PROFITABILITY AND FIRM SIZE

Research Report

Prepared for The
U.S. Small Business Administration (SBA)
Under Contract SBA-9216-AER-85

by

Ballantine and Associates

John W. Ballantine
Frederick W. Cleveland
C. Timothy Koeller

Principals

Stevens Institute of Technology
Hoboken, New Jersey 07030

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This is the final report on what has turned out to be a two year research project. We thank the research staff of SBA's Office of Advocacy for its patience and for the perceptive criticisms of its several reviewers: in particular Bruce Phillips, our technical coordinator, Charles Ou and Edward Starr, both manuscript readers. Needless to say, the opinions herein expressed are those of the authors and do not necessarily represent the official viewpoint of the SBA.

As so often happens in work of this kind, the data proved difficult to process, the concepts unexpectedly far-reaching. We think our results reaffirm the importance of economic information provided by government sources to clarifying business problems. Extensive as the data are, their availability in official form is of great help in formulating industrial policies.

John W. Ballantine
Frederick W. Cleveland
C. Timothy Koeller

January 30, 1987
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Abstract

The Small Business Administration (SBA) makes much of the dynamic role that small firms play in generating employment, backing its argument with extensive information. Comparable attention has yet to be paid to the financial posture of small firms and to their organizational performance. The present research is a first step toward filling this gap.

It is based 1) on aggregate tax returns, broken down by firm size and by industry, published as the Statistics of Income (SOI) by the Internal Revenue Service (IRS); and 2) on firm-level financial data (FINSTAT) that SBA has recently made available.

Our findings are:

1. **Profit-on-equity** for small firms with income is on average about twice that for large firms, a relationship found in over half the industries and hardly ever reversed.

2. **Sales/asset ratios** within industry for small firms are also roughly twice those for large firms, a relationship found in about 80 percent of the non-financial industries. Small firms economize greatly in labor usage per unit of saleable output, and even more in assets per unit of labor applied.

3. **Tolerance for risk** by small firms as measured by percent of assets for firms without income in a size class is twice that for large firms in good years, a relationship found in over half the industries. Risk tolerance is often not matched by high profit. But
organization movement, as dictated by profitability requirements, makes an important contribution to sales growth at all levels.

Two aspects of these findings are startling. First, the extent of the profit differential in favor of small firms: 10 to 12 percentage points for firms accounting for some 30 percent of corporate sales. These differentials are larger and more extensive than those customarily associated with market concentration (3 to 9 percentage points in industries comprising no more than 10 percent of corporate sales). Second, the persistent differences in sales/asset ratios and the supporting workforce ratios -- sales per worker and asset per worker -- between small firms and large. It appears that in SOI industries, small firms compete with different kinds of products (less complicated) made with simpler (less capital intensive) production processes than do large firms.

For profitability, the implication of these findings is that conventional norms need re-thinking -- greater emphasis placed on the differential role of profit in firm development. For market structure the implication is that product. and production, variety need to be written into market models. Analytically, it is important to identify small-firm contribution and when deemed appropriate to provide support therefor.
PROFITABILITY

AND FIRM SIZE
We began our research into profitability and firm size with conventional ideas about finance and industrial organization. Firms as profit- and growth- maximizers advance themselves and their profitability by enlarging market share; economies of scale lead many firms and industries to monopolistic behavior patterns. In sectors of the economy where such economies are absent, competition is alive but struggling. In line with these ideas, we expected to find profitability among small firms to be low and their need for support great.

Our first look at the evidence raised questions about our initial assumptions. Profitability turned out not to be a single well-behaved variable. Instead two distinct, but related, measures of profitability are pertinent, each with its own characteristic behavior. Profit-on-sales often rises with firm size, as conventional theory suggests, but profit-on-assets and/or profit-on-equity seldom do, and more generally fall. The effects of economies of scale proved equally elusive and contradictory. As firms grow in size, theory suggests that capital costs are spread over increased sales volume and that capital charges per unit of sales fall, resulting in an increase in sales per dollar of assets. Our studies show that this is not so. Sales/asset ratios fall with increases in firm size within specific industries, implying more complex rather than more streamlined technologies for large firms as compared to small.

These apparent anomalies occasioned a second look at our
assumptions. On the basis of the evidence, two points stand out:

First, in practice firms appear to treat profit and profit variations as variable means of adjusting asset position within an industry rather than as ends to be uniformly maximized;

Second, among firms operating within an industry there is great diversity of policy toward the development of output and assets.

Explaining found differences such as these, we came to realize, is a necessary part of any investigation into profitability and firm size.

Our approach to the present research stresses the organizational distinctions found between small businesses and large. In this respect, our focus differs from convention with its emphasis on market imperfections. However, convention still serve us well, in particular 1) the concept of industries as organizational entities, and 2) the concept of financial reports as appropriate descriptions of firm activity in markets. Our research builds its analytical framework from these two crucial concepts, that is, it makes the 'financing' of market positions its central theme.

Our major findings are summarized below under the following headings:

1. The Financial Posture Of Small Business. This chapter develops an economic tableau for analyzing small-firm vs. large-firm profitability as it varies within and across industry, and identifies the financial characteristics of small firms in terms of the tableau.
2. Production Distinctions. The productive capabilities of small firms and large are examined as related to the type of industry, to their workforces, and to their ability to borrow funds.

3. Organizational Vitality. Sales growth is introduced and tied to organizational movement within an industry, with particular attention to risk-profit tradeoffs by size class.

Comprehensive accounts of our research methodology and detailed reports of our findings are contained in Appendix A and Appendix B. To facilitate understanding of the extensive data herein reviewed, brief arguments are included at the beginning of each chapter with policy implications summarized at the end.
Chapter I

The Financial Posture

Of Small Firms
Argument

Five years of data from two sources are here examined. These data support our initial findings concerning 1) the high profitability of small firms and 2) their persistently high sales/asset ratios. The chapter first puts information about small-firm finances into a framework comparable to that SBA now uses to explain employment changes (Sections 1 and 2). It then develops and applies a general method for dealing with differences in profitability and structural ratios as each relate to firm size.

The method is to juxtapose means calculated for firms in different size classes within an industry with regressions of means across size classes, a method pioneered with SOI data by Caves and Pugel (1980). From the means comes a sense of the substantive differences involved in generating profit (Section 3) and in the structural ratios that lie behind profit generation (Section 4). Regressions indicate whether or not found differences are systematically related to organizational size within particular industries.

In section 5 findings based on SOI aggregates are related to findings from the FINSTAT sample. The correspondence is close. Furthermore, the firm-level analysis made possible with FINSTAT points up the sharp difference that exists between firm behavior and size-class behavior.

For the development of industrial policy, we conclude, size-class behavior is the important consideration.
I. The Employment Record

The Small Business Administration (SBA) has made much of the stimulating role small firms play in employment markets. Following the lead of David Birch, comprehensive files have been constructed specifying employment, and employment shares, attributable to firms in different size categories in major SIC industries. These files document changes in employment by size category over two-year periods due to firm movement (i.e., the birth or death of firms, and workforce expansions and contractions among continuing firms). The table below is indicative of the findings.

SMALL-FIRM VS LARGE-FIRM SHARE IN EMPLOYMENT AND EMPLOYMENT CHANGES

<table>
<thead>
<tr>
<th>Small-Firm Sector</th>
<th>Total</th>
<th>Large-Firm Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Total Employment in Firms</td>
<td>Private Sector Employment (million)</td>
<td>% Total Employment in Firms With More Than 500 Employees</td>
</tr>
<tr>
<td>With Less Than 100 Employees</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1976</td>
<td>37.4</td>
<td>76.0</td>
</tr>
<tr>
<td>1982</td>
<td>39.5</td>
<td>87.8</td>
</tr>
<tr>
<td>Percent Employment Change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1976 to 1982</td>
<td>22.1</td>
<td>15.6</td>
</tr>
<tr>
<td>[1976 to 1980]</td>
<td>[8.1]</td>
<td>[14.3]</td>
</tr>
</tbody>
</table>

Source: SBA Report To The President 1985, Table A1.21 and Table 1 in Appendix A of this report.

As the table suggests, small firms are substantial generators of jobs, particularly when employment shifts are
considered for periods that run from prosperous years to recession years (1976-1982). The small-firm record is somewhat less impressive when employment is growing without recession (1976-1980). In this regard, however, SBA reports that since the end of the 1981-82 recession, over two-thirds of the new jobs have come from firms with less than 500 employees.

The SBA has recently focused on the role small business-dominated industries play in employment changes in the economy and in its major sectors, as compared to the role of large business-dominated industries. The indications from these studies differ from the information yielded by the small-firm per se approach. The nature of the new findings are shown below.

SMALL-FIRM AND LARGE-FIRM DOMINATED INDUSTRIES:
SHARE IN EMPLOYMENT AND EMPLOYMENT CHANGES

<table>
<thead>
<tr>
<th></th>
<th>Small-Firm Sector</th>
<th>Total</th>
<th>Large-Firm Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Employment Industries Dominated By Firms Of Less Than 100 Employees</td>
<td>33.0</td>
<td>100.8</td>
<td>40.5</td>
</tr>
<tr>
<td>1984</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1985</td>
<td>34.1</td>
<td>103.5</td>
<td>39.7</td>
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</table>

<table>
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<tr>
<th>Percent Change In Employment</th>
</tr>
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<tr>
<td>1984 to 1985</td>
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<tr>
<td>5.1</td>
</tr>
</tbody>
</table>

Source: SBA's Report To The President 1986, Tables 1.5, 1.8, and A1.17

In this latter scenario the small-firm sector comprises not simply small firms, but industries in which small firms provide the leading management style. Small firms and large firms have a
presence in both types of industries, but what happens in each is underscored. Small-firm industries, primarily in Construction, Trade, and Services, do well in the year reported because demand for their products is strong.

The task of this research is to explore the financial activity that lies behind these variously viewed employment movements.
2. Sales And Asset Holdings

To get at the financial aspects of small-firm presence, it is useful to examine asset holdings by firms and the sales these assets support. The most comprehensive published sources of information for these purposes are the reports published by the Internal Revenue Service (IRS) as the Statistics of Income - Corporations (SOI-C). The SOI-C includes financial statement information broken down by industry divisions, by industries, and by asset size classes within industries. Data are presented for all corporate returns and for returns with income. From these data profitability ratios before and after tax, on-sales, on-assets, and on-equity, can be calculated.

To be fully compatible with SBA's information on small firms, financial information on proprietorships and partnerships, and information on not-for-profit enterprises, should be included. Proprietorships and partnerships account for most of the firms in our economy (over 12 million of 15 million enterprises). Unfortunately only spotty information is available as to the profitability of these firms. However, the corporate data are sufficiently representative for analytical purposes: in 1979 corporations accounted for almost 90 percent of private sector sales; furthermore corporations are well represented in all small-firm size classes in all industries.

For this study we used SOI-C data to construct an economic tableau highlighting small-firm posture in the corporate economy. The tableau adheres to the customary major industry divisions: Agriculture, Mining, Construction, Manufacturing, Utilities,
Trade, Finance and Services. Perforce we used the SOI primary industry codes, which correspond roughly to 3-digit SIC codes; there are about 180 SOI industries. SOI industries are listed in Report Table R6 attached.

We sorted industry divisions by economic function: two major categories for production -- goods and services -- and one major category for industries concerned with the financial assets that support and are supported by, production. This arrangement facilitates relating financial performance to overall economic movements. Within this framework we first examined small-firm presence in industry divisions with the results shown in the summary table below. The role of small business-dominated industries is examined in Chapter II.

**SMALL-FIRM SHARE:
THE FINANCIAL DIMENSION**

| Industry Sectors | Sales Delivered | | Assets Held |
|------------------|-----------------|-----------------|------------------|-----------------|
|                  | Sector Total ($B.) | % For Firms With Less Than $5M. In Assets | Sector Total ($B.) | % For Firms With Less Than $5M. In Assets |
| Goods            | 3.0             | 18.1            | 2.5              | 10.3            |
| Service          | 1.9             | 51.4            | .5               | 42.8            |
| Sub Total (Non-Fin.) | 4.9         | 30.6            | 3.0              | 16.7            |
| Finance          | .6              | 11.4            | 3.2              | 3.0             |
| All Corp.        | 5.5             | 29.4            | 6.2              | 9.8             |

Source: IRS's SOI-C 1978-1979 and Table 1 in Appendix A

Note: The Goods sector comprised Agriculture, Mining, Construction, Manufacturing, and Transportation and Utilities; the Service sector includes Trade and Services.
The SOI asset measure of small-firm size (less than $5 million in assets) is loosely comparable to SBA's employment measure (less than 100 employees). According to these measures, small business accounts for roughly a third of economic activity measured by employment, for about 30 percent when measured by corporate sales, and for about 16 percent when measured by assets. Note that for financial analysis, the subtotal for Non-Financial industries is the appropriate overall benchmark. The weight of financial assets included in Finance (over 50 percent of total corporate assets) distorts more inclusive averages.

The table shows that assets support higher sales in the service sector than in the Goods sector, (columns 1 and 3). It also shows (columns 2 and 4) that small firms use substantially less assets than large firms in all sectors.
3. Differences in Profitability By Size Class

Profitability and the differences found therein are the appropriate focal points for financial analysis of small firms. Profitability determines the ability of firms to maintain their industry posture. Without profit, sales initiatives lack direction and assets lose value. With profit, policy initiatives spring to life and generally succeed. Thus profitability is an indicator of organizational posture on a par with size itself. Taken together profit, asset holdings, and sales contribution per unit of assets condition and constrain the performance of firms as organizations.

Appendix A reports the results of our studies of relative profitability of firms by size class for the SOI population. Being management-oriented, we examine ratios of profit (after taxes and interest) to sales, to assets, and to equity. To avoid the distortions in averages that occur when losses for a comparatively few firms are included, we concentrate on profit for firms that reported income. Our major findings are:

1. Profit-on-equity and profit-on-assets are always at least as high for small firms as for large, and are often much higher—on average almost double:

2. Profit-on-sales is sometimes higher for large firms than for small, and is rarely lower, a result seemingly inconsistent with our first finding.

Not only are small-firm finances distinctive, but they are distinctive in unexpected ways. A sense for these findings can be obtained from the following table.
PROFIT DISTINCTIONS: 1979
FOR FIRMS WITH INCOME

<table>
<thead>
<tr>
<th>Industry Sectors</th>
<th>For Firms With Less Than $5M. In Assets</th>
<th>For Firms With More Than $5M. In Assets</th>
<th>After-Tax Profit-on-Equity (%)</th>
<th>After-Tax Profit-on-Sales (%)</th>
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</thead>
<tbody>
<tr>
<td>Goods</td>
<td>25.5</td>
<td>13.4</td>
<td>4.1</td>
<td>5.3</td>
</tr>
<tr>
<td>Service</td>
<td>24.6</td>
<td>17.6</td>
<td>2.7</td>
<td>2.8</td>
</tr>
<tr>
<td>Sub Total</td>
<td>25.0</td>
<td>13.9</td>
<td>3.1</td>
<td>4.6</td>
</tr>
<tr>
<td>(Non Fin.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finance</td>
<td>17.3</td>
<td>7.6</td>
<td>10.1</td>
<td>6.4</td>
</tr>
<tr>
<td>All Corps.</td>
<td>24.0</td>
<td>12.0</td>
<td>3.5</td>
<td>4.7</td>
</tr>
</tbody>
</table>

Source: IRS SOI-C for 1979 and Table 2 in Appendix A

Note: To avoid distortion from temporary 'oil' profits, Mining was excluded from large-firm averages.

These results are based on size-class aggregates -- profit for all returns with income in an asset size class divided by total equity or total sales. Thus profitabilities achieved indicate performance for small firms or large firms treated as two 'representative' classes of firms. They are not expected values for the several firms (or size classes) that make up the small-firm or the large-firm components of an industry or of industry divisions.

To relate these findings to profitability variations in other years and to other standard indexes of profitability, Report Tables 1 and 2 (RI and R2) attached have been prepared. As would be expected, there are variations in profitability over time. In dealing with published SOI data for corporations, the
The simplest profitability calculation to make is after-tax profit-on-equity for all firms (with and without income), both overall and by firm size class. These profitabilities are reported in the first two columns of Table R1. This is the measure used by Caves and Pugel and earlier by Stigler (1963). With inclusion of losses, these aggregates run substantially below those reported for firms with income only, particularly for small firms. As previously noted, since losers are few in number, we believe that averaging losses in results in a misleading picture of small-firm profitability.

For firms with income (column 3-5 in Table R1) profitability is fairly stable over the years, and so are differences in profitability between small firms and large. It is interesting to note that in 1976 and 1979 'oil' profits for large firms accounted for about 30 percent of total corporate profit on less than 5 percent of total equity, hence the exclusion of Mining from composite averages. Manufacturing's share of total corporate profit runs in the 40 percent range.

SOI financial reports are the most reliable and comprehensive available, but they are published some two years after the fact. For current information on profitability, the Quarterly Financial Report is the best official source. Three of its four series (Mining excluded) are reported in Table R2. The Quarterly Financial Report is current, but it is not comprehensive. Only the Manufacturing series is fully reliable. While at odds at some points, this series tracks pretty well with that segment of SOI-C data here reviewed.

To get at the industrial detail behind profitability
averages, we explored patterns of profitability vs. firm size for each industry by regression analysis. This phase of our research supported the general trends summarized in the table on page 19, but added considerable detail. Data for regression analysis came from the IRS Corporate Source Book of the Statistics of Income. The Source Book contains financial data for approximately 180 SOI industries, each with 13 asset size classes, and provides these data for all returns and for returns with income. We ran least squares regressions of profitability by size class against average assets. When profitability increases as firms become larger, the relationship is termed positive; when it increases as firms become smaller, the relationship is termed negative.

Tables 4 to 8 in Appendix A report our regression results. The regression signs for profit-on-equity vs asset size are negative (high profitability for small firms) in about 60 percent of the industries covered, and are almost never positive. In general, these relationships become less pronounced over the years covered, 1976 to 1980. Profitability is higher for small firms in small business-dominated industries (particularly in Trade) than in large business-dominated industries. As for profit-on-sales, there is no significant relationship in about half of the industries, a positive relationship in a quarter (mostly in Manufacturing), and a negative relationship in the rest (mostly Services and Construction). Profit-on-sales tended to be higher for large firms in large business-dominated industries.
The profit distinctions we are finding, different as they are from expectations, document the impressive performance of successful small firms in all industrial sectors.
3. Structural Ratios Compared

In respect to the profit distinctions noted above, two points are striking: first, the great difference between profit-on-equity and profit-on-sales; and second, the fact that this difference is much larger for small firms than large. Differences in the base on which profit is calculated account for the first point. For most firms dollar sales are greater than dollar assets (Mining and Utilities are exceptions). Total assets, in turn, are always greater than dollar equity due to the presence of debt. However, the second point -- why profit-on-equity exceeds profit-on-sales by so much more for small firms than for large -- calls for careful analysis. Do sales exceed assets to a larger extent for small firms than for large firms, raising profit-on-equity therewith? Do small firms carry more debt than large, giving rise to financial leverage effects?

Appendix A reports on the extensive analysis we made into these questions. The same methods of analysis were used as in studying profit differences. First, we looked at averages for small-firm and large-firm sectors of each industry. Then, through regression analysis, we looked at variations across size classes. Our findings are pointed:

1. Sales/asset ratios are consistently higher for small firms than for large. Low asset bases thus give rise in substantial measure to the relatively high profit-on-equity earned by small firms.

2. Debt/equity ratios show no consistent patterns with firm
size, indicating that leverage plays a limited role in explaining small-firm profitability.

Operationally speaking these findings, particularly the finding relative to sales/asset ratios, explain the profit distinctions reported in section 3. The table below summarizes averages for the so-called structural ratios.

DISTINCTIONS IN STRUCTURAL RATIOS: 1979

| Industry Sectors | Sales/Asset Ratios | | Debt/Equity Ratios | |
|------------------|--------------------|--------------------|--------------------|
|                   | For Firms With Less Than $5M. In Assets | For Firms With More Than $5M. In Assets | For Firms With Less Than $5M. In Assets | For Firms With More Than $5M. In Assets |
| Goods            | 2.1                | 1.1                | 2.2                | 1.3                |
| Service          | 3.3                | 2.3                | 2.1                | 2.0                |
| Sub Total (Non Fin.) | 2.8                | 1.3                | 2.1                | 1.4                |
| Finance          | 0.6                | 0.1                | 2.2                | 7.7                |
| All Corps.       | 2.8                | 0.6                | 2.1                | 3.1                |

Source: IRS SOI-C for 1978-1979 and Table 3 in Appendix A

As we explored the rationale behind these size-class differences in profitability and structural ratios, we came to see that these latter ratios have important organizational implications (hence their designation as 'structural'). On the operating side, asset holdings condition the way firms organize production for sales. On the investment side, how assets are financed sanctions and limits organizational growth. Considered together with size and profitability, the structural ratios reflect key elements of management.
Regression analysis was used to formalize the distinctions involved. Particularly significant here is the consistency with which sales/asset ratios decline with size. Negative relationships between this ratio and assets per firm were found in nearly all industries in all years studied (more sales per dollar of assets the smaller the firm). There were no differences in this regard between small business- and large business- dominated industries. This finding suggests that technologies prevailing in small businesses differ substantially in kind -- types of products, of processes, and of labor -- from those prevailing in large businesses. Production distinctions between small firms and large are substantiated and expanded upon in Chapter II.

For debt/equity ratios, here measured as total assets less equity divided by equity, the picture is mixed. We found no significant relationship between this variable and asset size in over 60 percent of the industries. Positive slopes were found in some 30 percent of the industries and negative slopes in fewer than 10 percent (See Tables 14 and 29 in Appendix A). The positive slopes (debt increases with firm size) were in Construction, Trade, Services and Finance. The negative slopes were all in Manufacturing. Thus, debt is only occasionally a distinguishing mark between firms of different size. However, debt is highly important to some small business, and to firms operating in small business- dominated industries, points discussed in Chapter II.
These distinctions, particularly those related to production, provide insight into the organizational constraints facing the two types of firms. The evidence suggests that small firms, with fewer assets per dollar of sales than large firms and higher profit-on-equity, have great capacity for organizational movement.
5. Firm Specific Analysis

Statistics of Income data paint a clear picture of the financial distinctions that prevail among firms of different size. But it is an aggregative picture, treating firms in each size class as one 'representative' firm. To confirm and extend the patterns found, specific attention must be paid to the financial performance of individual firms, i.e., to variations around the averages. For this purpose SBA developed its Financial Statistics file (FINSTAT), comprising a sample of approximately 12 percent of the Dun & Bradstreet population on which SBA's employment estimates are based. The file contains major balance sheet and income statement items -- e.g., after-tax profit, total sales, total assets, net worth, employment -- on a firm specific basis by four digit SIC industry codes.

An ancillary objective of this research is to determine how useful this file is for financial analysis. We find that FINSTAT is too selective a sample of the population to be used for estimating key indicators (see Appendix B). Reported profitability, for instance, is consistently high when compared to SOI averages, particularly for small firms. Debt/equity ratios, in contrast, are generally low, also particularly for small firms.

But for studying differences in firm behavior, the FINSTAT sample is sufficiently representative and comprehensive to be useful. The file is particularly helpful in analyzing the workforce ratios behind differences in sales/asset ratios (Chapter II below). This is an area where all biases with SOI
reference points disappear. In fact, FINSTAT provides the most comprehensive source of firm-level information on these latter variables for small firms now available.

For purposes of intraindustry analysis and comparison, the FINSTAT file was sorted into SOI industries and asset-size classes. Size-class averages were calculated for the key financial variables previously analyzed. These variables were then regressed against asset size across asset-size classes (comparable to our regressions with SOI averages). Finally, we regressed each variable against asset size on a firm level basis. (For details see Appendix A). Our findings are:

1. FINSTAT size-class averages for each variable vary with firm size in a manner consistent with the patterns found using CSB-SOI aggregates of the same variables, i.e., show substantial differences for each ratio between large-firm and small-firm size classes.

2. At the firm level within an industry, however, there are no consistent patterns of variation with firm size for any of the variables in any of the approximately 150 industries studied.

3. When treated within restricted asset size ranges, particularly for the smallest size class, some behavior variations with firm size reappear.

These findings highlight the variety of firm behavior that is contained within each size class. At the same time they indicate that firms in different size classes are facing and coping with distinctive sets of financial problems, calling for equally distinctive management styles. The effects of management
styles on firm behavior are emphasized by SBA in its treatment of employment changes. Firms with few employees (and asset holdings), so runs the logic, are entrepreneurial in behavior leading to large variations in employment. Firms with medium numbers of employees (and medium asset holdings) adopt the professional management style: they are likely to change employment only modestly. Firms extremely large in employment (and assets) are 'big business' in style; they are likely to be employment trimmers and asset acquirers.

Management styles such as these, each closely attached to firm size, help to explain the differences in behavior by size class we are finding in profitability and in the acquisition of assets. On an individual firm basis, however, localized variations within size class tend to distort the underlying continuities. Only among really small firms, where relative size differences are large, do differences in management patterns across size reappear.

The size-class regressions we ran with the FINSTAT sample confirmed all the size-class trends identified with the CSB-SOI data, a finding we consider impressive. Regressions of profit-on-equity and profit-on-assets vs. firm size had negative slopes for more industries than in the SOI population. Profit-on-sales vs. firm size regressions also had negative slopes in many industries and no positive slopes (a difference between the two series). Regressions of sales/asset ratios against firm size were as strongly negative as for the CSB-SOI population. Regressions of debt/equity ratios against asset size for the FINSTAT data were generally positive (a further
difference in the two series, reflecting the previously noted bias of the FINSTAT sample against debt for small firms).

The FINSTAT analysis clarifies the strong distinction that exists between firm behavior and size-class behavior: firm behavior is quite varied in direction among firms of all sizes; size-class behavior, in contrast, manifests strong systematic differences with variations in firm size.
Policy Implications

The diverse patterns of profit behavior we are finding adds considerable realism to the conventional treatment of the role of profit in a competitive economy. Since Adam Smith the paradigm has been that inventive small firms drive toward 'profit-less' equilibria, with the market power of large firms as an occasional threat. This is a proposition Stigler (1963) claimed to have reaffirmed (with SOI data). Our results indicate that profit advantage, far from being absent, exists for large segments of industry, and not for large firms and large-firm industries as theory suggests might happen, but rather for the small-firm sector.

These new facts upset the standards for policy usually associated with the competitive ideal. Bain (1950), Caves (1982) and others have argued that concentration, largely a large-firm phenomenon, yields profit excesses of from 3 to 9 percentage points for a limited sector of the economy, distortions some analysts have been at pains to minimize [Harberger (1950)]. Our data show profit advantage of 10 to 12 percent going to the much larger small-firm sector.

Highlighted by our analysis are the organizational aspects of profitability, in particular its tie to productive capabilities. Small firms thrive because they produce much with little. Industries as a whole thrive through variously balancing small-firm contributions with large-firm contributions. For small firms and large, it appears, profitability promotes quite different kinds of activity. Identifying these different kinds
of activity as they relate to industry development, we would suggest, is critical to policy making.

For policy-makers to do this, they will need continuing and improved information about profit differences and the conditions that lead thereto. Crucial in this regard is respect for size-class groupings and performance, i.e., size classes must be treated as organizational entities in their own right to be promoted on the record. Crucial too is respect for the balances differently driven size-class groups achieve, i.e., differential advantages that make such balances strong must be sought out and supported.
Chapter II

Production Distinctions
Argument

In identifying small-business strengths the structural ratios that characterize organizational posture provide important clues. The evidence suggests that small firms are competing with different technologies than large firms, gaining strength from their special capabilities as productive organizations. What are these distinctive capabilities? And where do they pay off? These are the questions this chapter explores.

Following SBA's 'dominated industries' lead, we first examine the operating characteristics of the two kinds of industries (Section 1). Here our concern is determining to what extent production conditions in an industry favor small firms or large. Workforce ratios available from the FINSTAT file are then used (Sections 2 and 3) to probe these differences.

Our presumption is that firms of different size compete with varied products. Differing sales/asset to firm size relationships (consistently decreasing) are a first indication of such differences. The behavior of sales per employee and assets per employee to size relationships (both generally increasing) are two additional indicators. Variations among these indicators are used to define patterns of production advantage for each industry.

After a quick look at financial variations (Section 4), the chapter concludes that attention to size-class differences promises to make industrial policies increasingly effective.
1. Small Business-Dominated Industries

When it divides the economy into small business- and large business-dominated sectors, the SBA observes that some kinds of goods and services are well suited to production by small firms. To check this observation, we sorted the firms in our tableau into small-firm and large-firm industry groups, and then analyzed the operating characteristics of the two groups. Industries are small business-dominated when 50 percent of industry employment, as determined by SBA analysis, is accounted for by firms with under 100 employees. (For classification of SOI industries on this basis see Table 25 of Appendix A.) Means for the several variables for each of the two kinds of industry were then derived. Reported in the table below are the summary means for the structural ratios.

**STRUCTURAL RATIOS FOR SMALL BUSINESS-VS LARGE BUSINESS-DOMINATED INDUSTRIES: 1979**

<table>
<thead>
<tr>
<th>Industry Sector</th>
<th>Sales-Asset Ratios</th>
<th>Debt-Equity Ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Small- Bus. In-</td>
<td>Large- Bus. In-</td>
</tr>
<tr>
<td>% Total Sales For Small Bus. Industries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goods</td>
<td>14.9</td>
<td>1.9</td>
</tr>
<tr>
<td>Service</td>
<td>80.6</td>
<td>2.9</td>
</tr>
<tr>
<td>Sub Total (Non-Fin.)</td>
<td>39.5</td>
<td>2.6</td>
</tr>
<tr>
<td>Finance</td>
<td>24.1</td>
<td>0.2</td>
</tr>
<tr>
<td>All Corps</td>
<td>39.1</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Source: IRS SOI-C 1978-1979 and Table 26 in Appendix A
These means closely parallel those found for the small-firm and large-firm sectors of each industry division. The implication is that patterns of domination develop when production requirements of a particular type are general within an industry. In the Goods sector, for instance, large-firm industries predominate in all divisions except Construction (See Table 26 in Appendix A). In the industries where large businesses predominate (62 out of 70 in Manufacturing), sales/asset ratios tend to be substantially lower than for the few industries that remain small business-dominated. The situation is just the reverse in the Service sector. Here small business-dominated industries predominate. Sales generally are high in relation to assets, and the difference between the sales/asset ratios of small business- and large business-dominated industries is comparatively modest. In this sector, opportunities to make technology more complicated are less prevalent.

Debt/equity ratios also have an interesting tale to tell. Asset ownership in some small business-dominated industries is much more heavily dependent on debt than is asset ownership in large business-dominated industries, but not in all. Debt burdens are particularly heavy in Construction and Wholesale Trade. in the latter case, we surmise, swelled by borrowing against inventory. In Services and Utilities, however, debt is higher for large business-dominated industries than small business industries (See Table 26 in Appendix A).

To round out the picture of structural differences among small-firm and large-firm industries, we examined the
profitability of the two groups on the same basis as for the structural ratios. Results are summarized below.

PROFIT DIFFERENCES FOR SMALL BUSINESS- VS LARGE BUSINESS- DOMINATED INDUSTRIES 1979

<table>
<thead>
<tr>
<th>Industry Sectors</th>
<th>Profit-on-Equity(%)</th>
<th>Profit-on-Sales(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goods</td>
<td>23.0</td>
<td>14.7</td>
</tr>
<tr>
<td>Services</td>
<td>24.4</td>
<td>16.9</td>
</tr>
<tr>
<td>Sub Total (Non-Fin.)</td>
<td>24.1</td>
<td>14.8</td>
</tr>
<tr>
<td>Finance</td>
<td>13.8</td>
<td>7.7</td>
</tr>
<tr>
<td>All Corps</td>
<td>22.0</td>
<td>12.8</td>
</tr>
</tbody>
</table>

Source: IRS SOI-C 1978-79 and Table 27 in Appendix

Just as with the means of the structural ratios, profitability means for small and large business- dominated industries closely parallel those for small-firm and large-firm sectors of industries as reported in Chapter I. Profit-on-equity in the Service sector, where small business- dominated industries are most prevalent, is somewhat higher than in the Goods sector. Profit-on-equity continues to run far ahead of profit-on-sales and particularly so for small business- dominated industries. This is to be expected given the structural ratios previously described. (For more detail see Table 27 in Appendix A.)
We conclude that industry conditions do much to foster small business predominance. In Construction, Trade, and most Services industry sales/asset ratios are high, reflecting simple technologies and open competition. In Manufacturing entry barriers and scale economies combine with low sales/asset ratios to favor large firms. In each case, profitability follows domination patterns, being relatively high (on-equity) in industries where small firms are predominant.
2. Variation in Workforce Ratios By Firm Size

To extend our understanding of the technical differences behind the decline of sales/asset ratios with firm size, we calculated two workforce ratios with FINSTAT data: assets per employee and sales per employee. We then examined the behavior of these ratios against firm size, making the conventional assumption that firms add assets to labor to increase the marginal productivity of their workforces. Our findings are:

1. Average assets per employee and average sales per employee are substantially lower for small-firm size classes than for large-firm size classes.

2. Size relationships, manifest elsewhere on a size-class basis only, persist at the firm level in the case of workforce ratios.

The table on the following page shows the distinctions among means of these workforce ratios.
### Distinctions in Workforce Ratios within Industry: 1979

<table>
<thead>
<tr>
<th>Industry Sector</th>
<th>Workforce Ratios For Small Firms</th>
<th>Workforce Ratios For Large Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sales Per Employee ($000)</td>
<td>Assets Per Employee ($000)</td>
</tr>
<tr>
<td>Goods</td>
<td>83</td>
<td>42</td>
</tr>
<tr>
<td>Service</td>
<td>104</td>
<td>41</td>
</tr>
<tr>
<td>Sub Total (Non Fin.)</td>
<td>99</td>
<td>41</td>
</tr>
<tr>
<td>Finance</td>
<td>103</td>
<td>167</td>
</tr>
</tbody>
</table>

Source: FINSTAT 1979 and Table 30 in Appendix A

Note: Small-firm sectors for each of industry are comprised of firms with less than $5 million in assets.

Dollar sales per employee for small firms are less than half those for large firms; dollar assets per employee are only a fifth as large. These orders of magnitude persist by industry (see Table 30 in Appendix A). What is being enhanced with increasing firm size, it appears, is not labor productivity so much as the amount of labor (and other costs) that can be loaded into the different products large firms are producing. In small business-dominated industries, where there is less difference in size among competitors, we had speculated that these distinctions would be small. This was true among the few small business-dominated industries in Manufacturing, but it was not true generally.

Reflected in sales per employee, it is well to remember, are all inputs included in final product -- material costs, capital charges, and compensation for workforce effort applied. While
the ratio is a useful proxy for productivity, it is a special one. In general, we take it to be indicative of the complexity of the services being offered customers as 'output' by more or less comparable productive operations. We further take the substantial differences in means often found to confirm our earlier presumption that small firms are competing with different products than large firms.

Regressions of workforce ratios against average asset size across size classes support the differences noted (see Tables 31 and 32 in Appendix A). In almost all industries both the sales per employee vs. size and the assets per employee vs. size relationships are strongly positive for each of the four years studied (1977-1980). But, as noted above, the surprise is that similar patterns appear when the ratios are analyzed on a firm specific basis. The persistent increase in sales and assets per employee with individual firm size is at odds with our findings concerning profitability and the structural ratios as related to individual firm size -- no systematic relationship. We surmise that these increasing workforce ratios reflect increases in management sophistication accompanying increasing firm size. Always involved therein, it seems, are increased expenses. whether for assets, for materials, or for employee compensation -- 'diseconomies' of sorts, even if duly recovered in product sales.

Averages, of course, are deceptive. But these differences in workforce ratios are substantial enough to indicate that small firms use their workers to very different advantage than do large firms. Simplicity in all aspects of production -- materials.
capital charges, labor applications -- are the order of the day. It also appears that the widely touted 'high tech' and/or 'high skill' contributions of small firms, which generate high relative sales per employee, are contained within industries and size classes characterized by the streamlining of products and staff.
3. Production Advantages For Small Firms

Our analysis of workforce ratios against firm size suggests that industrial organization can be assessed in terms of the productive advantages enjoyed by small firms and large. When dollar sales per employee (S/L) fail to rise visibly as assets are added overall and per employee (A/L), there is no gain from becoming large. Only the added costs per dollar of sales that must be borne as sales/asset ratios (S/A) decline. In the more usual case, where sales per employee do rise as firms add assets per employee, there is a more or less even trade-off between output gains and input costs. Only when sales/asset ratios fail to fall with increased firm size, and with increases in asset applications per employee, are the sales gains per employee from increased firm size an unqualified advantage. The controlling identity is: S/L = A/L x S/A.

Following this logic, we examined the production relationships prevailing in the several industries to determine patterns of advantage by industry, using the size-class regression results described in section 2 to make the determination. At the same time, we sorted industries by patterns of domination in accordance with the breakdowns described in Section 1. Results are summarized in the table below and by industry in Report Table 3 (R3) attached. As these tables indicate, there is great variety in production advantage among industries, but this variety has no discernible effect on patterns of industry domination.
## PRODUCTION ADVANTAGE VS PATTERNS OF INDUSTRY DOMINATION: 1979

<table>
<thead>
<tr>
<th>Number Of Industries</th>
<th>Small Business-Dominated Industries (SBD)</th>
<th>Large Business-Dominated Industries (LBD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>144</td>
<td>65</td>
<td>79</td>
</tr>
<tr>
<td>Small-Firm Advantage (SF)</td>
<td>35</td>
<td>14</td>
</tr>
<tr>
<td>Large-Firm Advantage (LF)</td>
<td>37</td>
<td>16</td>
</tr>
<tr>
<td>No Advantage</td>
<td>72</td>
<td>35</td>
</tr>
</tbody>
</table>

Source: FINSTAT 1979 for SO1 Industries and Table 1 Attached

Note: Advantage defined as no gain in sales per worker (SF), or large gain (LF), as asset size increases.

Small-firm advantage (SF) occurs in those industries where sales per employee failed to rise with asset size (no significant regression slope), i.e., adding assets to labor doesn't improve labor output. Large-firm advantage (LF) occurs in those industries where sales/asset slopes remained constant as firm size increases, i.e., adding assets to labor increases labor output substantially. Of the 144 industries for which these designations could be made, large firms had production advantages in 37 industries, primarily in Manufacturing and Wholesale Trade. Small firms had production advantages in 35 industries, primarily in Finance and Service.

Shown in the table that follows are the patterns of production advantage found in some representative industries selected from the report table (R3 attached). Noted in parentheses are the industries where advantage (SF or LF) and the
prevailing structure -- small business-dominated (SBD) or large business-dominated (LBD) -- don't match.

**PRODUCTION ADVANTAGE: 1979**

**SOME REPRESENTATIVE INDUSTRIES**

<table>
<thead>
<tr>
<th>Industry Sector</th>
<th>Industries Where Sales Per Employee Remain Constant With Size (SF)</th>
<th>Industries Where Sales/Asset Ratios Remain Constant With Size (LF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goods</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0400</td>
<td>Agriculture (LBD)</td>
<td>General Bldg. (SBD)</td>
</tr>
<tr>
<td>1150</td>
<td>Coal Mining</td>
<td>Grain</td>
</tr>
<tr>
<td>1600</td>
<td>Heavy Construction (LBD)</td>
<td>Soap</td>
</tr>
<tr>
<td>2050</td>
<td>Bakeries (LBD)</td>
<td>Metal Forgings (SBD)</td>
</tr>
<tr>
<td>3570</td>
<td>Office Computing (LBD)</td>
<td>Aircraft &amp; Missiles</td>
</tr>
<tr>
<td>4500</td>
<td>Air Transport (LBD)</td>
<td>Telephone Telegraph</td>
</tr>
<tr>
<td>Services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5040</td>
<td>Sporting Goods</td>
<td>Lumber (SBD)</td>
</tr>
<tr>
<td>5700</td>
<td>Furniture</td>
<td>Motor Dealers</td>
</tr>
<tr>
<td>Finance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7389</td>
<td>Business Service (LBD)</td>
<td>Drugs</td>
</tr>
<tr>
<td>8060</td>
<td>Hospitals (LBD)</td>
<td>Misc. Repair</td>
</tr>
<tr>
<td>6140</td>
<td>Personal Credit</td>
<td>Medical Labs. (SBD)</td>
</tr>
<tr>
<td>6355</td>
<td>Life Insurance (LBD)</td>
<td>Mutual Insurance</td>
</tr>
</tbody>
</table>

Source: FINSTAT 1979 and Table 33 in Appendix A

Notes: Industries identified by SOI code numbers. Abbreviations as described in text: SF for small-firm production advantage; LF for large-firm production advantage; SBD for small business-dominated industry; LBD for large business-dominated industry.

The differences between industry patterns of production advantage and patterns of industry domination can be explained as follows. Regressions of workforce ratios vs. size performed across asset size classes define the production patterns managers of small firms and large have established, and that now exist, in an industry, i.e., the present mix of small-firm and large-firm production capabilities. Domination patterns summarize the majority type of management, the type of management that has proven to be most capable of dealing with the conditions prevalent in each of the industries over time. Given the variety
of management styles that are found to persist within an industry, it is not surprising that production advantage (SF or LF) is often at odds with domination patterns (SBD or LBD). i.e. that some small firms do well in some large business-dominated industries and vice versa.

But the contrasts are instructive. Heavy construction contractors or bakers who succeed in remaining small, for instance, are getting as much sales from their workforces with less costly asset positions as are their large-firm counterparts who dominate the industry. Both hospital and life insurance companies, the table suggests, operating in industries where large firms are dominant, would do well to consider the advantages of smallness. By the same token firms operating in some small business-dominated industries need to beware the advantages of size. e.g., general builders, metal forgers, and wholesale lumber dealers.

Insofar as technological distinctions such as these are crucial to competition, it is important to pin down their dimensions. Crude as they are, our workforce ratios and the classifications that flow therefrom provide a useful step in this direction.
Chapter III

Organizational Vitality
Argument

Profitability turns out to be a many-dimensional master -- highly visible among small firms, more contained among the large. Technology, in turn, delivers advantage unevenly, rewarding leanness among small firms and complexity among the large. Changing profitability and changing technology both promote the movement of firms, which movements many see as the driving force underlying competitive vitality. How finance aids and abets firm movements is explored in this chapter.

A prime indicator of how readily firms move within an industry is their tolerance for risk. In the separation of profit-makers from all firms in each size class, SOI files provide a unique measure of risk -- the percent of sales or assets for firms without income in a size sector. Section 1 makes this measure of risk specific and relates risk so defined to sector profitability. Competitive vitality, we argue, is a size-class phenomenon, vital sectors those where firms accept chances of failure together with chances of profit and growth.

Small-firm vs. large-firm differences as related to risk and profitability are then examined (Section 2). The concept of financial advantage within an industry, comparable to the concept of production advantage, is developed. Finally we take a quick look at the relationship between firm profitability and growth (Section 3). Our findings here are very tentative.

Tying firm movement to sector movement, we conclude, puts organizational vitality as promoted by profitability in proper perspective for policy-making.
1. Variations in Risk by Size Class

Risk is variously defined in the literature, generally by some measure of the variability of profit and/or sales for individual firms. The presumption is that the financial records firms post are proxies for the economic conditions with which these firms are dealing. In the firms-without-income category of the SOI file, we have a comprehensive indicator of how well or badly firms in a sector are in fact dealing with circumstance. This indicator tells much more about risk than can be surmised from current proxies. Included in the without-income category are firms on their way to, or from, profit for whatever reasons.

In essence, the without-income indicator documents the degree of movement with which profit-seeking firms are coping in their industry or size class. To the extent that movement among firms making up an industry -- their expansion or contraction, birth or death -- is an essential part of competition, identifying the locus of risk so defined is obviously important. Our measure of risk -- the percent of sales and/or assets held by firms without income in each size class -- enables us to do just this.

Stratifying by the firm size dimension within industry, we find:

1. Small-firm size classes live with much larger without-income sectors than do large-firms size classes, even in prosperous times.

2. Profitability, while relatively high for small-firm size classes, is not closely associated with risk-bearing.
In connection with these findings, it is important to note that our approach ties organizational vitality to size-class groupings. Within a size class, precarious firms (the without-income sector) are offset by successful and profitable firms. It is how well the group as a whole performs, ultimately sector growth, that is of concern. Summarized below are differences in risk by our measure for two years of contrasting economic fortune.

RISK BEARING DISTINCTIONS

<table>
<thead>
<tr>
<th>Industry Sectors</th>
<th>1979</th>
<th>1980</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% Of Sector Sales For Firms Without Income</td>
<td>% Of Sector Sales For Firms Without Income</td>
</tr>
<tr>
<td></td>
<td>Firms With Less Than $5 M. In Assets</td>
<td>Firms With More Than $5 M. In Assets</td>
</tr>
<tr>
<td>Goods</td>
<td>20.6</td>
<td>19.0</td>
</tr>
<tr>
<td>Service</td>
<td>19.0</td>
<td>11.4</td>
</tr>
<tr>
<td>Sub Total (Non Fin.)</td>
<td>19.5</td>
<td>9.7</td>
</tr>
<tr>
<td>Finance</td>
<td>27.0</td>
<td>8.8</td>
</tr>
<tr>
<td>All Corps.</td>
<td>19.7</td>
<td>9.6</td>
</tr>
</tbody>
</table>

Source: IRS CSB-SOI for 1978-1979 and Table 36 in Appendix A.

This table shows that small businesses are accepting a high level of risk even in prosperous years (1979); in this year risk is presumably associated with opportunity. As a result, the increase in risk for less prosperous years (1980) turns out to be greater for large-firm size classes. In good years and bad, the presumption is, enterprising small firms are absorbing the
changes inherent in a competitive environment. Their less enterprising large-firm counterparts, in contrast, minimize risk in good years, but suffer with every one else when times are bad.

Risk measures calculated for selected asset size classes in each industry (Table 37 in Appendix A) bear out the substantial differences in exposure to losses suggested by the above table. In much of industry, not just on average, small-firm size classes are on the order of twice as risky as large-firm size classes. But there is great variation among industries and size classes. Risk-free large-firm size classes, for instance, often bring down an industry average to a very low level.

Regressions of our risk measure against firm size across asset size classes for the years 1977 to 1980 confirm and make specific these findings (see Appendix A, Tables 38-41). Due to reporting problems, statistically significant results emerge for a somewhat smaller number of industries (105) than in our previous regressions. Variation in risk burden among industries is considerable, but in only a handful of cases is risk greater for large firms than small. About half of the industries show negative regression slopes (more risk in small asset size classes). Negative slopes are fairly evenly divided by industry division (Goods vs. Service) and by type of industry organization (small business- vs. large business- dominated).

Firms in small-firm size classes live with much greater risk than their large competitors, this record shows. Previously it has been shown that small firms who succeed enjoy substantially greater profit-on-equity than large firms. Taken together these
two findings suggest that the standard profit-risk hypothesis is operative; i.e., that profitable small firms are earning a risk premium. The data, however, do not confirm this expectation. To check the hypothesis we ran risk vs. profit-on-equity regressions across size classes in each industry with mixed results. Our regression slopes were significant in about half of the industries, as were the risk-size regressions, but when significant regression slopes were positive less than half the time. (Tables 38 to 41). Positive risk-profit connections were found most frequently among small business-dominated industries, in particular in Construction, Wholesale Trade, and Services. Negative relationships appeared in the large business-dominated industries, especially Durable Manufacturing and Utilities.

Tying risk to size-class performance underscores the kind of organizational vitality competition is supposed to promote. The diversity of the risk patterns we have found reflects the diversity of competitive practice.
2. Risk-Profit Advantage by Size Class

The risk picture that emerges is of industries divided. At one end, high risk is borne by small-firm size classes, often for a premium. At the other end, low risk is often attained and preserved by large-firm size classes for the same profitability achieved elsewhere in the industry. In between are small firms that earn high profitability without undue risk (the really advantaged) and the industries where neither profitability or risk vary significantly with size.

This breakdown suggests that patterns of risk-profit advantage for each industry can be defined similar to the patterns developed in assessing production advantage in Chapter II. Using the risk and profitability regressions against asset size described in section 1 above, and the industry domination breakdowns of Chapter II, we made just such an analysis. Results are summarized in the table below and by industry in Report Table 4 (R4) attached. Here too, as in production, there is great variety as to small-firm and large-firm advantage, which advantage has little to do with patterns of industry domination.
RISK-PROFIT ADVANTAGE VS.
PATTERNS OF INDUSTRY DOMINATION: 1979

<table>
<thead>
<tr>
<th>All Industries</th>
<th>Small Business-Dominated Industries</th>
<th>Large Business-Dominated Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Industries</td>
<td>105</td>
<td>48</td>
</tr>
<tr>
<td>Small-Firm Advantage (SF)</td>
<td>23</td>
<td>13</td>
</tr>
<tr>
<td>Small-Firm Advantage Complete (SF*)</td>
<td>32</td>
<td>13</td>
</tr>
<tr>
<td>Large-Firm Advantage (LF)</td>
<td>21</td>
<td>9</td>
</tr>
<tr>
<td>No Advantage</td>
<td>29</td>
<td>9</td>
</tr>
</tbody>
</table>

Source: CSB-SOI for 1979 and Table R-4 attached.

The advantages summed up in the table are defined and determined as follows:

**Small-firm Advantage (SF):** Relatively high risk-taking by small firm (negative risk vs. asset size slope) supported by high profitability of small firms (negative profit-on-equity vs. asset size slope).

**Small-firm Advantage Complete (SF*):** Risk-taking low or moderate for small firms (positive or no risk vs. size slope) supported by high profitability (negative profit-on-equity vs. size slope).

**Large-firm Advantage (LF):** Risk-taking for large firms low (negative risk vs. size slope) supported by moderate or high profitability for large firms (positive or zero profit-on-equity vs. size slope).
As the tables show, in 23 of the 105 industries for which we had risk measures, small firms were bearing high risk and being paid a profit premium (SF). In another 32 industries small firms were even better off, bearing no higher risk than larger firms in their industry and still earning relatively high profit-on-equity (SF*). For 29 industries risk and profitability were fairly evenly distributed across size classes, i.e., firms didn't gain or lose as far as risk is concerned by becoming large. In a final 21 industries there was advantage for large firms in the sense that they escaped risk without losing profit (LF). In only about a quarter of the industries covered are the rewards for risk-taking substantial. Patterns of advantage are similar in the small business- and large business-dominated industries.

Shown in the table that follows are some representative industries that fall into each of our risk-bearing categories and the type of industry organization -- small business-dominated or large business-dominated (SBD or LBD) -- when at odds with indicated risk-bearing advantage. The logic here is the same as in our assessment of production advantage. Patterns of success in embracing or avoiding risk (SF, SF*, or LF), have no direct bearing on the patterns of dominance in an industry (SBD's or LBD's). Small firms taking advantage of risk to earn high profit-on-equity often thrive in industries dominated by large, relatively risk-insulated firms. Large risk-insulated firms, in turn, on occasion find niches in industries dominated by small risk-prone firms.

But as in the case of production, in industries where firm
advantage is at odds with the organizational disposition of the industry, there is reason to take notice. In industries where small-firm sectors do well in risk-bearing (the left-hand column), for instance, dominant large firms might question their profitability performance. Among many of these industries profit-on-equity rates are relatively high for small firms.

**RISK-BEARING ADVANTAGE: 1979**  
**SOME REPRESENTATIVE INDUSTRIES**

<table>
<thead>
<tr>
<th>Industrial Sectors</th>
<th>Industries Where Small Firms Profit From Risk (SF) Or Its Absence (SF*)</th>
<th>Industries Where Large Firms Bear Less Risk For Equal Profit (LF)</th>
</tr>
</thead>
</table>
| **Goods**          | 0600 Agriculture Serv.  
|                    | 1510 General Contract.  
|                    | 2345 Women's Clothes (LBD) (SF*)                                      | 0400 Agricultural  
|                    | 1380 Oil Service  
|                    | 1711 Plumbing  
|                    | 4830 Radio and TV (SBD)                                              | 4830 Radio and TV (SBD) |
| **Services**       | 5010 Motor Vehicles  
|                    | 5995 Other Retail  
|                    | 6140 Pers. Credit (LBD) (SF*)                                       | 5130 Apparel (SBD)  
|                    | 5129 Drugs (LBD)  
|                    | 5410 Grocery (LBD)  
|                    | 6511 Real Estate Operators                                          | 7316 Advertising  
| **And Finance**    |                                                                        | 7316 Advertising  
|                    |                                                                        | 7316 Advertising  
|                    |                                                                        | 7316 Advertising  
|                    |                                                                        | 7316 Advertising  

**Source:** CSB-SOI 1979 and Table 42 Appendix A

In industries 0600, 1510, 1380, 1711, 2345, and 3380, for instance, profitability rates were about 30 to 35 percent for small firms compared to about 15 percent for large firms. For industries 5010, 5995, and 6140 small firms earned profit-on-equity of 12 percent to 25 percent compared to about 8 to 15 percent for large firms. In industries 5129, 5410, and 6511 small firms earned profit-on-equity of 10 to 25 percent.
compared to 5 to 15 percent for large firms. Perhaps women's clothiers or personal credit agencies, to pick two, can gain from embracing more risk.

Similarly, in industries where risk is being absorbed and minimized by large firms, staying small may not be that sensible. Among these industries (the right-hand column) profit-on-equity rates are not that high for small firms. In industries 0400, 3670, and 4830 profit rates were 10, 25, and 18 percent respectively for small firms in 1979; large firms earned roughly the same rates (10, 20, and 20 percent). In the next group (industries 5130, 7310, and 8200), profit-on-equity rates were similar for large and small firms, amounting to about 15, 25, and 15 percent respectively. Perhaps radio and TV stations, or apparel firms, or motor vehicle distributors would benefit by becoming large (as some already are).

We conclude that there are distinct patterns of risk-bearing within industry, but that these patterns vary greatly as far as risk-profit advantage is concerned. Willingness of small firms to take chances and absorb losses (often for a high profit) in some industries (Construction, Wholesale and Services) is matched more generally by structured avoidance of risk-taking in many other industries.
3. **Sales Growth and Firm Movement**

Tolerance for risk within a size class can be termed the downside measure of organizational vitality, with growth in sales and the accompanying growth in number of firms the upside counterpart. In recent years economic policy-makers have become very growth oriented, tying growth closely to firm development on the one hand (productivity enhancement) and sector development on the other (capitalizing on employment contributions by small-firm size classes, for instance). At the macroeconomic level, that is to say, it is well recognized that firm-building and industry-building go hand in hand.

Integral to industry-building is entry of new firms both to the industry as a whole and to its several size classes. Of particular importance here is the balance between entry patterns of small firms, with their streamlined entrepreneurial approaches to success, and the entry patterns of large firms with their more sophisticated, and more costly, policies. Our analysis makes much of this latter distinction. Small firms are pictured as attaining high profitabilities from simple technologies with considerable tolerance for risk. Large firms, in contrast, have lower profitabilities, more complicated technologies, and less risk. These differences in approach are likely to lead to distinctive patterns of growth.

To flesh out this proposition, we are examining changes in sales and changes in the number of firms by size class within the several industries covered by the CSB-SOI for the years included in our study. For the period covered, our findings are...
1. Percentage growth in sales is greatest in the largest asset size classes.

2. Percent change in the number of firms is also quite substantial in many large-firm size classes.

In a period of rising prices, these findings are not that surprising. Average asset sizes of firms, and average sales, increase throughout the scale, with negative effects upon contributions to growth in small-firm size classes and positive effects in large-firm size classes. But the growth patterns, as shown in the table below are nonetheless interesting.

**GROWTH PATTERNS 1977-1979**

<table>
<thead>
<tr>
<th>Industry Sector</th>
<th>Percent Change in Sales</th>
<th>Percent Change in Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>For Firms With Less $5M.</td>
<td>For Firms With More $5M.</td>
</tr>
<tr>
<td>Goods</td>
<td>23.4</td>
<td>33.3</td>
</tr>
<tr>
<td>Service</td>
<td>31.8</td>
<td>52.5</td>
</tr>
<tr>
<td>Sub Total (Non-Fin.)</td>
<td>28.8</td>
<td>38.1</td>
</tr>
<tr>
<td>Finance</td>
<td>38.6</td>
<td>38.5</td>
</tr>
<tr>
<td>All Corps.</td>
<td>29.1</td>
<td>38.2</td>
</tr>
</tbody>
</table>

*Source: SOI-C 1977 and 1978-1979 and Table 44 in Appendix A*

The table indicates that new firms account for over half the increase in sales recorded in all areas except Finance. We picked a two-year period for analysis to minimize noise, a practice followed by SBA in analyzing employment changes. So far we have not been able to back up our analysis with simple industry-specific measures. Regressions of growth rates vs. size
show few significant relationships. This may be due to the
effects of inflation on reported sales noted earlier.

As an alternate to regressions, we made direct comparisons
between sector growth and the industry average for three selected
asset size classes in each industry (Table 45 to 47 in Appendix
A). Through this analysis we identified:

1. Those industries in which growth in sales for each of
the three size classes exceeds the industry average --
in the largest size class (over $100 million in assets)
in almost all industries, but rarely in the two smaller
size classes:

2. Those industries in which growth in the number of firms
in each size class exceeds the industry average --
seldom in the smallest size class ($250,000 to $500,000
in assets), more often in the larger small-firm size
class ($1 to $5 million in assets), and frequently in
the largest size class:

3. Those industries in which growth in each size class is
related to profitability -- particularly in the $1 - $5
million asset size class for growth in number of firms,
but in no size classes are profitability and growth in
sales correlated.

Profit-growth connections in the $1 to $5 million asset size
class are detailed by industry in Table R5 attached. The table
shows that for about half the industries growth in the number of
firms and profit-on-equity both exceeded industry average, a
fairly strong set of positive correlations.

Clearly, further work is called for with these growth data.
attention paid to cyclical variations; employment-based size measures used to avoid inflationary distortions. As yet it is not clear what size class patterns will emerge. What is clear, however, is that it is important to look at growth as a size-class phenomenon, closely related to firm failures (risk) to firm successes (the profitability of winners), and to the production policies which lie behind success and failure.
Policy Implications

Economists have always been concerned with risk and growth as the two relate to organizational vitality. In recent work, however -- Markowitz (1950), Lintner (1959), Sharpe (1960) and others -- risk is often viewed as individual hazard to be diversified away, not as market opportunity to be promoted -- Adam Smith's vision. Growth, in turn, is often tied to the prosperity of individual competitors, much made of the profit foregone by large firms to foster increased sales [e.g., Baumol (1959)]. not tied to industry performance, fueled by the profits its innovating members earn -- Schumpeter's vision.

Attention to size-class behavior has been forced upon this research by the nature of the SOI data. But size-class analysis is no less persuasive therefor. The aggregates for which profit-on-equity and sales/asset ratios are high for small firms are the same aggregates for which policy is made. In this chapter the full impact of firm-aggregate interactions is clarified. Going without income is not any firm's preference, but taken as wholes, the size sectors where this happens often are very vital. i.e., enjoy high profitability, attract new firms, and generate increased output.

What emerges from this preliminary view of size classes as progenitors of vitality is some understanding of how differently the two sectors we have studied perform their mission. Small firms operate in sectors where risk may be great, and often profitability; growth in firms if not sales is the evident characteristic of these sectors. Large firms, in contrast,
operate in sectors manifesting less day to day risk and where profitability is constrained; but in large-firm sectors growth drives are powerful. Policy-makers need to be aware of these differences, aware too of the balances that must be maintained for the industries in which the several size classes are operating to remain vital.

The information patterns here developed suggest avenues of inquiry that are important to policy-making in the growth area. But just as important as information in developing policy, we believe, is respect for the critical role interactions within and between size classes play in industrial development.
Conclusion

Promoting Competitive Advantage
Conclusion

Promoting Competitive Advantage

Differences in mission between small firms and large firms are substantial and need fostering. This is the central conclusion from our extensive research into profitability and firm size.

Convention has it that large firms gain unfair competitive advantage because they make excessive profits. The data indicate that if large firms are distorting competitive balance, it is not because their profitabilities are excessive, but because they are applying their workforces and their investment initiatives to less advantage than they might.

Convention applauds small businesses because they have a hard time of it, forever scrambling for 'small' expected reward. The data establish that small firms have advantages of their own. If they deserve support, it is because they are using their limited resources effectively to provide jobs and movement in a changing and perilous economic world.

Once the differences that distinguish these competing types of firms are made central, new research goals emerge. Identifying where small firms, and small-firm industries, are doing well and deserve support is a first concern. Finding where large firms, and large-firm industries, are becoming unduly stultified and are in need of an infusion of small-firm vitality is a second. In both cases, the need is to build organizational concepts that identify differential advantage. Our analyses of production advantage and risk advantage are suggestive avenues in
this regard.

Emphasis on management mission and the differences therein provides a natural stepping stone to industrial policy. Particularly helpful here is the concept of group performance so heavily stressed in our analysis. Firms function as parts of wholes — operating on their own, to be sure, but to an important extent operating a part of the size class to which they belong. It is how well the group performs, we would argue, that justifies the existence of its firms. For policy-makers, certainly aggregate performance is critical — determining where each group has advantage and seeing to it that these advantages are properly promoted.

Small business merits attention and support, we would urge, not because it is a poor cousin of big business. It needs attention and support because small business size classes are doing well jobs they are uniquely qualified to do and for which our economy has a unique need.
References


TABLE R1
AFTER-TAX PROFIT-ON-EQUITY FOR VARIOUS INDUSTRY GROUPS IN SELECTED YEARS: SOI-C

<table>
<thead>
<tr>
<th>Year</th>
<th>For Firms With Income</th>
<th>For Firms With Income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without Income (%)</td>
<td>In All Asset Under $5M (%)</td>
</tr>
<tr>
<td>1976</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Corps.</td>
<td>9.0</td>
<td>9.6</td>
</tr>
<tr>
<td>Non. Fin.</td>
<td>10.8</td>
<td>10.8</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>12.8</td>
<td>12.0</td>
</tr>
<tr>
<td>Trade</td>
<td>13.1</td>
<td>12.5</td>
</tr>
<tr>
<td>Wholesale</td>
<td>16.2</td>
<td>15.1</td>
</tr>
<tr>
<td>Retail</td>
<td>9.7</td>
<td>6.5</td>
</tr>
<tr>
<td>1979</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Corps.</td>
<td>10.4</td>
<td>12.8</td>
</tr>
<tr>
<td>Non. Fin.</td>
<td>12.0</td>
<td>14.1</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>14.0</td>
<td>16.6</td>
</tr>
<tr>
<td>Trade</td>
<td>14.9</td>
<td>13.4</td>
</tr>
<tr>
<td>Wholesale</td>
<td>18.6</td>
<td>NA</td>
</tr>
<tr>
<td>Retail</td>
<td>10.5</td>
<td>NA</td>
</tr>
<tr>
<td>1982</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Corps.</td>
<td>4.3</td>
<td>1.0</td>
</tr>
<tr>
<td>Non. Fin.</td>
<td>5.3</td>
<td>0.7</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>6.0</td>
<td>-0.1</td>
</tr>
<tr>
<td>Trade</td>
<td>7.6</td>
<td>4.8</td>
</tr>
<tr>
<td>Wholesale</td>
<td>9.0</td>
<td>NA</td>
</tr>
<tr>
<td>Retail</td>
<td>6.0</td>
<td>NA</td>
</tr>
</tbody>
</table>

Notes: Mining is excluded from composite average values in 1976 and 1979 to avoid distortion due to "oil" profits. As a result of changes in SOI reporting procedures information is not available (NA) from published reports in several categories.