may benefit from research and development carried out by its parent firm. For this reason, expenditures by the LB on research and development per dollar of sales (LBRD75) and expenditures by the parent firm per dollar of sales (FRD75) are included as separate explanatory variables in the profitability equation.

6. Capital Intensity

Discussing alternative measures of profitability, Weiss [1974, pp. 198-199] says

> . . . there is a good case for the rate of return on sales if some account is taken of the capital-sales ratio. Admittedly competitive industries with equal risk would have the same rate of return on equity in long-run equilibrium. However, two firms with the same degree of monopoly power would not have the same rates of return on equity if the capital they needed per dollar of sale differed. This is because the firm with the higher capital requirement would have more equity and would receive more in "normal profits" (profits needed to attract capital into the business).

Thus, when profitability is measured as a rate of return on sales (as it is in this study), a capital-sales ratio should be included as an explanatory variable. The coefficient of the capital-sales ratio is an estimate of the normal rate of return on capital (a formal justification for this interpretation is given in Section III.A.2.c).

For this reason, I include the LB capital-sales ratio (LBKSR) as an explanatory variable in the profitability equation. It should be pointed out that within any industry there is a wide range in the capital-sales ratios of different LBs. Some of the extreme values may represent inefficient factor combinations. It may well be that the rate of return on sales earned by an LB is determined more by the average capital intensity of the industy within which it operates than by its own capital intensity; the coefficient of the industry average capital-sales ratio (IKSR) in an LB profitability equation should be positive.

Williamson [1975, p. 147] has argued that both the firm and the market allocate capital:

> . . . the general management and its support staff can perform a further capital market function—assigning cash flows to high yield uses. Thus, cash flows in the M[ultidivisional]-form firm are not automatically returned to their sources but instead are exposed to an internal competition. Investment proposals from the several divisions are solicited and evaluated by the general management. The usual criterion is the rate of return on invested capital.

The more capital intensive the parent firm, the greater the range of alternative investment opportunities within the firm—the greater the opportunity cost of capital to the LB. The firm capital-sales ratio (FKSR) should have a positive coefficient in the LB profitability equation.

7. Firm Structure

There is a natural measure of firm diversification, which corresponds to the Herfindahl index of market concentration. An LB's market share is defined as its fraction of industry sales. By analogy, define an LB's firm share as its fraction of the sales of its parent firm.

Then a Herfindahl index of the diversification of firm sales across industries is (Berry [1974, 1975]):

$$\text{(2)} \qquad DIV_i = \sum_{j=1}^{M_i} FS_{ij}^2$$

(where FS_{ij} is the share of firm i sales accounted for by its operations in industry j and M_i is the number of industries within which firm i operates). If DIV_i equals one, all of firm i's operations occur in just one industry, and firm i is completely specialized. Smaller values of DIV indicate greater diversification. For a firm which divided its operations equally among a great many industries, DIV would approach zero.

If LBs which are components of diversified firms are more efficient (being able to shift resources to or from other divisions of the firm as appropriate) or if they enjoy greater market power than otherwise identical LBs because of access to intangible assets (brand name, goodwill, credit rating) of the parent firm, then diversification will have a positive effect on profitability.[14] Because lower values of the diversification index indicate greater diversification, the expected sign of the coefficient of DIV in the LB profitability equation is negative.

Firm share may itself have an impact on profitability. Every diversified firm possesses tangible and intangible assets which benefit all divisions of the firm. Examples of such assets include the corporate management, firm brand names, accumulated goodwill, and corporate R & D programs. It is reasonable to interpret the LB's firm share as an index of the impact of these assets on the LB level. Gale [1972, p. 413] ascribes a similar role to market share, but relative size within the firm is surely more appropriate to the allocation of assets within the firm than relative size within the industry. If firm share is interpreted in this way, the expected sign of the coefficient of FS in the LB profitability equation is positive.

8. Internal Organization

Williamson [1970, p. 180; 1975, p. 8] has emphasized the importance of the internal organization of the firm in explaining market performance. His own work and that of his students (Bhargava [1973]) has employed qualitative evaluations of organization form. He

[14]Berry [1974] finds no evidence that diversification increases concentration; see also Scherer [1980, Chapter 12] and Caves [1981].

has emphasized the benefits of the multidivisional form of internal organization (Williamson [1970, p. 133]):

> . . . the transformation of a large business firm for which divisionalization is feasible from a unitary to a multidivisional form organization contributes to (but does not assure) an attenuation of both the control loss experience and subgoal pursuit (. . .) that are characteristic of the unitary form. Realization of these attentuation effects, however, requires that the general office be aggressively constituted to perform its strategic planning, resource allocation, and control functions.

Firms which are operated under a multidivisional form, and which are actually administered so that the potential benefits of the multidivisional form are realized, will have a higher level of administrative cost per dollar of sales which cannot be traced to any particular LB than would otherwise be the case. LBs which are components of such parent firms should be more profitable, all else equal. On this argument, the expected sign of the coefficient of nontraceable administrative costs per dollar of firm sales (FADMIN) in the LB equation is positive.

In contrast, firms which do not benefit from effective corporate control will have a high level of administrative cost which can be traced to the LB level. The expected sign of traceable administrative cost per dollar of LB sales (LBADMIN) in the LB profitability equation is negative.

B. Relative Size

LB market share is a measure of size relative to the industry; LB firm share is a measure of the size relative to the parent firm. For reasons discussed above, each should have a positive effect on LB profitability. Neither market share nor firm share can be regarded as exogenously given. They are determined endogenously, and will be determined by many of the same forces which shape LB profitability.

It is important to understand the factors which contribute to large market share or large firm share. Market share is the fundamental building block of market concentration; firm share is the fundamental building block of firm diversification. If we understand why some LBs are large in their industry or in their firm, we will understand why some markets are concentrated, and some firms diversified. To this end, I now discuss the specification of equations explaining variations across LBs in market share and firm share, which are treated as endogenous variables in this study.

1. Profitability

If markets work, profitability will serve as a signal to reallocate resources. For this reason, I include lagged[15] profitability as an explanatory variable in the market share equation. As argued by Orr [1974], it is expected that greater past profitability will have encouraged entry, resulting in a lower current market share (all else equal). The expected sign of the coefficient of lagged profitability in the LB market share equation is negative.

Profitability is similarly a signal to reallocate resources within the firm. If firms allocate resources away from low-return divisions and toward high-return divisions, then the coefficient of lagged profitability in the LB firm share equation will be positive.

2. Scale Economies

LB market share should be larger, all else equal, in industries for which minimum efficient scale is a large part of industry output, especially if the cost curve rises sharply below minimum efficient scale. MES should have a positive coefficient in the market share equation; CDR should have a negative coefficient. The arguments behind these assertions parallel those made in discussion of LB profitability, and will not be repeated here.

Firms which operate at efficient scale in industries for which MES is large are likely to have a sizeable investment in fixed assets. The possession of such assets will increase the return expected from diversification into other industries within which the assets can be employed (Caves and Porter [1977, pp. 257-258]). If this is the case, then MES will have a negative coefficient in the firm share equation: anything which increases the diversification of the parent firm reduces the share of individual LBs in the firm.

3. Industry Demand Characteristics

Industries with a large fraction of output going to final consumer demand are probably more susceptible to product differentiation than industries which sell primarily to industrial customers. Consumer markets may for this reason be occupied by relatively small LBs, which serve specialized market segments (the argument of Caves and Pugel, quoted above, is relevant here as well). This suggests that

[15]M. A. Adelman has suggested in private communication that current profitability may be a better index of the incentives for resource reallocation than lagged profitablity. When current profitability is substituted for lagged profitability in the market share and firm share equations reported below, no substantive change in the nature of the results takes place.

the expected sign of the coefficient of CONS in the market share equation is negative.

If the Federal government concentrates its purchases among a few large firms (the "military-industrial complex" argument), then LBs in industries which supply much of their output to the Federal goverment will be larger in their industries than would otherwise be the case. Without endorsing this argument, I note that it predicts a positive coefficient for FEDSR in the market share equation.

The expected impact of sales to state and local governments on market share, and of the demand share variables generally on firm share, is unclear. These variables are included in the market share and firm share equations to control for differences across industries in the price elasticity of demand.

Entry should be easier, the more rapid the growth of market demand (Scherer [1980, p. 99]):

> . . . the more rapidly demand grows, the more likely it is that rising plant scale requirements will be outstripped, . . . and hence the stronger any trend toward declining concentration, or the weaker any trend toward rising concentration.

For this reason, LB market share should be smaller in rapidly growing industries than would otherwise be the case. The expected sign of the coefficient of the industry growth rate of sales (GR7475) in the market share equation is negative.

To the extent that LBs in rapidly growing industries tend themselves to grow more rapidly, they will have larger firm shares. The expected sign of the coefficient of GR7475 in the firm share equation is positive.

If import competition tends to encourage domestic concentration (a kind of countervailing power argument), then LBs which operate in industries with large import shares will have larger market shares than would otherwise be the case.

There is some evidence that U.S. trade flows involve trade among developed countries in differentiated producer goods (Caves and Khalilzadeh-Shirazi [1977, p. 116]; Koo and Martin [1983, p. 18]). If U.S. exports involve specialized LBs serving particular niches in world markets, then the industry export-sales ratio (EXSR) should have negative coefficients in the market share and firm share equations.

4. Promotional Activity

In the discussion, above, of the specification of the LB

profitability equation, I noted the theoretical ambiguity concerning the impact of promotional activity on profitability. This ambiguity carries over to market share and firm share. Promotional activities which promote goodwill will increase product differentiation, bind consumers more completely to particular LBs, and increase market share and firm share, all else equal. Promotional activity which eases the flow of information in the marketplace will increase competition, which should lower market share and firm share, all else equal. Because of this uncertainty, I take no position concerning the expected signs of the coefficients of the advertising and other sales effort variables in the market share and firm share equations.

5. Research and Development

To the extent that expenditures on research and development increase product differentiation, market share should be larger than would otherwise be the case. But if large research and development expenditures indicate intense price competition, or firms' serving specialized market segments, then the effect on market share may be negative.

An ongoing research and development program, especially at the firm level, may be the kind of intangible asset which can be exploited in more than one industry. If so, this should promote firm diversification, which is to say that the firm share of individual LBs will be reduced. The expected sign of the R & D variables in the firm share equation is negative.

6. Absolute Size

If large firms enjoy capital cost advantages vis-à-vis smaller firms, then LBs which are components of large firms should have larger market shares than would otherwise be the case. I measure firm size by the natural logarithm of firm assets; its expected coefficient in the LB market share equation is positive.

All else equal, a LB which operates in a large industry should be larger (or at least, no smaller) in its firm on that account. The expected coefficient of industry size (here measured as the natural logarithm of industry assets) in the firm share equation is positive.

7. Internal Organization

I have argued above, discussing the specification of the profitability equation, that large values of overhead administrative cost

per dollar of sales (FADMIN) will indicate more effective corporate management. If this is the case, then LB market share should be larger, all else equal, the larger is FADMIN. On the other hand, if an effective corporate management is the kind of asset which, because it can be exploited in several industries, encourages diversification, then firm share will be smaller when FADMIN is larger.

In contrast, when management is concentrated at the LB level, market share should be smaller, and firm share larger, than would otherwise be the case.

C. Promotional Activity

It is now generally recognized that advertising is endogenously determined (see, among others, Strickland and Weiss [1976] or Martin [1979a,b]). The same is clearly true for nonadvertising kinds of promotional activity (Weiss, Pascoe, and Martin [1983]). I present below estimates of two equations, one explaining variations across LBs in expenditures on advertising per dollar of sales and one explaining variations across LBs in expenditures on non-advertising promotional activity per dollar of sales.

It should be expected that LBs which operate in industries where advertising is common will advertise more than LBs in industries where advertising is not a common competitive technique. The expected sign of the industry advertising sales ratio (IASR) in the LB advertising equation is positive. Similarly, LBs which are components of firms which advertise a great deal are probably more likely to advertise themselves; the expected sign of the firm advertising-sales ratio (FASR) in the LB advertising equation is positive.

If advertising and other sales efforts are substitute promotional strategies, on average, then LBs which are components of firms which advertise intensely will spend less on other sales efforts; conversely, LBs which are part of firms which engage heavily in non-advertising sales efforts will advertise less for that reason. If advertising and other sales efforts are complements, relationships in the other direction will appear. To test this issue, FASR is included in the LB other sales effort equation and FOSR is included in the LB advertising equation.

1. Profitability

It is a well-known implication of Dorfman-Steiner models of advertising (reviewed by Schmalensee [1972, pp. 20-43]) that advertising per dollar of sales will rise with profitability: if the profit

earned on each sale is greater, then the return to advertising which induces such sales will be greater than would otherwise be the case. Appropriately reformulated, such models will yield the same implication for non-advertising sales efforts.

2. Market Structure/Firm Structure/Size

There are externalities involved in the decision to advertise or to engage in other kinds of sales efforts. Such promotional activities may engender a general increase in demand, benefiting rivals as well as the firm which incurs the expense. The larger is market share, the more likely is the firm which incurs the expense to reap the benefits. For this reason, I expect both advertising and other sales efforts to rise with market share.

Comanor and Wilson [1974, pp. 144-5] expect a positive impact of concentration on advertising intensity in industries which produce a homogeneous product, but suggest possible negative effects when the product is heterogeneous. They adopt an agnostic stance with respect to the expected impact of market concentration on advertising in a cross-section study. I take the same position here concerning the impact of market concentration (as measured by the Herfindahl index) on media advertising and on other sales expenditures.

If firm share has an impact on the intensity of sales efforts (which I test for here), it is probably positive: the potential return to advertising or other sales efforts, from the firm's point of view, will be greater in larger divisions of the firm. To the extent that promotional activities by one LB benefit all divisions of the firm, LBs which are divisions of more diversified firms will engage more intensely in promotional activities than would otherwise be the case. Because smaller values of DIV indicate that the parent firm is more diversified, the expected sign of the coefficients of DIV in the advertising and other sales effort equations is negative.

The impact of absolute LB size on advertising and on other kinds of sales efforts can be tested by including the natural logarithm of LB assets in the LASR and LOSR equations. Negative coefficients, indicating that promotional activities fall, in proportion to sales, as LB sizes increases, will suggest economies of large scale in promotional activity.

3. Industry Demand Characteristics

The more important are sales to final consumer demand, the more likely are expenditures on advertising or other sales efforts to

create product differentiation. For this reason, LASR and LOSR should increase with the fraction of industry output going to final consumer demand.

In discussing the impact of sales to the Federal government on profitability, I stressed the potential importance of bargaining power relationships. If the Federal government exercises its bargaining power effectively, activities aimed at cultivating product differentiation are likely to be less profitable. The expected impact of FEDSR on LASR and LOSR is negative.

In contrast, promotional activity—especially non-advertising sales efforts—should be more profitable in industries which sell to myriad small units of state and local government.

The return from successful product differentiation—in terms of profit and in terms of sales volume—will be greater in growing industries. The expected impact of industry growth on advertising and on other sales efforts is positive.

4. Research and Development

If, on average, product differentiation through research and development is an alternative to product differentiation via advertising or other sales efforts, then expenditures on advertising or other sales efforts will fall as expenditures on R & D rise. However, promotional activity may be the means by which the development of new products via R & D is translated into marketplace advantage. If the return to promotional activity rises with R & D, then LB advertising and other sales efforts will also rise with R & D.

III. Issues of Empirical Specification

In Table I, I summarize the five-equation model which was described in Section II. These are the equations which will be tested against the 1975 Line of Business sample.[16] Sample properties of the different variables are given in Appendix I.

In Section III-A, I discuss issues involved in the measurement of profitability for empirical studies of industrial organization. In Section III-B, I describe the sample and the estimation technique.

A. Measuring Profitability at the Line of Business Level

1. Common Costs

I employ a measure of profitability which, like the familiar price-cost margin derived from the Census of Manufactures, is a rate of return on sales. I measure profitability as the margin of total revenues and transfers at the LB level over operating costs, media advertising expense, other selling costs, and administrative costs *which can be traced to the Line of Business*, as a percentage of total revenues and transfers.

In a sample of diversified firms, the issue of common costs—costs which cannot be directly associated with the operations of any particular Line of Business—arises. One example of such an expense—overhead administrative cost—has been discussed above. It is my view that since such common costs cannot in principle be assigned to any one Line of Business, they should not be arbitrarily allocated to the LB level when LB profitability is measured.

Long [1981] has shown that the empirical results obtained with LB data are robust to the use of alternative allocation techniques for common costs. The qualitative nature of the results reported below are not sensitive to the particular specification which I have chosen. In addition, I show below (in the discussion of overhead administrative cost) that the estimated equation for LB profitability measured gross to the common costs of the firm implies an estimated firm profitability equation, when firm profitability is measured net of the common costs

[16] In addition to the variables listed in Table 1, variables intended to control for differences across industries in transportation cost, distribution margins, and countervailing power were included in the equations. Each equation in the complete specification is identified. For an industry-level study which employs these variables, see Martin [1983a]. For compactness, coefficients for these variables are not reported here, but are available on request from the author.

TABLE 1:

Equations to Be Estimated

	PCM75	MS75	FS75	LASR75	LOSR75
Profitability:					
PCM75				+	+
PCM74		−	+		
Market Structure:					
MS75	+		+	+	+
HERF72	+		?	?	?
Firm Structure:					
FS75	+	+		+	+
DIV75	−	−/?		−	−
Advertising:					
LASR75	?	?	?		
FASR75	?	?	?	+	?
IASR72	?	?	?	+	?
Other Sales Efforts:					
LOSR75	?	?	?		
FOSR75	?	?	?	?	+
Scale Economies:					
MES	+	+	−		
CDR	−	−	?		

TABLE 1:

Equations to Be Estimated (Continued)

	PCM75	MS75	FS75	LASR75	LOSR75
Demand Conditions:					
CONS	+	−	?	+	+
FEDSR	−/?	−/?	?	−	−
SLSR	+/?	?	?	+	+
GR7475	+	−	+	+	+
EXSR	+	−	−		
IMSR	−	+	?		
Research & Development:					
LBRD75	−/?	−/?	−	?	?
FRD75	+/?	+	−	?	?
Internal Organization:					
LBADMIN75	−	−	+		
FADMIN75	+	+	−		
Size:					
LOG (LBKAP)	+			−/?	−/?
LOG (FKAP)		+			
LOG (IKAP)			+		
Capital Intensity:					
LBKSR	+				
FKSR	+				
IKSR	+				

See Appendix I for variable definitions and sample properties.

of the firm. The specification which I have chosen does not ignore the common costs of the firm; it places them where they are incurred—at the firm level.

2. *Accounting Data*[17]

Fisher and McGowan [1983] are sharply critical of empirical studies of industrial structure-conduct-performance relationships, because such studies employ accounting measures of profitability as an index of performance.

There are three strands in the Fisher-McGowan argument. First, structure-conduct-performance studies "uniformly" measure profitability as a rate of return on assets or as a rate of return on stockholders' equity. Second, the only correct measure of profitability for economic analysis is the discount rate which makes the present value of an income stream equal to the expenditure which generates the income stream. This concept of profitability is well known to economists, as the marginal efficiency of investment. Fisher and McGowan label it "the economic rate of return." The final strand in the Fisher-McGowan argument is provided by a series of numerical examples, which suggests that accounting rates of return are very poor proxies for the marginal efficiency of investment. This mismeasurement, in the view of Fisher and McGowan, is so serious that studies of industrial profitablilty with accounting data are meaningless.

I will briefly discuss each of the links in the Fisher-McGowan argument.

a. Measurement of Profitability in the Literature

Fisher and McGowan [1983, p. 83] suggest that the literature consisting of empirical studies of concentration and profitability "uniformly relies" on profitability in proportion to stockholders' equity or to total assets. It is, however, well known that many such studies, and probably a majority, measure profitability as a rate of return on sales. Many of these studies are mentioned in the literature surveys which are cited by Fisher and McGowan (Weiss [1974], Scherer [1980]). As I have noted elsewhere, this includes all studies which measure profitability with the well-known "price-cost margin" computed from Census of Manufactures data (Martin [1979b, p. 474]). Weiss [1974, p. 199] and Scherer [1980, p. 269] suggest that rates of return on sales should be preferred to other measures of profitability.

[17]For further discussion, see Martin [1984]. I am grateful to M. A. Adelman and F. M. Fisher for comments on the material in this section.

b. The Correct Measurement of Profitability

Fisher and McGowan [1983, p. 82] assert that what they call the economic rate of return is the only correct measure of profitability for economic analysis. There are essentially two reasons for this claim. In long-run equilibrium in a competitive economy, and in the absence of risk, this rate of return would be equalized for all investments. Out of equilibrium, it is this rate of return which drives resource reallocation and moves the economy toward equilibrium.

This argument involves the economic theory of the behavior of profit maximizing firms. But another measure of profitability commonly arises in formal models of the behavior of such firms: the Lerner index of monopoly power, the price-marginal cost margin.

Many studies of the concentration-profitability relationship have been motivated with explicit reference to the price-cost margin.[18] It appears not only in models of price and output determination but also in models of nonprice competition (including research and development and advertising).[19]

To show that the marginal efficiency of investment does not dominate measures of profitability based on the Lerner index, it is useful to explore a formal model of firm profit maximization.

Suppose a firm combines labor, L(t) and capital, K(t), according to a neoclassical production function $Q = F(K,L)$, to produce output which is sold according to an inverse demand function p(Q). The firm may hire any amount of labor for time t at wage w(t); capital is purchased at price $p^k(t)$. Capital stock depreciates at rate $\delta(t)$. This is, of course, an absolutely conventional neoclassical model of the firm.

Investment at time t is

$$I(t) = \dot{K}(t) + \delta(t)K(t) \tag{3}$$

(the superimposed dot indicates a time derivative).

Assume the firm acts to maximize the present discounted value of net cash flow,

$$\pi = \int_{t=0}^{\infty} e^{-rt}\{p[F(K(t),L(t))]F(K(t),L(t)) - w(t)L(t) - p^k(t)I(t)\}dt \tag{4}$$

Euler's equation of the calculus of variations yields (after

[18]For example, Bain [1956, p. 7, pp. 190-191]; Collins and Preston [1970, p. 10]; Rhoades and Cleaver [1973, p. 91]; Cowling and Waterson [1976]; see also Liebowitz [1982, p. 231, fn. 1].

[19]Schmalensee [1972, pp. 20-43]; Needham [1975]; Cubbin [1981].

substituting (3) into (4)) first order necessary conditions for profit maximization:

(5) $Qp'(Q)F_L(K,L) + p(Q)F_L(K,L) = w$

(6) $Qp'(Q)F_K(K,L) + p(Q)F_K(K,L) = (r + \delta)p^k - \dot{p}^k = \lambda p^k$

where for compactness I define

(7) $$\lambda = r + \delta - \frac{\dot{p}^k}{p^k}$$

as the shadow rental of the services of a unit of capital and suppress functional dependence on time.

The first order conditions (5) and (6) may be rewritten

(8) $$\frac{p - \frac{w}{F_L}}{p} = \frac{1}{\epsilon_{Qp}}$$

(9) $$\frac{p - \frac{\lambda p^k}{F_K}}{p} = \frac{1}{\epsilon_{Qp}}$$

where ϵ_{Qp} is the price elasticity of demand. Since marginal cost for the firm is

(10) $$MC = \frac{w}{F_L} = \frac{\lambda p^k}{F_K}$$

equations (8) and (9) are two different ways of writing the Lerner formula,

(11) $$\frac{p - MC}{p} = \frac{1}{\epsilon_{Qp}}$$

It is critical to note that the optimal conditions for factor employment at time t (equations (8) and (9)), and the equivalent Lerner index, depend only on values defined at time t. This is a property which Arrow [1964, pp. 27-28] has labeled "myopia":

> Until very recently, the myopic property was largely unremarked in the literature. Indeed, the usual formulation, for example, Keynes's use of the marginal efficiency of capital, (. . .) requires comparison of the present value of all future returns for a given investment with the investment cost. This procedure is not unambiguous . . . . . its most significant defect is to concentrate attention on the choice between undertaking an investment and not undertaking it at all, whereas the myopic rule is based on comparison between undertaking the investment now and postponing it for a short period.

When factor markets work reasonably well—when firms can hire or fire workers and buy or sell capital goods in a way consistent with (4)—then the myopia property justifies the measurement of current profitability by the Lerner index. Present value calculations of the kind which underlie the marginal efficiency of investment are not required. It follows that the arguments of Fisher and McGowan—which revolve around the use of accounting data to approximate the marginal efficiency of investment—fail to establish that accounting data should not or cannot be used to construct measures of profitability based on the Lerner index.

c. The Lerner Index and Accounting Data

Long and Ravenscraft [1984] point out a number of computational flaws in the Fisher-McGowan examples. In spite of this, these examples do illustrate a property of accounting data, a property which has implications for the use of the Lerner index in empirical studies. I show this by specializing equation (11) and deriving a version of the Lerner index similar to measures of profitability commonly employed in empirical work.

Baumol, Panzar, and Willig [1982, p. 33] note that constant returns to scale is the leading empirical case. Suppose it holds here. In this case, marginal and average cost are the same; from equation (10),

(12) $wL + \lambda p^k K = MC(LF_L + KF_K) = MC(Q)$

since the assumption of constant returns to scale gives

(13) $Q = LF_F + KF_K$

Thus

(14) $$MC = \frac{wL + \lambda p^k K}{Q} = AC$$

and the Lerner index (11) can be rewritten

(15) $$\frac{pQ - wL}{pQ} = \frac{1}{\epsilon_{Qp}} + \lambda\frac{p^k K}{pQ}$$

Now interpret L as a vector of variable factors, with w a conformable vector of factor prices. The left hand side of equation (15) is the margin of revenue over the cost of current inputs, as a fraction of revenue; this quite clearly corresponds to the familiar "price-cost

margin," computed from Census of Manufactures' data[20] and to rates of return on sales computed from other sources.

A simple way to rationalize common empirical models on the basis of this theoretical model is to observe that the relevant price elasticity of demand in (15) will depend on various firm and industry characteristics. Equation (15) also provides a formal rationale for the use of the capital-sales ratio as an explanatory variable in the profitability equation when profitability is measured as a rate of return on sales, and justifies the interpretation of the coefficient of this variable as an estimate of the normal rate of return on capital.

The examples employed by Fisher and McGowan suggest that accounting measures of the value of the capital stock are likely to be such poor measures of the economic value of the capital stock that the capital-sales ratio, the second right-hand side term in (15), will be subject to serious measurement error.

This point is well known. It is discussed by Scherer [1980, pp. 272-3]. It is discussed by Weiss [1974, pp. 196-7]. Several studies employ stock market measures of asset value in order to examine the robustness of empirical results to this particular property of accounting measures of asset value (Bothwell and Keeler [1976]; Sullivan [1977]; Thomadakis [1977]). As noted by Thomadakis [1977, p. 181, fn. 1], this measurement error is a serious problem only if it is systematically related to market structure. It is not obvious that this is the case.

With respect to the results of this study, I have shown elsewhere (Martin [1981]) that the qualitative results which I report below are robust to the use of alternative definitions of the capital stock. The argument of Fisher and McGowan—which is generally incorrect—is not relevant to the results presented here.

B. Sample and Estimation Technique

As noted above, the complete 1975 Line of Business sample contains information on 4,527 lines of business. Only lines of business in manufacturing industries are included in the sample employed here. All LBs in industries described as "miscellaneous" or "not elsewhere classified" were excluded from the sample on the grounds that such LBs often will not operate in the same industry in a meaningful economic sense; in addition, industry-level variables for

[20]Liebowitz [1982] criticizes the Census price-cost margin by comparison with Internal Revenue Service data. Scherer identifies two major problems with IRS data: the assignment of entire firms to a single industry [1980, p. 270] and the impact of accounting rules which are followed for tax purposes only [1980, p. 272]. As noted above (footnote 2), Liebowitz corrects for the first problem [1982, pp. 238-9, fn. 22]. He recognizes the second [1982, p. 238, fn. 2], and assumes that it can be ignored. There is no reason to think that this is the case, which invalidates his conclusions.

such observations will be ill-defined. Because lagged profitability appears in the system, and because lagged values of other endogenous variables were used as instruments, only LBs which were surveyed in both 1974 and 1975 were included in the sample. This eliminated a number of "births" and "deaths"—LBs which were just beginning or about to cease operations. Others were eliminated following a classification of Weiss and Pascoe [1981]. One firm was excluded to avoid a potential conflict of interest.[21] The sample employed here contains 2,297 Lines of Business, which are components of 218 industries and 424 firms.

The estimates reported in Table II are obtained by means of instrumental variables. Variables labeled with the superscript "E" are treated as endogenous. All exogenous or predetermined variables were used as instruments. Because a number of the explanatory variables are related in a nonlinear way (and following Kelejian [1971]), squares and cross-products of a number of instrumental variables were included as instrumental variables.

Examination of the residuals from ordinary least squares regressions suggested the presence of heteroskedasticity. The estimates reported in Table 2 are corrected for heteroskedasticity, on the assumption that the variance of the error term is multiplicatively related to LB sales, firm sales, and industry sales. Ravenscraft [1983] gives an extensive treatment of the heteroskedasticity problem for the profitability equation. Appendix II contains estimates which are not corrected for heteroskedasticity.

For simplicity, I confine myself to specifications which are linear in the coefficients to be estimated. Ravenscraft [1983] examines interaction effects for the profitability equation.

[21]During early research for this study, the author was employed as a consultant in an antitrust case involving the American Hospital Supply Corporation, which for that reason was excluded from the sample.

IV. Results

In Section II, I discussed theoretical issues in the specification of a model of LB profitability, relative size, and promotional activity. In Section III, I discussed empirical issues, and described the sample employed here to test the empirical model. In this Section, I discuss estimates of the model. The discussion is divided into three segments: first profitability, then market share and firm share, and finally advertising and other sales efforts.

A. The Profitability Equation

1. Market Structure/Firm Structure

As expected, market share has a positive effect on LB profitability. This effect is statistically significant. As noted above, this positive effect may reflect either market power at the LB level or the realization of economies of scale.

The market concentration variable (HERF) has a negative and statistically significant impact on LB profitability. Qualitatively similar results are obtained if the Herfindahl index is replaced by the four-firm seller concentration ratio (see Appendix II). Ravenscraft [1983] reports similar results for the LB sample, using an alternative specification and an alternative correction for heteroskedasticity. Gale and Branch [1982, p. 100] report similar results for the PIMS database. This result is unexpected, but it is robust.

Before discussing this result, it should be pointed out that the familiar results of industrial-level studies of the relationship between profitability and market concentration are not entirely comparable to the results reported here. If we focus on market share and the Herfindahl index of market concentration, the profitability equation is

$$PCM_{ij} = \alpha MS_{ij} + \beta HERF_j + \ldots, \tag{16}$$

where PCM_{ij} is the price-cost margin of the division of firm i which operates in industry j and α, β are coefficients to be estimated. Multiplying both sides of equation (16) by the market share of firm i in industry j (MS_{ij}) and summing over all LBs which operate in industry j yields (in view of equation (1))

$$PCM_j = (\alpha + \beta)HERF_j + \ldots, \tag{17}$$

TABLE 2:

Two-Stage Least Squares Estimates

	PCM75	MS75	FS75	LASR75	LOSR75
Intercept	10.5059***	−0.054530***	−0.109324***	0.9736***	2.0647***
	(3.8114)	(8.3214)	(3.6214)	(2.5758)	(2.6573)
Profitability:					
PCM75[E]				−0.0087*	−0.1281***
				(1.5798)	(11.3165)
PCM74		−0.000076***	0.000421***		
		(3.2905)	(3.3298)		
Market Structure:					
MS75[E]	9.5728***		0.937900***	0.4155	2.3791**
	(3.0120)		(23.4424)	(0.6844)	(1.9065)
HERF72[E]	−40.8283***		−0.064152	−0.3298	−7.3406***
	(5.8153)		(0.9092)	(0.2914)	(3.1550)
Firm Structure:					
FS75[E]	3.5156**	0.068860***		0.1933	0.1763
	(2.0989)	(16.4698)		(0.5800)	(0.2574)

* Indicates statistical significance at the 10% level.
** Indicates statistical significance at the 5% level.
***Indicates statistical significance at the 1% level.
Asymptotic t-statistics in parentheses. The goodness-of-fit measure (GOF) is the square of the correlation coefficient between actual and fitted values; see Haessel [1975]. Superscript "E" indicates that the variable is treated as endogenous.

TABLE 2:

Two-Stage Least Squares Estimates (Continued)

	PCM75	MS75	FS75	LASR75	LOSR75
DIV75^E	−2.5944**	0.003505		−0.2709	−1.5450***
	(1.7134)	(1.2040)		(0.8742)	(2.4254)
Advertising:					
LASR75^E	0.1605*	0.000055	0.000648		
	(1.3063)	(0.2792)	(0.6417)		
FASR75^E	−0.3141*	0.000184	0.004849**	0.8420***	−0.6037***
	(1.4742)	(0.4168)	(2.2930)	(23.2985)	(8.1264)
IASR72^E	0.2407**	−0.000419*	−0.004404***	0.4192***	0.3800***
	(1.8642)	(1.5339)	(3.1650)	(15.9691)	(7.0422)
Other Sales Efforts:					
LOSR75^E	−0.4347***	0.000028	−0.000438		
	(7.9006)	(0.2714)	(0.9278)		
FOSR75^E	0.4053***	0.000426***	0.000062	−0.1026***	0.7194***
	(5.0657)	(2.7014)	(0.0849)	(7.3778)	(25.1675)
Scale Economies:					
MES	0.4759***	0.002701***	−0.000733		
	(3.7220)	(8.9801)	(0.5854)		

TABLE 2:

Two-Stage Least Squares Estimates (Continued)

	PCM75	MS75	FS75	LASR75	LOSR75
CDR	−.0256	0.000023	−0.000296*		
	(1.2355)	(0.4691)	(1.5095)		
Demand Conditions:					
CONS	−2.6876*	−0.005076	0.007242	0.5919*	2.6619***
	(1.4366)	(1.1772)	(0.3917)	(1.5557)	(3.4038)
FEDSR	−26.9739***	−0.007413	0.006012	−1.9152	−4.3193
	(2.7761)	(0.4103)	(0.0600)	(0.9804)	(1.0757)
SLSR	29.8476***	−0.010756	−0.045520	4.6226***	13.7877***
	(3.7428)	(0.6007)	(0.6760)	(2.5937)	(3.7635)
GR7475	0.1174***	0.000045	0.000193	0.0026	0.0172**
	(6.1691)	(0.9941)	(1.0138)	(0.6503)	(2.0995)
EXSR	9.2794**	−0.024546**	−0.034965		
	(1.8915)	(2.2058)	(0.7267)		

* Indicates statistical significance at the 10% level.

** Indicates statistical significance at the 5% level.

***Indicates statistical significance at the 1% level.

Asymptotic t-statistics in parentheses. The goodness-of-fit measure (GOF) is the square of the correlation coefficient between actual and fitted values; see Haessel [1975]. Superscript "E" indicates that the variable is treated as endogenous.

TABLE 2:

Two-Stage Least Squares Estimates (Continued)

	PCM75	MS75	FS75	LASR75	LOSR75
IMSR	−1.9315	0.014137**	0.008774		
	(0.7626)	(1.8889)	(0.3664)		
Research & Development:					
LBRD75[E]	−0.3172***	−0.000298***	0.000093	−0.0207**	−0.0142
	(5.6813)	(2.4581)	(0.1542)	(1.8788)	(0.6263)
FRD75[E]	0.2022***	−0.000480***	−0.002678***	0.0043	0.0450*
	(2.8053)	(2.9744)	(4.2792)	(0.2971)	(1.5158)
Internal Organization:					
LBADMIN75[E]	−0.3359***	0.000294**	0.001576***		
	(5.2537)	(2.1956)	(2.5947)		
FADMIN75[E]	0.9386***	0.001053***	0.006742***		
	(5.6620)	(2.9806)	(3.8817)		
Size:					
LOG(LBKAP)[E]	0.6407***			−0.0598	−0.1289*
	(2.4452)			(1.2807)	(1.3428)
LOG(FKAP)[E]		0.019187***			
		(37.9691)			
LOG(IKAP)[E]			0.024637***		
			(9.7418)		

TABLE 2:

Two-Stage Least Squares Estimates (Continued)

	PCM75	MS75	FS75	LASR75	LOSR75
Capital Intensity:					
LBKSR	−5.3201***				
	(6.7304)				
FKSR	5.0932***				
	(3.8150)				
IKSR	1.8137*				
	(1.4237)				
GOF	0.2484	0.2634	0.2799	0.4467	0.3944
DF	2258	2262	2262	2271	2271

* Indicates statistical significance at the 10% level.

** Indicates statistical significance at the 5% level.

***Indicates statistical significance at the 1% level.

Asymptotic t-statistics in parentheses. The goodness-of-fit measure (GOF) is the square of the correlation coefficient between actual and fitted values; see Haessel [1975]. Superscript "E" indicates that the variable is treated as endogenous.

where PCM_j is the industry j price-cost margin and omitted terms are now weighted averages for the industry.

Thus the coefficient of the Herfindahl index of market concentration in an industry-level study reflects not only the potential exercise of market power but also LB-specific market power or the realization of scale economies, as reflected by market share. This combination of effects cannot be separated at the industry level. In view of the high correlation between the Herfindahl index and the conventional measure of joint market power, the four-firm seller concentration ratio, this observation applies to studies which employ the four-firm seller concentration ratio as a measure of market concentration.[22]

The industry-level coefficient of the Herfindahl index implied by the disaggregate estimates of Table 2 is negative (-31.2555) and statistically significant at the 1% level (standard error 6.7126). This contrasts with the result of an industry level study (Martin [1983a]) in which the directly estimated coefficient of the Herfindahl index, at the industry level, was positive and statistically significant.

Although a number of ad hoc explanations could be offered for this result, I will not do so. I think there is some merit to the contention that in 1975 manufacturing LBs were undoubtedly in disequilibrium, due to recession and to the aftermath of oil shocks. In this sense, the robustness of this result against samples for different time periods should be examined.

LBs which are large in their firms are significantly more profitable, all else equal. Paradoxically, LBs which are components of more diversified firms are also more profitable. The net effect of diversification on firm profitability can be inferred from the LB-level profitability equation via an aggregation exercise similar to equations (16) and (17). Write a portion of the LB-level profitability equation as

$$PCM_{ij} = \theta FS_{ij} + \mu DIV_i + \ldots, \tag{18}$$

where FS_{ij} is the share of sales in industry j in the sales of firm i and DIV_i is the Herfindahl index of firm diversification. Then multiply both sides of equation (18) by FS_{ij} and sum over all industries in which firm i operates. The result is an implied firm-level profitability equation,

$$PCM_i = (\theta + \mu)DIV_i + \ldots, \tag{19}$$

where the omitted variables are now weighted averages across industries for the firm. The implied aggregate coefficient, $\theta + \mu$, gives the

[22]See Martin and Ravenscraft [1982] for further discussion.

net effect of diversification on firm profitability. The estimates of Table II imply a positive coefficient (0.9212). Because lower values of DIV indicate more diversification, this means that more diversified firms are less profitable for this sample. However, the aggregate coefficient is not significantly different from zero in a statistical sense (standard error 1.4653).

2. Promotional Activity

LB advertising has a barely significant positive impact on profitability, while the effect of other sales efforts by the LB is negative and quite significant. If we use the classification of Boyer, quoted above, this suggests an informative role for other sales efforts at the LB level.

LBs which are components of firms which advertise intensely are less profitable; the coefficient is barely significant in a statistical sense. Non-advertising sales efforts at the firm level significantly increase LB profitability. A firm-level corporate marketing program is apparently a valuable asset, which increases profitability.

LBs which operate in industries where advertising is intense tend to be more profitable on that account. If we jump ahead for the moment to the market share and firm share equations, advertising-intensive industries tend to be inhabited by LBs with smaller market shares and smaller firm shares (more diversified parent firms). This suggests a high degree of product differentiation, with many small producers or groups of small producers, each supplying a relatively limited segment of the market.

3. Demand Conditions

The expected sign of the coefficient of CONS in the profitability equation is positive, on the argument that consumer goods industries are more likely to be susceptible to product differentiation than industries which sell mainly to industrial consumers. The estimated sign in Table 2 is negative, and just statistically significant.

On the other hand, the estimated coefficients of the government demand category variables are as suggested by the bargaining power view of government demand. LBs in industries which depend on the Federal government for a large part of demand are less profitable, all else equal, on that account. LBs which operate in industries which sell to state and local governments—which generally exercise little monopsony power—are for that reason more profitable.

The signs of the coefficients of the growth rate of indus-

try sales, the export sales ratio, and the import sales ratio are all as expected. The coefficient of the import sales ratio, although negative, is not statistically significant.

4. Research and Development

The results reported in Table 2 for LB-level research and development are consistent with the results of Caves, Porter, and Spence [1980], discussed above: LBs which invest heavily in R & D are less profitable than other LBs, all else equal. This suggests that heavy R & D expenditures serve as an index of the intensity of conventional price competition, which apparently serves as a spur for research and development. The results of a forthcoming study of research and development at the LB level (Lunn and Martin [1983]) are consistent with this interpretation. These are important results, because they are just the opposite of those predicted by the familiar Schumpeterian hypothesis.

In contrast, a large firm-level R & D program enhances LB profitability (the coefficient is quite significant, but is of smaller magnitude than the coefficient of LBRD75). Again, if we jump ahead to the market share and firm share equations, LBs which are components of firms which engage heavily in R & D tend to have smaller market shares and smaller firm shares. This is just the sort of relationship observed for industry advertising. It suggests that a firm-level R & D program is the kind of asset which encourages diversification (lower firm shares), and increases profitability in each industry where it is applied, perhaps by adapting the product to fit the preferences of a particular market segment.

5. Internal Organization

In this sample of divisions of large, diversified manufacturing firms, divisions of firms which have a high level of overhead or common administrative cost are more profitable on that account; divisions of firms which have a high level of administrative cost concentrated at the division level are less profitable, all else equal. An effective corporate management structure increases profitability at the LB level.

From the point of view of the firm, however, the real question is the effect of overhead administrative cost on firm profitability, not on LB profitability. As indicated above in the discussion of common costs, I now show that the LB profitability equation, estimated for profitability measured gross to overhead administrative cost,

implies a firm-level profitability equation, where firm profitability is net of overhead administrative cost.

To aggregate the estimated LB profitability equation to the firm level, multiply both sides of the equation by firm share and sum over all LBs of the firm (see the discussion of equations (18) and (19)). The result is a firm-level profitability equation, profitability measured gross to the common cost of the firm, in which one explanatory variable is FADMIN75. The coefficient of FADMIN75 is this firm-level equation, from Table II, is 0.9386. To obtain a firm-level profitability equation where profitability is measured net of overhead administrative cost, subtract FADMIN75 from both sides of the equation. The coefficient of FADMIN75 in this firm-level net profitability equation is $0.9386 - 1 = -0.0614$, which is not significantly different from zero (t-statistic 0.3704). Corporate supervision increases LB profitability but has no significant impact on firm profitability.[23]

6. Other Explanatory Variables

As should be expected, in principle and from industry-level studies, the estimated coefficient of minimum efficient scale in the profitability equation is positive and quite significant in a statistical sense. Also as expected,the coefficient of the cost disadvantage ratio is negative (but not statistically significant).

Large LBs, where size is measured by the natural logarithm of LB assets, are more profitable. This parallels Shepherd [1972a], and contradicts Hall and Weiss [1967].

I argued above that LBs with a greater capital-sales ratio should be more profitable per dollar of sales, reflecting the normal rate of return on capital. In fact, the estimated coefficient of the LB capital-sales ratio in Table II is negative and statistically significant.

Scherer [1980, pp. 293-294] offers a plausible explanation for this finding. The sample employed here is for 1975, a recession year. Scherer discusses evidence which suggests that during recessions, price competition is especially severe in capital-intensive industries, as producers attempt to keep their plants operating near capacity. This suggestion is consistent with the explanation offered above for the negative estimated effects of market concentration on LB profitability.

I have argued that the coefficients of the firm and industry capital-sales ratios in the LB profitability equation should be positive. These expectations are confirmed. The coefficient of the firm

[23] I am grateful to David Ravenscraft for discussion of this point. For wholesaling lines of business, the implied effect of FADMIN on firm-level net profitablity is positive, not negative; see Martin [1983b].

capital-sales ratio is especially significant, which is consistent with the view that diversified firms operate as internal capital markets, allocating resources across lines of business.

B. Market Share and Firm Share

1. Past Profitability

As expected, lagged profitability has a significant negative impact on market share and a significant positive impact on firm share. This is consistent with the view that profitability serves as a signal for resource reallocation. In view of the fact that the lag is for just one year, the estimated effects are reasonably large. An increase of one standard deviation in lagged profitability causes market share to decline by 2% of mean market share, and causes firm share to rise by almost 5% of mean firm share.

2. Reciprocal Effects

Market share has a significant positive impact on firm share: firms expand in industries where they enjoy market power or have been able to realize scale economies. LBs which are large in their firm—and benefit from the common assets of that firm—tend to have larger market shares than LBs which are small in their firm.

There is no significant impact of market concentration on firm share: market concentration apparently has no effect on firm diversification. Similarly, there is no significant effect of firm diversification on market share.

3. Promotional Activity

As noted above, LBs which operate in industries where advertising is intense tend to have smaller market shares and smaller firm shares. In contrast, LBs of firms which advertise a great deal tend to have larger firm shares: firm advertising does not induce diversification.

The only significant effect of non-advertising sales efforts on relative size is for firm-level other sales efforts and market share. Firm-level other sales efforts increase LB market share just as they increase LB profitability.

4. Research and Development

The significant effects of research and development on relative size are all negative. This suggests that R & D encourages diversification (lower firm shares), with operations serving relatively small market segments (lower market shares) with differentiated products.

5. Internal Organization

LB-specific and firm-level administrative costs both increase market share. The effect of overhead administrative cost is larger and more significant than the effect of traceable administrative cost. Administrative costs similarly increase firm share, which is to say that they discourage diversification.

6. Other Explanatory Variables

None of the demand share variables have any significant effect on either market share or firm share. On the other hand, LBs which operate in export-intensive industries tend for that reason to have smaller market shares. This is consistent with the argument that U. S. exports involve differentiated producer goods. This argument also suggests a negative coefficient in the firm share equation, which is the case; however, the coefficient is not statistically significant.

The coefficient of the industry-average import-sales ratio in the market share equation is positive, which suggests consolidation of domestic producers to meet foreign competition.

Minimum efficient scale has the expected positive effect on market share and negative effect on firm share. The effect on firm share is not significant in a statistical sense.

There is a negative and marginally significant effect of the cost disadvantage ratio on firm share. When the cost disadvantage ratio is larger, small-scale operations compete on a relatively equal basis, in terms of labor cost, with larger operations. It is not surprising that LBs which operate in such industries tend to be smaller in their firms, all else equal.

As expected, LBs which are components of absolutely large parent firms tend for that reason to be relatively large in their industry. Similarly, LBs which operate in absolutely large industries tend to be large in their firm.

C. Promotional Activity

1. Profitability

Current profitability has a negative and modestly significant impact on advertising expense; its impact on other sales effort is also negative, and highly significant. This contrasts with the industry-level effect of profitability on advertising intensity, generally found to be positive (Martin [1983a]), and on other selling expense per dollar of sales, also found to be positive at the industry level (Weiss, Pascoe, and Martin [1983]). Although the results reported here contrast with those at the industry level, they are consistent with the argument of Cubbin [1981] that advertising intensity may increase when entry is less difficult. They are also consistent with the findings of Primeaux [1981]. These results suggest that advertising and other sales efforts, like research and development, become more attractive as a competitive strategy when price competition is severe.

2. Market Structure/Firm Structure

Neither market share, nor market concentration, nor firm share, nor firm diversification, have any significant effect on LB advertising intensity.

However, and as expected, LBs with larger market shares spend more on other sales efforts, per dollar of sales, than LBs with smaller market shares. At the same time, the coefficient of HERF in the other sales effort equation is negative. This may suggest the extension of oligopolistic coordination to non-advertising sales efforts in concentrated industries.

3. Reciprocal Effects

As expected, LBs which are components of firms which advertise intensely themselves advertise more intensely on that account; LBs which are components of firms which invest heavily in non-advertising sales efforts themselves invest more than would otherwise be the case in non-advertising sales efforts.

It appears that advertising and other sales efforts are substitute marketing strategies. LBs of firms which advertise a great deal spend less than other LBs on non-advertising sales efforts. LBs of firms which spend heavily on non-advertising sales efforts spend less on advertising, all else equal.

4. Demand Conditions

The estimated coefficients for these variables are of the expected sign. LBs which operate in industries which sell more to consumers advertise and spend more on other kinds of sales efforts than LBs in industries which sell mainly to industrial consumers. LBs in industries for which relatively more sales are made to the Federal government spend less on promotional activities; these coefficients are not significant in a statistical sense. However, LBs in industries which sell a good deal to state and local governments promote their products more intensely, and this is especially true for non-advertising sales efforts. Also as expected, LBs in growing industries promote their products more intensely; the effect is significant only for non-advertising sales efforts.

5. Other Explanatory Variables

The negative significant coefficient of LBRD75 in the LB advertising equation suggests that advertising and R & D are alternative product differentiation schemes. The coefficient of LBRD75 in the other sales effort equation is also negative, but not statistically significant.

Firm-level R & D expenditures, on the other hand, have positive effects on promotional activity. The effect on non-advertising sales efforts is moderately significant.

The effects of absolute LB size on promotional activity, which are moderately significant at best, are negative. This is consistent with the existence of economies of large scale in promotional activity.

V. Conclusion

The results reported above bear on a wide range of issues in the field of industrial organization. Certain results deserve particular attention.

(1) Profitability serves as a signal for resource allocation among industries and within firms. Rivals move resources into industries where profitability is high, reducing the market share of firms which operate in such industries. Firms reallocate resources internally away from less profitable divisions, reducing the share of such divisions in the firm.

(2) Market share is a significant factor in increasing LB profitability. This may reflect either market power at the LB level, or the realization of scale economies, or both. Industry studies will probably be required to separate these effects, and the breakdown between market power and scale economies will differ from industry to industry.

(3) In contrast, LBs which in 1975 operated in more concentrated industries tended to be less profitable, all else equal. The most likely explanation for this result is that oligopolistic coordination is less effective in recession years, while the very barriers to entry which engender market concentration impede exit in the short run. Time series studies, or a time series of cross-section studies, will be needed to determine the circumstances under which market concentration translates into greater profitability.

(4) Absolute size is important. Larger LBs are more profitable than smaller LBs. LBs which are components of larger firms have for that reason larger market shares. LBs which operate in large industries tend to be larger in their firms, which is to say that the parent firms tend to be less diversified. There is some indication of economies of large scale in promotional activity: large LBs spend less per dollar of sales on promotional activity (especially non-advertising sales efforts) than small LBs.

(5) Price competition stimulates a variety of product differentiating strategies, including research and development, advertising, and non-advertising sales efforts. In conjunction with the results on size and advertising, this suggests that regulatory agencies should pay special attention to competitive strategies which revolve around artificial or endogenous impediments to price competition.

(6) The internal organization of the firm—the level in the firm at which administrative costs are incurred—is an important factor in determining LB profitability. Management at the firm level increases LB profitability; management at the LB level has the opposite effect. The social cost involved in dismembering the effective corporate management program should be considered in framing divestiture decrees as remedies in antitrust cases.

Appendix I:
Sample Properties

Variable Definitions and Sources:

PCM	LB profitability as a percentage of sales, gross to the common costs of the firm. 1974, 1975 LB data base.
MS75	LB sales divided by industry sales. LB data base and Annual Survey of Manufactures.
HERF	Approximate industry Herfindahl index. 1972 Census of Manufactures.
FS75	LB sales divided by parent firm sales. LB data base.
LASR75	Traceable LB advertising expense as a percentage of sales. LB data base.
FASR75	Traceable and nontraceable firm advertising expense as a percentage of sales. LB data base.
IASR72	Industry average advertising as a percentage of sales. 1972 Input-Output Tables for the United States.
LOSR75	Traceable LB expenditures on non-advertising selling efforts, as a percentage of sales. LB data base.
FOSR75	Traceable and nontraceable firm expenditures on non-advertising selling expense, as a percentage of sales. LB data base.
MES	Average plant size of largest plants accounting for at least half of industry output, as a percentage of industry output. 1972 Census of Manufactures.
CDR	Cost disadvantage ratio; see p. 12. 1972 Census of Manufactures.
CONS	Fraction of industry output going to final consumer demand. 1972 Input-Output Table for the United States.
FEDSR	Fraction of industry output going to the Federal government. 1972 Input-Output Table for the United States.
SLSR	Fraction of industry output going to State and Local governments. 1972 Input-Output Table for the United States.
GR7475	Growth rate of industry sales between 1974 and 1975. Annual Survey of Manufactures.
EXSR	Export sales as a fraction of shipments by domestic producers. 1972 Input-Output Table for the United States.

IMSR	Sales by importers as a fraction of shipments by domestic producers. 1972 Input-Output Table for the United States.
LBRD75	LB expenditures on R & D per dollar of sales. LB data base.
FRD75	Firm expenditures on R & D per dollar of sales. LB data base.
LBADMIN	Administrative cost traceable to the LB per dollar of sales. LB data base.
FADMIN	Firm nontraceable administrative cost as a percentage of firm sales. LB data base.
LBKAP	LB assets; KAP4 of Martin [1981]. LB data base.
FKAP	Firm assets. LB data base.
IKAP	Industry assets. Annual Survey of Manufactures.
LBKSR	LB capital-sales ratio. LB data base.
FKSR	Firm capital-sales ratio. LB data base.
IKSR	Industry capital-sales ratio. Annual Survey of Manufactures.

Other Acronyms Used:

PIMS
LB

TABLE 3:

Sample Properties

Variable	Minimum*	Mean	Maximum*	Standard Deviation
PCM75	−125.80	7.87	58.87	14.06
MS75	0.0002	0.0458	0.9592	0.0846
HERF72	0.0016	0.0571	0.2763	0.0576
CR472	3.2000	33.3532	93.0000	21.6946
FS75	0.0003	0.1279	1.0000	0.1949
DIV75	0.0396	0.2564	1.0000	0.1934
LASR75	0.0000	1.3941	38.1429	3.4522
FASR75	0.0000	1.4358	14.0129	2.0976
IASR72	0.0450	1.5963	22.2260	2.9360
LOSR75	0.0000	6.6622	50.7422	6.7046
FOSR75	0.0000	6.8633	25.7237	4.5958
MES	0.1000	2.7310	24.7000	2.6959
CDR	23.3000	89.0349	100.0000	12.4462
CONS	0.0000	0.2126	0.9865	0.0065
FEDSR	0.0000	0.0383	0.6595	0.1107
SLSR	0.0000	0.0159	0.3049	0.0328
GR7475	−77.6121	2.4267	44.3757	14.0457
EXSR	0.0000	0.0606	0.4841	0.0633
IMSR	0.0000	0.0619	1.9287	0.0980
LBRD75	0.0000	1.9468	81.3223	5.5878
FRD75	0.0000	2.2702	30.5480	3.9814
LBADMIN75	0.0000	6.5871	48.5276	4.1015
FADMIN75	0.0000	1.3518	16.2733	1.6648
LBKAP (million $)	0.1487	95.7	6,151.0	374.1
FKAP (million $)	32.4	1,121.3	12,896.9	1,674.1
IKAP (million $)	46.7	3,020.3	33,380.9	5,460.6
LBKSR	0.0274	0.5159	5.6477	0.4230
FKSR	0.0628	0.5149	1.7624	0.2038
IKSR	0.0791	0.4094	1.6778	0.2613

*To prevent disclosure of values pertaining to individual LBs, extreme values of LB data reported in this table are the arithmetic averages of the six extreme values.

Appendix II:

Alternative Estimates

TABLE 4:

Two-Stage Least Squares Estimates (Concentration Measured by CR4)

	PCM75	MS75	FS75	LASR75	LOSR75
Intercept	13.1962***	−0.052866***	−0.100091***	1.1581***	2.2637***
	(4.7506)	(8.0304)	(3.2007)	(2.9643)	(2.8136)
Profitability:					
PCM75^{E}				−0.0084*	−0.1286***
				(1.5092)	(11.2555)
PCM74		−0.000075***	0.000423***		
		(3.2783)	(3.3377)		
Market Structure:					
MS75^{E}	9.8198***		0.927918***	−0.0094	2.0973*
	(3.1213)		(23.3113)	(0.0157)	(1.7070)
CR472^{E}	−0.1145***		0.000026	0.0043*	−0.0193***
	(5.9726)		(0.1397)	(1.3521)	(2.9800)
Firm Structure:					
FS75^{E}	3.3671**	0.068887***		0.2345	0.1859
	(2.0119)	(16.4989)		(0.7050)	(0.2714)
DIV75^{E}	−2.4306*	0.003523		−0.2822	−1.5806***
	(1.6079)	(1.2114)		(0.9104)	(2.4758)

TABLE 4:

Two-Stage Least Squares Estimates (Concentration Measured by CR4)
(Continued)

	PCM75	MS75	FS75	LASR75	LOSR75
Advertising:					
LASR75^{E}	0.1811*	0.000059	0.000547		
	(1.4744)	(0.3026)	(0.5420)		
FASR75^{E}	−0.3788**	0.000180	0.005036***	0.8425***	−0.6183***
	(1.7777)	(0.4088)	(2.3822)	(23.3371)	(8.3160)
IASR72^{E}	0.2554**	−0.000446**	−0.004462***	0.4118***	0.3848***
	(1.9953)	(1.6496)	(3.2277)	(15.7103)	(7.1297)
Other Sales Efforts:					
LOSR75^{E}	−0.4352***	0.000022	−0.000416		
	(7.9450)	(0.2102)	(0.8820)		
FOSR75^{E}	0.4185***	0.000423***	0.000064	−0.1035***	0.7258***
	(5.2428)	(2.6852)	(0.0878)	(7.4837)	(25.4796)

* Indicates statistical significance at the 10% level.
** Indicates statistical significance at the 5% level.
***Indicates statistical significance at the 1% level.
Asymptotic t-statistics in parentheses. Superscript "E" indicates that the variable is treated as endogenous.

TABLE 4:

Two-Stage Least Squares Estimates (Concentration Measured by CR4)
(Continued)

	PCM75	MS75	FS75	LASR75	LOSR75
Scale Economies:					
MES	0.4330***	0.002724***	−0.001392		
	(3.4916)	(9.0603)	(1.1851)		
CDR	−0.0360**	0.000021	−0.000274*		
	(1.7268)	(0.4236)	(1.3945)		
Demand Conditions:					
CONS	−2.8804*	−0.004882	0.002857	0.4618	2.2108***
	(1.5113)	(1.1210)	(0.1541)	(1.1917)	(2.7704)
FEDSR	−2.3154	−0.003968	−0.035284	−0.1547	−4.5887***
	(0.7911)	(0.6269)	(1.2201)	(0.2755)	(3.9678)
SLSR	25.9443***	−0.011114	−0.059016	4.3930***	12.5348***
	(3.2289)	(0.6143)	(0.8654)	(2.4399)	(3.3806)
GR7475	0.1137***	0.000042	0.000198	0.0019	0.0170**
	(5.9462)	(0.9246)	(1.0312)	(0.4792)	(2.0636)
EXSR	10.8616**	−0.026205***	−0.040479		
	(2.2602)	(2.4344)	(0.8483)		

TABLE 4:

Two-Stage Least Squares Estimates (Concentration Measured by CR4)
(Continued)

	PCM75	MS75	FS75	LASR75	LOSR75
IMSR	−2.2458	0.014007**	0.013940		
	(0.8871)	(1.8558)	(0.5820)		
Research & Development:					
LBRD75^{E}	−0.3084***	−0.000301***	0.000073	−0.0213**	−0.0144
	(5.5454)	(2.4836)	(0.1209)	(1.9378)	(0.6353)
FRD75^{E}	0.2035***	−0.000476***	−0.002602***	0.0047	0.0501**
	(2.8257)	(2.9536)	(4.1576)	(0.3257)	(1.6839)
Internal Organization:					
LBADMIN75^{E}	−0.3445***	0.000294**	0.001598***		
	(5.3887)	(2.1912)	(2.6176)		
FADMIN75^{E}	0.9379***	0.001038***	0.006711***		
	(5.6679)	(2.9394)	(3.8656)		

* Indicates statistical significance at the 10% level.
** Indicates statistical significance at the 5% level.
***Indicates statistical significance at the 1% level.
Asymptotic t-statistics in parentheses. Superscript "E" indicates that the variable is treated as endogenous.

TABLE 4:

Two-Stage Least Squares Estimates (Concentration Measured by CR4)
(Continued)

	PCM75	MS75	FS75	LASR75	LOSR75
Size:					
LOG (LBKAP)^E	0.6362***			−0.0591	−0.1258*
	(2.4334)			(1.2667)	(1.3092)
LOG (FKAP)^E		0.019177***			
		(38.3631)			
LOG (IKAP)^E			0.024591***		
			(9.8369)		
Capital Intensity:					
LBKSR	−5.3346***				
	(6.7674)				
FKSR	5.1486***				
	(3.8658)				
IKSR	1.0781				
	(0.8226)				
DF	2258	2262	2262	2271	2271

TABLE 5:

Two-Stage Least Squares (Uncorrected for Heteroskedasticity)

	PCM75	MS75	FS75	LASR75	LOSR75
Intercept	11.1791***	−0.147889***	−0.236021***	0.8193**	2.0594***
	(3.6122)	(7.8763)	(5.0481)	(2.0564)	(2.5696)
Profitability:					
PCM75^E				−0.0112**	−0.1059***
				(2.0434)	(9.6405)
PCM74		0.000151*	0.000684***		
		(1.3308)	(2.4023)		
Market Structure:					
MS75^E	6.8523*		1.134975***	0.2739	1.6115
	(1.6189)		(22.9805)	(0.3128)	(0.9149)
HERF72^E	−43.4337***		−0.026509	−0.4248	−8.9638***
	(5.3474)		(0.2414)	(0.3245)	(3.4033)
Firm Structure:					
FS75^E	2.7747*	0.222796***		0.1647	0.1552
	(1.3682)	(25.2929)		(0.3926)	(0.1839)

* Indicates statistical significance at the 10% level.
** Indicates statistical significance at the 5% level.
***Indicates statistical significance at the 1% level.
Asymptotic t-statistics in parentheses. Superscript "E" indicates that the variable is treated as endogenous.

TABLE 5:

Two-Stage Least Squares (Uncorrected for Heteroskedasticity)
(Continued)

	PCM75	MS75	FS75	LASR75	LOSR75
DIV75^{E}	−2.7769**	−0.016998**		−0.2726	−2.0739***
	(1.7192)	(1.9875)		(0.8001)	(3.0261)
Advertising:					
LASR75^{E}	0.0882	0.000362	0.000901		
	(0.6925)	(0.5287)	(0.5253)		
FASR75^{E}	−0.1516	−0.000518	0.001854	0.8545***	−0.5229***
	(0.6413)	(0.4107)	(0.5840)	(20.7040)	(6.2982)
IASR72^{E}	0.2352*	−0.002562***	−0.005440***	0.4587***	0.3744***
	(1.6178)	(3.2840)	(2.7619)	(15.5473)	(6.3086)
Other Sales Efforts:					
LOSR75^{E}	−0.3630***	0.000007	−0.000900		
	(6.2501)	(0.0216)	(1.1535)		
FOSR75^{E}	0.3500***	0.000488	−0.000404	−0.1149***	0.6541***
	(4.0200)	(1.0359)	(0.3466)	(7.2479)	(20.5124)
Scale Economies:					
MES	0.4684***	0.010306***	−0.002079		
	(3.1829)	(17.6023)	(0.9958)		

TABLE 5:

Two-Stage Least Squares (Uncorrected for Heteroskedasticity)
(Continued)

	PCM75	MS75	FS75	LASR75	LOSR75
CDR	−0.0289	−0.000038	−0.000223		
	(1.2476)	(0.3078)	(0.7163)		
Demand Conditions:					
CONS	−3.0442*	−0.031294***	0.072731***	0.5567*	3.0134***
	(1.4375)	(2.8214)	(2.6163)	(1.3104)	(3.5258)
FEDSR	−24.6219**	0.219686***	0.049971	−1.8585	−4.3793
	(2.2919)	(4.0752)	(0.3391)	(0.8358)	(0.9790)
SLSR	29.0932***	0.052427	−0.149492	5.4005***	12.1737***
	(3.3543)	(1.1234)	(1.2813)	(2.9948)	(3.3557)
GR7475	0.1196***	0.000128	0.000153	0.0046	0.0164*
	(5.5411)	(1.1119)	(0.5281)	(1.0498)	(1.8645)
EXSR	8.3906*	−0.089091***	−0.098720*		
	(1.5389)	(3.0685)	(1.3540)		

* Indicates statistical significance at the 10% level.
** Indicates statistical significance at the 5% level.
***Indicates statistical significance at the 1% level.
Asymptotic t-statistics in parentheses. Superscript "E" indicates that the variable is treated as endogenous.

TABLE 5:

Two-Stage Least Squares (Uncorrected for Heteroskedasticity)
(Continued)

	PCM75	MS75	FS75	LASR75	LOSR75
IMSR	0.1559	0.032222**	0.004087		
	(0.0528)	(2.4408)	(0.1032)		
Research & Development:					
LBRD75[E]	−0.4179***	0.000180	0.000641	−0.0230**	−0.0236
	(6.7793)	(0.5411)	(0.7801)	(1.7470)	(0.8926)
FRD75[E]	0.2589***	0.000659*	−0.004512***	0.0027	0.0452*
	(3.4150)	(1.6032)	(4.4795)	(0.1774)	(1.4689)
Internal Organization:					
LBADMIN75[E]	−0.5047***	−0.000409	0.003093***		
	(7.2945)	(1.0732)	(3.2711)		
FADMIN75	0.8913***	0.002808***	0.004290**		
	(4.6651)	(2.7169)	(1.6868)		
Size:					
LOG (LBKAP)[E]	1.1106***			−0.0156	0.0456
	(3.9916)			(0.2934)	(0.4254)
LOG (FKAP)[E]		0.023128***			
		(15.3760)			

TABLE 5:

Two-Stage Least Squares (Uncorrected for Heteroskedasticity)
(Continued)

	PCM75	MS75	FS75	LASR75	LOSR75
LOG (IKAP)[E]			0.042993***		
			(11.3037)		
Capital Intensity:					
LBKSR	−6.8136***				
	(10.0263)				
FKSR	4.9102***				
	(3.3368)				
IKSR	1.8587*				
	(1.2972)				
DF	2258	2262	2262	2271	2271

* Indicates statistical significance at the 10% level.
** Indicates statistical significance at the 5% level.
***Indicates statistical significance at the 1% level.
Asymptomatic t-statistics in parentheses. Superscript "E" indicates the variable is treated as endogenous.

TABLE 6:

Two-Stage Least Squares (Concentration Measured by CR4, Uncorrected for Heteroskedasticity)

	PCM75	MS75	FS75	LASR75	LOSR75
Intercept	13.9351***	−0.147983***	−0.216476***	0.9992***	2.0868***
	(4.4417)	(7.8021)	(4.5918)	(2.3945)	(2.4830)
Profitability:					
$PCM75^E$				−0.0107**	−0.1052***
				(1.9499)	(9.5014)
PCM74		0.000180*	0.000727***		
		(1.5863)	(2.5492)		
Market Structure:					
$MS75^E$	7.0791**		1.109403***	−0.1776	1.1626
	(1.6875)		(22.6941)	(0.2057)	(0.6688)
$CR4^E$	−0.1186***		0.000399*	0.0031	−0.0220***
	(5.4396)		(1.3602)	(0.8748)	(3.0948)
Firm Structure:					
$FS75^E$	2.5951	0.223122***		0.2220	0.1891
	(1.2813)	(25.3085)		(0.5302)	(0.2242)
$DIV75^E$	−2.6240*	−0.106474**		−0.2895	−2.1084***
	(1.6276)	(1.9256)		(0.8495)	(3.0719)

TABLE 6:

Two-Stage Least Squares (Concentration Measured by CR4, Uncorrected for Heteroskedasticity)
(Continued)

	PCM75	MS75	FS75	LASR75	LOSR75
Advertising:					
$LASR75^E$	0.1051	0.000269	0.000671		
	(0.8251)	(0.3921)	(0.3906)		
$FASR75^E$	−0.2067	−0.000252	0.002421	0.8555***	−0.5304***
	(0.8773)	(0.1994)	(0.7631)	(20.7383)	(6.3840)
$IASR75^E$	0.2442**	−0.002442***	−0.005640***	0.4522***	0.3801***
	(1.6951)	(3.1509)	(2.8923)	(15.2955)	(6.3837)
Other Sales Efforts:					
$LOSR75^E$	−0.3633***	0.000049	−0.000855		
	(6.2795)	(0.1561)	(1.0969)		
$FOSR75^E$	0.3597***	0.000456	−0.000578	−0.1151***	0.6591***
	(4.1424)	(0.9690)	(0.4974)	(7.2900)	(20.7259)

* Indicates statistical significance at the 10% level.
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***Indicates statistical significance at the 1% level.
Asymptotic t-statistics in parentheses. Superscript "E" indicates that the variable is treated as endogenous.

TABLE 6:

Two-Stage Least Squares (Concentration Measured by CR4, Uncorrected for Heteroskedasticity)
(Continued)

	PCM75	MS75	FS75	LASR75	LOSR75
Scale Economies:					
MES	0.4169***	0.010364***	−0.003661**		
	(2.9288)	(17.6038)	(1.8293)		
CDR	−0.0403**	−0.000010	−0.000146		
	(1.7243)	(0.0836)	(0.4690)		
Demand Conditions:					
CONS	−3.1811*	−0.033981***	0.067894***	0.4648	2.6851***
	(1.4838)	(2.9925)	(2.3838)	(1.0852)	(3.1127)
FEDSR	−0.2894	−0.078651***	−0.015557	−0.0010	−4.3268***
	(0.0893)	(4.6338)	(0.3558)	(0.0016)	(3.4210)
SLSR	25.5974***	0.053658	−0.178148*	5.3154***	11.7113***
	(2.9233)	(1.1359)	(1.5119)	(2.9079)	(3.1811)
GR7475	0.1155***	0.000145	0.000118	0.0043	0.0172**
	(5.3291)	(1.2501)	(0.4037)	(0.9760)	(1.9351)
EXSR	9.9558**	−0.111058***	−0.127791**		
	(1.8628)	(3.9000)	(1.7790)		

TABLE 6:

Two-Stage Least Squares (Concentration Measured by CR4, Uncorrected for Heteroskedasticity)
(Continued)

	PCM75	MS75	FS75	LASR75	LOSR75
IMSR	−0.1317	0.039114***	0.009705		
	(0.0446)	(2.4668)	(0.2445)		
Research & Development:					
LBRD75[E]	−0.4107***	0.000082	0.000584	−0.0231**	−0.0233
	(6.6880)	(0.2475)	(0.7117)	(1.7666)	(0.8823)
FRD75[E]	0.2616***	0.000654*	−0.004437***	0.0041	0.0483*
	(3.4542)	(1.5879)	(4.4024)	(0.2662)	(1.5688)
Internal Organization:					
LBADMIN75[E]	−0.5131***	−0.000353	0.003164***		
	(7.4182)	(0.9245)	(3.3408)		
FADMIN75[E]	0.8920***	0.002759***	0.004067*		
	(4.6778)	(2.6673)	(1.6001)		

* Indicates statistical significance at the 10% level.
** Indicates statistical significance at the 5% level.
***Indicates statistical significance at the 1% level.
Asymptotic t-statistics in parentheses. Superscript "E" indicates that the variable is treated as endogenous.

TABLE 6:

Two-Stage Least Squares (Concentration Measured by CR4, Uncorrected for Heteroskedasticity)
(Continued)

	PCM75	MS75	FS75	LASR75	LOSR75
Size:					
LOG (LBKAP)^E	1.1147***			−0.0194	0.0487
	(4.0120)			(0.3641)	(0.4538)
LOG (FKAP)^E		0.023386***			
		(15.5439)			
LOG (IKAP)^E			0.042804***		
			(11.3603)		
Capital Intensity:					
LBKSR	−6.8405***				
	(10.0865)				
FKSR	4.9589***				
	(3.3783)				
IKSR	1.0612				
	(0.7197)				
DF	2258	2262	2262	2271	2271

* Indicates statistical significance at the 10% level.
** Indicates statistical significance at the 5% level.
***Indicates statistical significance at the 1% level.
Asymptotic t-statistics in parentheses. Superscript "E" indicates that the variable is treated as endogenous.

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