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THE ROLE OF SMALL BUSINESS  
ENTERPRISE IN ECONOMIC DEVELOPMENT

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A STUDY

PREPARED FOR THE USE OF THE  
JOINT ECONOMIC COMMITTEE  
CONGRESS OF THE UNITED STATES



MAY 14, 1981

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(II)

## LETTERS OF TRANSMITTAL

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MAY 7, 1981.

*To the Members of the Joint Economic Committee:*

Transmitted herewith for the use of the members of the Joint Economic Committee and other Members of the Congress is a study entitled "The Role of Small Business Enterprise in Economic Development."

This study was conducted by Drs. Harvey A. Garn and Larry C. Ledebur of the Urban Institute.

This study assesses what is currently known about the status and performance of the small business sector and its contribution to the growth and development of the national economy. The study raises important questions about whether firm size alone should be the criterion for economic development assistance, and about whether particular industries are more appropriate for assistance than others.

The views expressed in this study are those of the authors and do not necessarily reflect the views of the Joint Economic Committee or any of its members.

Sincerely,

HENRY S. REUSS,  
*Chairman, Joint Economic Committee.*

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APRIL 30, 1981.

HON. HENRY S. REUSS,  
*Chairman, Joint Economic Committee,  
Congress of the United States,  
Washington, D.C.*

DEAR MR. CHAIRMAN: Transmitted herewith is a study entitled "The Role of Small Business Enterprise in Economic Development." The study was prepared by Drs. Harvey A. Garn and Larry C. Ledebur of the Urban Institute.

The study analyzes how economic performance varies with firm size, and the immediate and longer term employment potential of different size firms.

The committee is grateful to David Greytak of the Maxwell School, Syracuse University, for his assistance and suggestions in reviewing this study.

Sincerely,

JAMES K. GALBRAITH,  
*Executive Director, Joint Economic Committee.*

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# THE ROLE OF SMALL BUSINESS ENTERPRISE IN ECONOMIC DEVELOPMENT<sup>1</sup>

By Harvey A. Garn and Larry C. Ledebur

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## INTRODUCTION

There is renewed national concern for the welfare and/or plight of the small business sector in the United States. This resurgence of national interest in the contribution of small business enterprise to the economy and wider society can be perhaps attributed primarily to two factors. The first is the recent estimate that "on the average about 60 percent of all jobs in the United States are generated by firms with 20 or fewer employees and about 50 percent of all jobs are created by independent, small entrepreneurs."<sup>2</sup>

The second factor contributing to the timeliness of recent concern for small business is the inescapable fact that small business in America is in trouble.

The focusing of attention on the contribution and welfare of small business has occurred while the national government is considering methods of effectively providing direct financial assistance to firms within the private sector.<sup>3</sup> Formulation of programs and criteria for financial assistance directly to private firms on other than an *ad hoc* basis must address a complex array of questions concerning objectives,<sup>4</sup> tradeoffs among objectives, targeting of industries, and appropriate geographical and size of firm considerations.

However, despite the increasing interest and concern for the small business sector in the U.S. economy, existing knowledge about the role and contribution of smaller enterprises is limited, and review of the literature relating to small business reveals that many of the often asserted tenets about their role and contribution fall more in the realm of speculation and judgment rather than verified fact. One researcher, observing the reemergence of concern for small business in England has stated:<sup>5</sup>

Unfortunately, the renewed interest marches hand in hand with a deplorable absence of facts. In this country our knowledge about small firms has long been abysmal. The structure of this sector, let alone its conduct and performance has remained murky obscure. This is partly a legacy of past disinterest. After all,

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<sup>1</sup> This paper is a revision of "The Renaissance of Concern for Small Business Enterprise in the United States," by Harvey A. Garn and Larry C. Ledebur, Urban Institute Working Paper 1355-1, Feb. 22, 1980.

<sup>2</sup> David Birch, "The Job Generation Process," Cambridge, Mass.: MIT Program on Neighborhood and Regional Change, 1979. Report submitted to the Economic Development Administration, U.S. Department of Commerce.

<sup>3</sup> Direct financial assistance to private sector firms has been the objective of the Small Business Administration and the Office of Minority Business Enterprise. Most recently this objective has been established in the new Business Finance Program of the Economic Development Administration which assumes many of the functions of the proposed national development bank.

<sup>4</sup> For example, employment, wages, productivity, rates of return, leveraging of private investment, etc.

<sup>5</sup> Jonathan Boswell, *The Rise and Decline of Small Firms* (London: George Allen and Unwin, Ltd., 1972), p. 14.

neither governments, academics or public commentators thought it worthwhile to go to much trouble in collecting the facts. But the mystery also reflects certain characteristics of small firms themselves. Structural, legal and statistical factors make them difficult to research. They are removed from such searchlighting as the capital market can provide; their private legal status has, until very recently, exempted most of them from the obligation of filing their annual accounts; and their multiplicity and dispersion make them difficult to get at from the point of view of official and statistical inquiries. To cap it all, the psychology of the small businessman, his independence and individualism, have often appeared to create an allergy, or even downright resistance, to the scrutines of public interest or research.

While this statement refers to Great Britain, it is apropos to the United States as well as other western industrialized countries. A cross-national review of existing information on small business performance concluded that "the difficulties of obtaining and analyzing data on business formation and closures are not confined to the U.K. and there are, in fact, very few national comprehensive analyses on this subject in any country."<sup>6</sup> The head of the Small Business Administration, A. Vernon Weaver, confirming the dearth of data on small business enterprise in the United States, has stated, "One thing we have to do is find out what our statistics are. And the unfortunate fact is that nobody really knows what they are. . . ."<sup>7</sup>

The murkiness surrounding the economic role and contribution of the small business sector, due primarily to the inadequacies of existing data precluding more analytic scrutiny,<sup>8</sup> persists despite periodic efforts at illumination.<sup>9</sup> As a consequence, much which purports to be fact about small business is surrounded by uncertainty and resistance to analytical documentation.

In the context of the current reattention to the performance and plight of small business enterprise, and the possibility of the formulation of further public policies of direct financial assistance to firms using some criterion of enterprise size, it is appropriate to readdress the question of what is actually known about the status and performance of the small business sector and its contribution to the growth and development of the national economy of the United States. Inevitably, such a reassessment will identify research needed to penetrate the murkiness surrounding the small business issue, as well as those important to the formulation of policies for direct financial assistance to firms.

<sup>6</sup> *Small Firms in Cities: A Review of Recent Research*, prepared by Economists Advisory Group, Ltd., for Shell U.K., Ltd., 1979.

<sup>7</sup> "Evaluating the SBA: Its Programs, Problems and Future, An Interview with A. Vernon Weaver," *Harvard Business Review*, March-April 1979, p. 184.

<sup>8</sup> The Small Business Administration is undertaking the establishment of a small business national data base. This project is being undertaken through an interagency, Small Business Data Committee, chaired by SBA. One component of the charge to this Committee is to establish common definitions of business size categories for use in the collection and tabulation of statistical data.

<sup>9</sup> National conferences on small business were held in 1938 and 1958 as well as that of 1980. In addition, President Eisenhower established a Cabinet Committee on Small Business in May 1956 under the then Chairman of the Council of Economic Advisers, Arthur Burns.

## ECONOMIC DEVELOPMENT OBJECTIVES: TRADEOFFS WITH FIRM SIZE

Support for the thesis that smaller businesses make a unique contribution relative to enterprises of greater size derives from a variety of propositions. The range and diversity of these propositions preclude their systematic assessment in a single study. The present study focuses on a single rationale for assistance to the small business sector—that of the role of small scale enterprise in the growth and development of the U.S. economy and its composite local economies. The impetus for this analysis grows out of the estimate that “60 percent of all jobs are generated by firms with 20 or fewer employees” and the subsequent attention to this phenomenon in public policy considerations.<sup>1</sup> The objective of this analysis is the evaluation of the potential economic development implications of policies targeted to the small business sector and the possible tradeoffs among objectives which might result from these actions.

Studies of small business inevitably address the question of what is meant by small. Numerous studies argue about the inadequacies of scales measured on a single dimension such as assets or employment. Others point to the pitfalls of definitions of scale exclusive of considerations of industrial structures in which firms operate, and managerial and related characteristics of firms and industries—the primary pitfall being definitions which lead to inappropriate policy measures and applications.<sup>2</sup>

Invariably, however, researchers are confined to working with size definitions which are dictated by the somewhat arbitrary delineations used in the collection of federal statistics. Two criteria are primarily available for firm size taxonomies—asset size or employment size. Given available data configurations, it is not even possible to cross-classify firms by asset and employment size, i.e., to identify value of capital assets of firms classified by employment size. This represents a critical deficiency in existing sources of data on small business which constrains analysis of small business performance.

Because of these inherent data limitations, this study employs the most common convention of measuring enterprise size by number of employees. While constricting, this convention permits identification of potential economic development tradeoffs by establishment size, thus serving the limited objectives of this study.

### ECONOMIC DEVELOPMENT CRITERIA

In order to implement a program of direct assistance to firms through the public sector, a set of criteria must be identified which can be employed to select appropriate projects from the array of

<sup>1</sup> David Birch, *op. cit.*

<sup>2</sup> See John Deeks, *The Small Firm Owner-Manager: Entrepreneurial Behavior and Management Practice*, Praeger Publishers, New York, 1976, ch. 4, “The Small Firm in an Advanced Industrial Society.”

competing alternatives. These selection criteria are necessary even if the decision has been made to target assistance to specific industrial sectors (e.g., manufacturing) or firms meeting particular standards such as asset or employment size.

The set of screening criteria appropriate for any given program will depend upon the objectives of the policy it is designed to implement. For example, if the objective of a program is the economic development of national and local economies, the set of screening criteria for project selection should be related to potential economic development outcomes or impacts of projects. Designation of the appropriate criteria set for economic development projects is difficult both because development is a multi-faceted process which cannot be measured along a single dimension (e.g., employment generation) and the very real possibility of significant tradeoffs among development outcomes. These tradeoffs might arise, for example, in a situation where two potential projects were competing for a given bundle of assistance. One firm might offer the prospects of greater initial employment gains, but lower wages and value added per employee. This would typically be the case with firms which are less capital intensive. The alternative project might result in smaller employment gains but higher wages and value added per employed worker. The tradeoffs between the two projects are greater employment gains versus higher wages and productivity as measured by value added. It is by no means clear, *a priori*, which project would have the greatest economic development payoff in the local economy in which the firms would be located.

The difficulty of project selection is compounded by the fact that "indirect" outcomes must be considered in addition to those more "direct" impacts suggested above.<sup>3</sup> These indirect effects consist of (a) backward linkages to other firms through demand for their outputs in the assisted firms' production processes; (b) forward linkages to households through the supply of goods and services which enter the final consumption sector and to other firms through the supply of needed intermediate goods; (c) fiscal linkages through payment of taxes and demand for public services or other public expenditures.<sup>4</sup> The development impacts of a firm on the community in which it operates will vary, therefore, not only with the characteristics of the firm itself, but also with the characteristics of the local economy and its constituent workforce, firms and households.

In this paper, only direct development outcomes and potential tradeoffs among these outcomes, are considered. The question addressed is that of what scale of firm operation has the greatest likelihood of maximizing the positive development impacts in a local community. As will be demonstrated, the tradeoffs among development objectives which occur over ranges of firm size tend to be significant and vary from industry to industry, thus, perhaps, drawing into question the practicality of stringent firm size criterion in programs with the primary objective of economic development of subnational areas.

<sup>3</sup> The multiplier effect of the income generated by the firm being spent and respent in the local economies is considered a direct outcome.

<sup>4</sup> These are discussed in Harvey A. Garn, "The Estimation of Development Impacts," Urban Institute, February 1980, No. 1395-1.



The selection of any particular set of direct development impact indicators is somewhat arbitrary and, inevitably, the availability of data constrains the selection process. Primary indicators are used in this examination of industry performance across size of firm classifications.

1. *Employment Generation.*—Data on jobs generated over time by firms classified by employment size are not available from conventional data sources. Thus, we start from the provisional assumption that smaller firms are the primary generators of new employment, and ask the question, "what are the development tradeoffs between the employment gains associated with smaller firms and those of greater size?"<sup>5</sup> The rationale for this assumption is the observation that 85 percent of the employment gains in manufacturing between 1969 and 1976 were in firms with 20 or fewer employees (Table 1). There is a great deal of regional variation in these figures. In the hard hit Northeast, all of the employment gains occurred in smaller firms. In the three remaining regions, the percentage of new jobs generated by smaller firms was less than the national average. In the growing South, very small firms and very large firms accounted for approximately the same proportion of new employment.

TABLE 1.—PERCENT DISTRIBUTION OF MANUFACTURING EMPLOYMENT GAINS AND LOSSES<sup>1</sup> BY FIRM SIZE, 1969-76

Region	Employment size class				
	0 to 20	21 to 50	51 to 100	101 to 500	500 plus
United States.....	85.4	14.6	15.2(-)	32.2(-)	62.5(-)
Northeast.....	100.0	5.0(-)	11.3(-)	28.0(-)	55.6(-)
North central.....	83.1	16.9	7(-)	28.2(-)	71.1(-)
South.....	39.0	13.9	5.1	1.6	40.5
West.....	59.7	17.7	10.0	12.6	100.0(-)

<sup>1</sup> Distribution of losses signified by the symbol (-).

Source: Developed from data in David Birch, "The Job Generation Process", op. cit.

<sup>5</sup> Data produced by the Census Bureau and the Bureau of Economic Analysis identify number of firms and employees by employment size of firms. It is not possible to identify the number of firms in a size category which represent new starts and closures of firms from these data. Nor can firms be followed as they change employment size categories over time. This precludes the analysis of employment generation of firms over their life cycles.

The data used by David Birch was drawn from the Dun & Bradstreet Market Indicators File, a proprietary data set not accessible to most researchers. In the absence of other data with comparable flexibility, it is not possible to verify or refute the job generation findings based on Dun & Bradstreet data. Therefore, this study provisionally accepts these conclusions. However, findings based on the Dun & Bradstreet data must be interpreted with caution. Alan Olson of the Economic Research Division of EDA in a memorandum, has argued:

"The Birch study is most often criticized for using the Dun & Bradstreet (D. & B.) file of business establishments as the basic data source. The privately collected file has been found to underreport the number of establishments and total employment when compared with U.S. Government statistics. Statistics for New England, for example, show that D. & B. had 39.9 percent fewer establishments than the *Census County Business Pattern* and 39.4 percent fewer employees than the decennial census. A 39 percent underreporting would not be a problem if it were consistent across types and classes of firms, but this does not appear to be the case. Several analysts, including Birch, have stated that D. & B. reporting of small firms is probably more complete than its reporting of larger ones.

"There is also some question as to whether Birch's methodology biases the result in favor of small firms. His method consists of classifying firms by size in initial year (1969) without revising those classifications as firms grow. (Firms added to the data set after 1969 are classified as of the year they were added). Therefore, many small firms could have grown to become medium or even large firms before the terminal data year (1976). Birch's result would probably be different if the firms were reclassified by size in each year of the study so that only small firms were credited to small firm employment growth.

"There is also some evidence that the time period chosen for this study is nonrepresentative. Data from *County Business Patterns* show that 1969 was a relatively low point for small business: The small business (0-19 employees) share of total manufacturing employment dropped from 7.2 percent in 1964 to 6.0 percent in 1969 before rising to 7.0 percent in 1975. The same pattern of decline in the sixties followed by growth in the seventies occurred in other industry divisions, including construction, transportation, and wholesale trade. Therefore, most of the growth in small firms during the 1970's only reestablished the position this class of firm had held in the early 1960's."

In addition to this regional variation in firm size performance, variation among manufacturing industries would be expected. A much richer level of regional and industry detail is required to test the assumption that small manufacturing firms generate the most new employment opportunities in all places and all industries.

2. *Value Added per Employee.*—The average annual rate of increase in productivity in the U.S. economy has fallen below that of Japan, Germany, France, Canada, and the United Kingdom over the last decade.<sup>6</sup> Thus, productivity, a critical factor both in maintaining international competitiveness and moderating inflationary pressures, is a major national development consideration. Value added per employee is used as a measure of productivity for examining the performance of manufacturing firms of different employment size.

3. *Change in Value Added per Employee.*—In addition to high productivity firms, an appropriate economic development focus might also be enterprises generating rapid productivity increases over time. Change in value added per employee between 1967 and 1972 is used to compare rates of productivity increase by manufacturing firms by employment size.

4. *Wages per Employee.*—The wage levels paid by firms is a development consideration for local economies. Communities will be concerned not only with the generation of jobs, but also the incomes which they bring into the local economy, the tax capacity which they create to pay for necessary services and the linkages of these incomes to other jobs.

5. *Change in Wages per Employee.*—In turn, the rate of increase in wage levels as well as absolute wage levels are a significant development factor. Communities will seek firms with the potential for growth and enhancement of income flows.

6. *New Capital Expenditures per Employee.*—The capacity of firms and industries to generate new investments in their operations is important to both the national and local economies. Capital expenditures per employee in 1972 are used as a measure of the investment as an economic development impact.

\* See the following table :

ANNUAL GROWTH IN GNP PER EMPLOYED WORKER IN MAJOR INDUSTRIAL COUNTRIES, 1963-79  
[Percent change per year]

Country	1963 to 1973	1973 to 1979 <sup>1</sup>
United States.....	1.9	0.4
Japan.....	8.7	3.1
Germany.....	4.6	3.2
France.....	4.6	2.7
United Kingdom.....	3.0	.3
Italy.....	5.4	1.4
Canada.....	2.4	.6

<sup>1</sup> Estimate.

Source: Organization for Economic Cooperation and Development. Reprinted in *Economic Report of the President, January 1980*, (Washington, D.C., U.S. Government Printing Office, 1980), p. 85.

It should be reemphasized that while these six performance measures are commonly used indicators, they do not necessarily constitute the most appropriate set for the nation or any particular local economy. Selection of a set of criteria for evaluating development outcomes ultimately should be based on the circumstances, needs and priorities of places. However, the criteria identified above serve to illustrate the tradeoffs of benefits deriving from firms of varying size.

#### ECONOMIC PERFORMANCE OF FIRMS: TRADEOFFS WITH ENTERPRISE SIZE

The economic performance of small firms (1-99 employees) is examined in Table 2. The performance data from which the rankings presented in this table are derived, as well as greater detail by firm size, are presented in Appendix A. Columns 1-5 of Table 2 rank the performance of smaller firms in each industry relative to four size classes of larger firms in their industry. Column 6 is an average of the rankings for smaller firms across the five criteria variables.

In columns 7-12 the issue of firm performance is approached in a somewhat different manner. Here small firms in an industry are ranked relative to small firms in other manufacturing industries on each of the five criteria rather than against larger firms in their own industry. Column 12 presents averages of these rankings across the five performance criteria.

In this form the data permit identification of two alternative procedural rules of thumb which, in turn, serve to illustrate some paradoxical dilemmas of developing industrial policies where firm size is an initial screening device for eligibility. Given a decision that assistance should be targeted to smaller firms—

*Procedural Rule 1.*—Assistance should be targeted to those industries in which small firms exhibit high performance relative to larger firms in their industry.

The objective of this screening procedure is to minimize the tradeoffs or opportunity costs within an industry which results through targeting to small firms.

*Procedural Rule 2.*—Assistance should be targeted to those industries in which small firms exhibit high performance relative to firms of equivalent size in other industries.

The objective of this decision rule is to minimize the tradeoffs or opportunity costs among industries in targeting to small business enterprises.

Given the assumption that assistance will be directed to small firms, the most propitious outcome of application of these procedural rules for project selection would be that they identified common sets of industries, thus minimizing tradeoffs or opportunity costs both within and across industries. Unfortunately, this clearly is not the case as indicated by the data of Table 2.

Using the unweighted average of criteria rankings, a procedure which gives equal weight to each of the five criteria, the five high performance industries identified by each of the two procedural rules are:

TABLE 2.—RANKING ON CRITERIA VARIABLES FOR SMALL FIRMS (1 TO 99 EMPLOYEES)

	Rank in industry <sup>1</sup>					Rank in size class <sup>2</sup>					Average rank for all criteria in the industry	
	Value added per employee, 1972 (thousands)	Wages per employee, 1972	New capital expenditures per employee, 1972 (thousands)	Δ in value added per employee, 1967-72 (percent)	Change in wages per employee, 1967-72 (percent)	Average rank for all criteria in the industry	Value added per employee, 1972	Wages per employee, 1972	New capital expenditures per employee, 1972 (thousands)	Δ in value added per employee, 1967-72 (percent)		Change in wages
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
All industries.....	\$5.0	\$5.0	\$5.0	4.0	5.0	4.8						
20—Food.....	5.0	5.0	2.0	2.0	3.0	3.4	3	\$12	\$7	2	4	5.6
21—Tobacco.....	5.0	4.0	5.0	4.0	4.0	4.4	17	19	16	20	16	17.6
22—Textiles.....	1.0	2.0	2.0	2.0	5.0	2.4	16	17	8	7	9	11.4
23—Apparel.....	2.0	2.0	3.0	5.0	5.0	3.4	20	20	20	19	20	19.8
24—Lumber and wood.....	5.0	5.0	4.0	5.0	3.0	4.4	15	16	9	1	1	8.4
25—Furniture.....	<sup>3</sup> 4.0	<sup>3</sup> 3.0	<sup>3</sup> 4.0	<sup>3</sup> 2.0	<sup>3</sup> 4.0	3.4	18	15	17	13	15	15.6
26—Paper.....	5.0	5.0	4.0	1.0	5.0	4.0	9	9	6	5	6	7.0
27—Printing and publishing.....	5.0	5.0	4.0	4.0	5.0	4.6	10	7	12	10	11	10.0
28—Chemicals.....	<sup>3</sup> 4.0	<sup>3</sup> 4.0	<sup>3</sup> 4.0	<sup>3</sup> 3.0	<sup>3</sup> 4.0	3.8	2	3	2	4	5	3.2
29—Petroleum.....	5.0	5.0	5.0	1.0	5.0	4.2	1	1	1	3	3	1.8
30—Rubber and plastics.....	5.0	5.0	1.0	5.0	5.0	4.2	11	13	4	11	14	10.6
31—Leather.....	4.0	3.0	2.0	5.0	4.0	3.6	19	18	19	15	13	16.8
32—Stone, clay and glass.....	5.0	5.0	3.0	4.0	3.0	4.0	4	6	5	8	2	5.0
33—Primary metals.....	4.0	5.0	2.0	5.0	4.0	4.0	5	8	3	18	17	10.2
34—Fabricated metals.....	5.0	5.0	1.0	3.0	5.0	3.8	8	4	11	12	12	9.4
35—Nonelectrical machinery.....	5.0	5.0	3.0	5.0	5.0	4.6	6	2	13	16	18	11.0
36—Electrical machinery.....	5.0	4.0	2.0	5.0	5.0	4.2	12	11	14	14	10	12.2
37—Transportation.....	5.0	5.0	2.0	5.0	5.0	4.4	13	10	10	17	19	13.8
38—Instruments.....	5.0	5.0	4.0	3.0	2.0	3.8	7	5	15	9	7	8.6
39—Miscellaneous.....	<sup>3</sup> 4.0	<sup>3</sup> 2.0	<sup>3</sup> 4.0	<sup>3</sup> 3.0	<sup>3</sup> 2.0	3.0	14	14	18	6	8	12.0
Average rank for all industries.....	4.4	4.2	3.1	3.6	4.2							

<sup>1</sup> Rank of small firms' performance relative to 4 other size classes of firms: (1) 100 to 249, (2) 250 to 499, (3) 500 to 999 and (4) >1,000 employees within the industry. Worst-off equals 5, best-off equals 1.

<sup>2</sup> Rank of industry performance relative to small firms' performance in the other industry breaks.

Worst-off equals 20, best-off equals 1.

<sup>3</sup> Data not available for 1 of the size-classes because of disclosure requirements; therefore, ranks range from 1 to 4 with worst-off equal to 4.

Procedural rule 1		Procedural rule 2	
Industry	Average	Industry	Average
1. Textiles.....	2.4	1. Petroleum.....	1.8
2. Apparel.....	3.4	2. Chemicals.....	3.2
3. Furniture.....	3.4	3. Stone, clay and glass.....	5.0
4. Food.....	3.4	4. Food.....	5.6
5. Leather.....	3.6	5. Paper.....	7.0

The only industry which falls within the top five on performance by both rules is food. The two industries in which small firms outperform firms in the same size category in other industries are petroleum and chemicals. These industries are highly capital intensive, ranking 1 and 3 respectively among the 22-digit manufacturing industries in the fewest employees per \$1 million of capital stock in 1972.<sup>7</sup> In contrast, four of the five industries (the exception is food) identified by the first procedural rule are relatively labor intensive, ranking among the lowest five two-digit manufacturing industries.<sup>8</sup>

The programmatic dilemma which arises with these observations is as follows. In general, if assistance is directed toward small firms in industries where they outperform firms of greater size in the same industry, this procedure tends to direct assistance away from those industries in which small firms have the highest performance compared to small firms in other industries. On the other hand, if assistance is directed towards industries whose small firms outperform small firms in other industries, larger scales of firm operation always tend to have better performance.

Thus, rather than identifying a common set of industries, the two procedural rules for selection identify two largely discreet sets of industries in which the tradeoffs in outcomes tend to be sharp and significant. In a general way, it is possible to characterize these tradeoffs as products of the contrasting labor/capital ratios of the two industry sets.

<sup>7</sup> See the following table:

Industry:	Employees per \$1 million capital stock
Food products.....	35
Tobacco products.....	11
Textiles.....	62
Apparel.....	93
Lumber and wood.....	38
Furniture and fixtures.....	104
Paper products.....	34
Printing and publishing.....	54
Chemicals.....	19
Petroleum refining.....	5
Rubber and plastics.....	51
Leather goods.....	86
Stone, clay and glass.....	42
Primary metals.....	25
Fabricated metals.....	52
Non-electrical machinery.....	33
Electrical machinery.....	35
Transportation equipment.....	22
Instruments.....	43
Miscellaneous.....	68
Average.....	45.6
Standard deviation.....	26.5

Source: Harvey A. Garn, The Urban Institute, unpublished tabulations.

<sup>8</sup> Excluding the industry category "Miscellaneous."

From the data of Table 2 general observations on the tradeoffs resulting from targeting to small firms can be made. Two appear particularly germane.

1. *Small firms perform poorly on the criterion of value added per employee, our measure of productivity.<sup>9</sup> It is probable, therefore, that there exists a sharp tradeoff between the new employment generated by smaller firms and potential productivity gains which would occur with larger firm scale.*

In some industries small firms perform better on the criteria of change in value added per employee between 1967 and 1972,<sup>10</sup> but overall performance on this measure is inferior to that of larger firms.

2. *Small business enterprises tend to perform less well on the criterion of wage per employee than do larger firms. Small firms have lower average wages, creating a tradeoff between employment generation and wage levels.<sup>11</sup>*

The lower average wage level of smaller firms is not necessarily undesirable in an economic development context. An important role of small firms in the economy is the provision of entry level jobs to less skilled workers. A more critical issue is whether these jobs serve as stepping stones to higher wage employment opportunities or are "dead end" without opportunities for job progression.

#### BENEFIT/COST RATIOS OF DEVELOPMENT OUTCOMES

An alternative approach to the selection of potential projects for assistance, and examining potential tradeoffs by industry and firm size is to use the maximization of benefits per unit of capital cost as the initial screening device. This rule of thumb is a reasonable approach where the public sector is seeking to maximize the development impacts on local economies of assistance funds for capital investment rather than operating costs of firms.

The rankings of small firms relative to four categories of larger firms on the basis of these benefit cost ratios are presented in Table 3. Because of the nonexistence of data on capital assets by firm size, it was necessary to calculate these ratios of benefits to capital costs using a proxy for asset value. For this purpose, new capital expenditures by firm size by industry were used. To test the legitimacy of this procedure, capital invested per employee in 1972 and new capital expenditures in 1972 were ranked by industries. The rank order correlation between the two sets of rankings was approximately 0.90, suggesting that the proxy selected is reasonable.<sup>12</sup> However, the ratios resulting from these calculations have validity only for comparative purposes, e.g., across industries or among firms of differing sizes within an industry. The magnitude of the ratios themselves do not constitute approximations of actual benefits/capital cost ratios.

<sup>9</sup> With the noted exception of textiles.

<sup>10</sup> The data on value added per worker and average wages are presented in Appendix A. For all manufacturing the difference in value added per worker between the smallest firms (1-19 employees) and the largest (greater than 1,000 employees) is \$6.61. This per worker differential is not trivial, as David Birch has argued ("Researchers Challenge 'Small Is Best' Claim," *Inc Magazine*, October 1980, p. 32). When aggregated for all workers these productivity differentials among firms of differing size become highly significant and represent sharp tradeoffs with employment outcomes.

<sup>11</sup> That wage levels vary with scale of business enterprise is not a new observation. This relationship results from the higher productivity of large firms, the characteristics of their workforce such as education and occupational skills as well as a variety of institutional factors (e.g., unionization).

<sup>12</sup> It should also be pointed out that the rank correlation between capital invested per employee and new investment per employee does not necessarily hold across firm size categories. This points again to the importance and need for data on capital assets cross-tabulated by firm size taxonomies.

TABLE 3.—RANKING ON CRITERIA VARIABLES (PER DOLLAR OF NEW CAPITAL EXPENDITURE) FOR SMALL FIRMS (1-99 EMPLOYEES)

	Rank in industry <sup>1</sup>					Average rank for all criteria in the industry (6)	Rank in size class <sup>2</sup>					Average rank on all criteria in size class (12)
	Value added	Wages	Production workers	Δ in VA	Δ in wages		Value added	Wages	Production workers	Δ in VA	Δ in wages	
	(1)	(2)	(3)	(4)	(5)		(7)	(8)	(9)	(10)	(11)	
All industries.....	4	5	1	1	2	2.6						
20—Food.....	4	5	4	3	3	3.8	13	15	17	13	14	14.4
21—Tobacco.....	1	1	1	1	1	1.0	7	11	7	5	4	6.8
22—Textiles.....	2	4	4	3	4	3.4	18	16	15	19	19	17.4
23—Apparel.....	3	4	3	5	5	4.0	3	3	2	20	20	9.6
24—Lumber and wood.....	3	3	2	4	2	2.8	16	14	13	16	17	15.2
25—Furniture.....	1	1	2	3	3	1.8	6	6	5	17	16	10.0
26—Paper.....	3	3	2	1	1	2.0	17	17	16	3	3	11.2
27—Printing and publishing.....	5	4	1	4	4	3.6	11	10	12	11	12	11.2
28—Chemicals.....	1	3	2	1	1	2.2	15	20	20	4	5	12.8
29—Petroleum.....	1	1	1	1	1	1.0	1	2	4	1	1	1.8
30—Rubber and plastics.....	5	5	5	5	5	5.0	20	19	19	18	18	18.8
31—Leather.....	5	5	4	2	2	8.6	4	5	3	12	11	6.8
32—Stone, clay and glass.....	1	1	1	1	1	1.0	2	1	1	2	2	7.6
33—Primary metals.....	5	5	4	1	1	8.2	19	18	18	6	6	13.4
34—Fabricated metals.....	5	5	4	5	5	4.8	10	9	8	10	10	9.4
35—Nonelectrical machinery.....	3	3	1	1	5	2.6	9	7	9	7	7	7.8
36—Electrical machinery.....	4	4	4	4	4	4.0	12	12	10	8	8	10.0
37—Transportation.....	5	5	4	3	3	4.0	14	13	14	9	9	11.8
38—Instruments.....	4	2	2	4	3	8.0	8	8	11	14	13	10.8
39—Miscellaneous.....	1	1	1	3	3	1.8	5	5	6	15	15	9.2
Average of small firms.....	3.25	3.25	2.55	3.30	3.10							

<sup>1</sup> Rank of small firm performance relative to 4 other size classes of firms: (1) 100 to 249, (2) 250 to 499, (3) 500 to 999 and (4) ≥ 1,000 employees within the industry. Worst-off equals 5, best-off equals 1.

<sup>2</sup> Rank of industry performance relative to small firm performance in the other industry breaks. Worst-off equals 20, best-off equals 1.

<sup>3</sup> Data not available for 1 of the size classes because of disclosure requirements; therefore ranks range from 1 to 4, with worst-off equal to 4.

The procedure selection rules previously examined can again be used in selecting high performance industries where performance is measured by the benefit per unit of capital cost ratios. This approach increases the number of industries which fall out under both procedural selection rules—petroleum, stone, clay and glass and tobacco. Assistance to small firms in these industries would tend to result in high benefit per unit of capital expenditure ratio, both relative to larger firms in their industries and smaller firms in other industries, thus minimizing potential tradeoffs or opportunity costs with other industries or scale of firm operation.

Procedural rule 1		Procedural rule 2	
Industry	Average rank	Industry	Average rank
1. Petroleum.....	1.0	1. Stone, clay and glass.....	1.6
2. Stone, clay and glass.....	1.0	2. Petroleum.....	1.8
3. Tobacco.....	1.0	3. Leather.....	6.8
4. Furniture.....	1.8	4. Tobacco.....	6.8
5. Paper.....	2.0	5. Nonelectrical machinery.....	7.8

While the methodology suggested above is useful in identifying industries which might be appropriate, it does not dispose of the dilemma of major tradeoffs among development outcomes which arise when programs are targeted to small businesses in most industries.



## EMPLOYMENT POTENTIAL BY FIRM SIZE

This study has provisionally accepted the findings that small firms in the aggregate generate the majority of net new jobs in the U.S. economy (see text page 5, and footnote 5). Two additional considerations should be introduced in evaluating the significance of this observation based on the Dun & Bradstreet data: (1) Do small firms create the most new jobs relative to their representation among all firms? and (2) what is the employment potential of small firms compared to those of greater scale over time? Both of these questions are highly germane in assessing the observation that small firms generate 66 percent of new employment.

### EMPLOYMENT GENERATION PER FIRM

According to the Dun & Bradstreet data, small firms with 0-20 employees constituted 91.9 percent of all firms in the national economy and accounted for 95.1 percent of firm closures, 92.4 percent of employment expansions, 76.8 percent of employment contractions and 66 percent of new jobs. The average employment generated per firm in the five firm size categories used by Birch are presented in Table 4. The ratio of new jobs per firm increases with firm size. As would be expected, the smallest firms generate the fewest jobs per firm and the largest the greatest number of jobs per firm. Thus, the employment generation impact of smaller firms is a consequence of their aggregate numbers rather than a consequence of employment scale.

TABLE 4.—AVERAGE EMPLOYMENT GENERATION BY FIRM SIZE

	Firm size				
	0 to 20	21 to 50	51 to 100	101 to 500	500 plus
Percent of firms.....	91.9	5.4	1.6	1.0	0.1
Percent of new jobs.....	66.0	11.2	4.3	5.2	13.3
Ratio new jobs/firm.....	0.718	2.07	2.69	5.2	133.0

One implication of this observation is that the appropriate economic development policy issue is the aggregate size of the small firm sector rather than the nature of particular small firms. This suggests that the appropriate policy focus may be the generation of new small firms rather than attempts to preserve the existing firm stock with the attendant risk of intercepting the processes of adaptation within the

small firm sector. This does not argue, however, that public policy should not be concerned with the range of tax, paperwork, regulatory and credit disincentives which adversely affect small business.

### IMMEDIATE AND LONGER TERM EMPLOYMENT POTENTIAL

An important further aspect of the relative economic development potential of different size firms is the degree to which the jobs created are likely to continue over time. Job generation is only part of the story. Small firms (particularly in the 0-20 employee size class) have considerably higher probabilities of closing than larger firms. The impact of these closure probabilities on firms of different sizes is shown in Table 5.

TABLE 5.—SURVIVAL PROBABILITIES AND INDICES (1969-76)  
[0-20=1.00]

Initial size	Surviving past 4 yr		Surviving past 9 yr		Continuing to survive 10+ yr	
	Survival probability (percent)	Index	Survival probability (percent)	Index	Survival probability (percent)	Index
0 to 20.....	37.4	1.00	17.3	1.00	8.6	1.0
21 to 50.....	53.6	1.44	35.2	2.03	26.2	3.0
51 to 100.....	55.7	1.49	36.4	2.10	27.4	3.1
101 to 500.....	56.4	1.51	36.8	2.13	28.3	3.2
501 plus.....	67.7	1.82	42.5	2.46	35.7	4.1

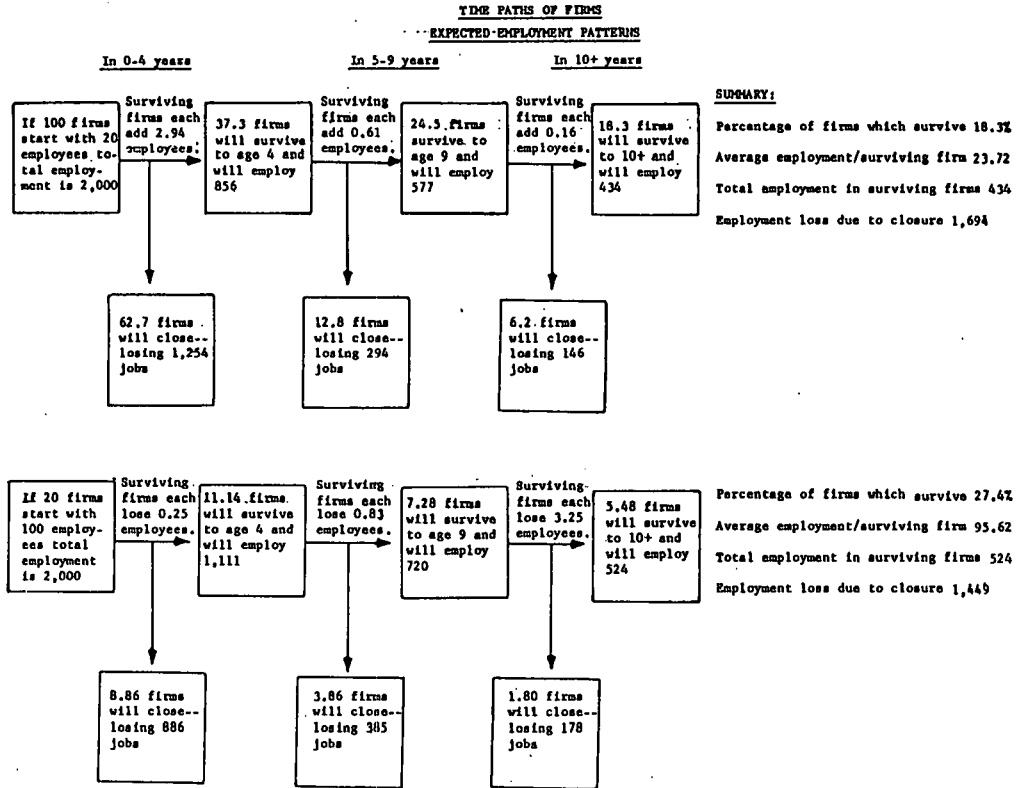
Source: Calculated from data in table 4-6 in David L. Birch, "The Job Generation Process."

Table 5 highlights two important features of small firms relative to larger firms. First, their survival probability for each age group is considerably smaller than for larger firms.<sup>1</sup> Second, the difference in expected survival rates favors larger firms relatively more over time. The very largest firms have a probability of surviving past 4 years that is over 80 percent higher than for firms with fewer than 20 employees. The probability of the largest firms surviving past 10 years, however, is more than 300 percent higher than for the smallest firms. The table also shows the fairly dramatic improvement in survival probability once a firm employs more than 20 people. An obvious explanation for this phenomena, which is offered also by David Birch, is that larger firms have a greater ability to weather reductions in demand or other adverse effects with temporary layoffs or longer term reductions in work force without going out of business altogether than do smaller firms.

These considerations suggest the importance of estimating the employment which might be expected in firms of different sizes which do survive. The significance of the time paths of firms of different sizes is illustrated in Figure 1.

<sup>1</sup> The survival probability of a firm surviving beyond 4 years is equal to  $(1 - \text{percent of deaths})$ . Thus, the chance of a 0-20 size firm entering the 5-9 period =  $(1 - .627) = 0.373$ . Of the 37.3 percent of such firms which enter the 5-9 year period, 53.7 percent die. The probability of surviving past 9 years is, therefore  $(1 - 0.537) 37.3 = 17.3$ . The other probabilities in the table are calculated in the same way.

# FIGURE 1



Source: Calculated from data in Table 4-6, The Job Generation Process, David Birch, p.37.

This chart shows that (for the 1969-76 period) firms initially employing 100 people have a significantly higher probability of surviving than firms which initially employ 20 people (27.4 percent versus 18.3 percent). Each of the smaller firms which survive would be expected to have expanded their employment by about four employees, while the larger firms would have lost slightly more than four employees. The key differences are in the relative employment loss due to closures and total employment in surviving firms. These estimates show that expected closures in small firms would result in the loss of about 250 more jobs out of an assumed initial employment of 2,000 than in larger firms initially employing the same number. Furthermore, the total employment in surviving firms is estimated to be considerably greater for the larger firms even though each of them would experience some work force reduction over this time period.

The relative ability to generate employment of different size firms over time varies both regionally and by industry. Appendix B shows time paths of firms for manufacturing, trade and services in the Northeast and the West in order to illustrate this variability. Table 6 summarizes significant aspects of this data.

TABLE 6.—REGIONAL AND INDUSTRY PERFORMANCE OF FIRMS OF DIFFERENT SIZES (INITIAL EMPLOYMENT 20 AND 100) OVER 10+YR

Region	Percent of firms surviving		Percent of employment surviving		Relative permanent employment potential <sup>1</sup>
	20 employees	100 employees	20 employees	100 employees	
<b>Northeast:</b>					
Manufacturing.....	19.3	27.6	21.7	25.8	1.08
Trade.....	18.4	26.5	23.2	23.6	1.02
Services.....	16.6	20.5	17.4	18.3	1.05
<b>West:</b>					
Manufacturing.....	17.6	27.1	24.4	29.7	1.22
Trade.....	14.5	25.0	17.8	24.7	1.39
Services.....	15.3	19.0	17.2	17.5	1.02

<sup>1</sup> Relative permanent employment potential is the ratio of surviving employment in firms initially employing 100 to firms initially employing 20 per initial employee.

In all cases, larger firms have a greater percent which survive and a higher percent of initial employment which survives than do the firms which start with fewer employees. Generally, a higher proportion of both size classes in manufacturing firms and employment survived than for trade and services, attesting to the greater volatility of these latter two sectors. The only exception to this generalization is the percent of employment surviving in small trade firms in the Northeast.

The final column of Table 6, "Relative permanent employment potential," should be interpreted as the number of permanent employees (jobs lasting for 10+ years) in firms which originally employ 100 relative to each permanent employee in firms which originally employ twenty. The relative advantage of larger firms on the criterion of permanency of jobs is shown by values greater than one in this column. Particularly striking is the strong relative advantage of larger firms in manufacturing and trade in the West (1.22 and 1.39, respectively). This relative advantage is especially significant because it is known that the West has experienced a rapid expansion in employment in small firms in this same time period.<sup>2</sup> Thus, a climate

<sup>2</sup> "Manufacturing in a Changing Industrial Environment," by Harvey A. Garn, Larry C. Ledebur, and Jim Miller, unpublished.

which is apparently conducive to small firms does not appear to eliminate the greater permanent employment potential in larger firms; rather, it may enhance it.

The information in this section suggests that it probably would be unwise to adopt an exclusive strategy of supporting only small or large firms with economic development incentives. Over any given time period, most new jobs are likely to be created in small firms. The magnitude of the advantage of small firms in this regard is probably sensitive to the national cycle. Furthermore, it will most likely continue to be the case that small firms will continue to experience a higher incidence of closure than larger firms. To the extent, therefore, that permanency of jobs is considered an important feature of a local employment base and important to the future income prospects of employees initially hired, larger firms are preferable.

## CONCLUSIONS

There is a resurgence of interest in the role of the small business sector in the national economy and the mosaic of local economies of which it is composed. Attendant with this renewed interest must be the recognition that there is a serious and persistent lack of information on the performance of small business enterprise and the contribution of this sector to national and local economic development objectives. This lack of knowledge is particularly critical as programs of direct public sector assistance to industries, firms and the issue of the appropriate scale of business enterprise are considered.

The research of David Birch on the dynamics of job generation represents a useful and necessary step in the process of analytically evaluating the performance of small business in the national economy and in its constituent local economies. One consequence of this work has been to focus attention on the employment contribution of smaller firms. Employment is but one measure of the outcome or impacts of the development process. No less important are the productivity of firms, the wage levels of employees, and the permanency or stability of the employment generated by particular activities. Communities will be concerned not only with new employment, but also with the income flows generated by wages and other expenditures of the firm, and the possibilities of long-term retention of these firms and the stability of the employment which they generate. These factors, over time, will be determined by the productivity of those firms and the competitiveness of their products nationally and internationally.

It has been demonstrated by Birch that smaller firms generate more new employment opportunities than those of greater size. However, larger firms have higher levels of productivity and wages than those of lesser size. Thus, there appear to be sharp tradeoffs between employment gains and productivity and wages. It is probable, therefore, that public programs to provide assistance to firms will confront a rather clear cut choice—whether to provide assistance to smaller firms with higher initial employment and lower productivity and wage levels, or larger firms with higher productivity and higher wages, but at the cost of generating fewer new jobs.

In addition, there will generally be sharp tradeoffs between short-run job creation and the permanency of jobs as a function of the size of firm. The probability that a firm will survive and continue to provide jobs increases with the size and age of the firm. Viewed over a short period of time, small firms will provide most new jobs. Over longer periods, the proportion of the jobs which remain will consistently favor larger sized firms. Consequently, the earned income from a job has a greater chance of being interrupted for a worker in a small than in a larger firm. A policy choice to support smaller firms with higher initial employment gains than in larger firms represents implicitly a substantial discount rate on future jobs and earned income relative to current jobs.

The identification of these critical tradeoffs among potential development outcomes with firm size raises serious questions about the feasibility of targeting assistance exclusively to firms of any particular size. It is apparent that, in some cases, employment objectives and productivity objectives of economic development policies cannot be realized simultaneously. Furthermore, if productivity increases and the international competitiveness of U.S. exports become primary objectives of an emergent national industries policy, there may be tradeoffs between the objectives of economic development policies and those of industry policies.

In addition, there is a great deal of variation in the performance of different sized firms among industries and subnational economies.<sup>1</sup> This variation suggests that uniform national policies relating to either industries or size of firm will not be responsive to the unique characteristics and conditions of diverse local economies. A much richer level of geographical and industry detail is required to evaluate the performance of firms by size across industries and places.

Finally, it should be pointed out that an important set of policy issues relating to firm size has not been addressed. The specific types of policy intervention which would have the greatest benefit per dollar of federal expenditure has not been determined. At present, this cannot be done because of the lack of data on capital assets of firms in various size categories. It is uncertain what the results of a rigorous attempt to sort out these issues would show. However, the information presented in this paper suggests that this information is requisite to an evaluation of the desirability of establishing restrictive firm size rules for eligibility in economic development programs. While data examined are intended to be illustrative, they serve to raise serious issues for considerations of economic development policies which provide support exclusively for firms of particular size, either small or large.

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<sup>1</sup> The issue of potential conflicts in the objectives of economic development and national industries policies and the geographical variation of industry performance is addressed in Harvey A. Garn and Larry C. Ledebur, "Congruencies and Conflicts in Regional and Industry Policy," paper presented to the Atlantic Economic Conference, Feb. 14, 1980, and Marc Bendick and Larry C. Ledebur, "National Industrial Policy in Economically Distressed Communities," *Policy Studies Journal*, 1981, forthcoming.

## APPENDIX A

A-1 CRITERIA VARIABLES AND RANKS FOR FIRMS WITH 1-99 EMPLOYEES, 1972  
(CRITERIA VARIABLES PER EMPLOYEE)

	Value Added 1972 (\$1000)	Rank		Wages 1972 (\$)	Rank		New Capital Expenditures 1972 (\$1000)	Rank		Number of Production Workers 1972	Rank		% Change in Value Added 1967-72	Rank		% Change in Wages 1967-72	Rank	
		Rank <sup>1</sup>	Rank <sup>2</sup>		Rank <sup>1</sup>	Rank <sup>2</sup>		Rank <sup>1</sup>	Rank <sup>2</sup>		Rank <sup>1</sup>	Rank <sup>2</sup>		Rank <sup>1</sup>	Rank <sup>2</sup>			
ALL INDUSTRIES	16.55	5		7702.77	5		1.18	5		0.77	2		36.33	4		31.57	5	
Food	20.60	5	3	7448.98	5	12	1.55	2	7	0.66	4	19	43.45	2	2	35.29	3	4
Tobacco	12.91	5	17	5558.82	4	19	0.65	5	16	0.85	3	5	20.65	4	20	29.14	4	16
Textiles	13.10	1	16	6482.18	2	17	1.35	2	8	0.86	5	4	39.66	2	7	32.69	5	9
Apparel	10.32	2	20	5448.59	2	20	0.27	3	20	0.87	3	2	24.64	5	19	23.49	5	20
Lumber & Wood	13.32	5	15	6512.76	5	16	1.25	4	9	0.88	1	1	53.10	5	1	41.53	3	1
Furniture	12.89	4 <sup>a</sup>	18	6936.20	3 <sup>a</sup>	15	0.61	4 <sup>a</sup>	17	0.83	3 <sup>a</sup>	6	34.41	2 <sup>a</sup>	13	29.19	4 <sup>a</sup>	15
Paper	16.61	5	9	7930.61	5	9	1.69	4	6	0.80	1	10	40.88	1	5	34.14	5	6
Printing and Publishing	16.47	5	10	8421.54	5	7	0.95	4	12	0.68	1	16	37.94	4	10	30.70	5	11
Chemicals	32.38	4 <sup>a</sup>	2	9199.54	4 <sup>a</sup>	3	2.89	4 <sup>a</sup>	2	0.61	4 <sup>a</sup>	20	41.03	3 <sup>a</sup>	4	34.97	4 <sup>a</sup>	5
Petroleum	33.25	5	1	10028.37	5	1	3.52	5	1	0.67	5	18	42.03	1	3	36.37	5	3
Rubber & Plastics	15.85	5	11	7155.39	5	13	2.08	1	4	0.81	1	8	37.35	5	11	29.63	5	14
Leather	10.59	4	19	5862.14	3	18	0.31	2	19	0.87	3	3	31.55	5	15	29.91	4	13
Stone, Clay & Glass	18.58	5	4	8425.13	5	6	2.00	3	5	0.75	5	14	39.59	4	8	36.80	3	2
Primary Metals	17.80	4	5	8420.50	5	8	2.09	2	3	0.82	1	7	26.33	5	18	27.48	4	17
Fabricated Metals	16.84	5	8	8490.95	5	4	0.95	1	11	0.79	1	12	35.48	3	12	30.11	5	12
Nonelec. Machinery	17.52	5	6	9425.59	5	2	0.91	3	13	0.75	1	13	29.11	5	16	26.50	5	18
Elec. Machinery	15.66	5	12	7750.27	4	11	0.91	2	14	0.73	3	15	32.71	5	14	30.94	5	10
Transportation	14.81	5	13	7872.32	5	10	1.15	2	10	0.80	1	9	28.11	5	17	25.55	5	19
Instruments	17.46	5	7	8445.71	5	5	0.88	4	15	0.67	2	17	38.24	3	9	33.96	2	7
Miscellaneous	14.05	4 <sup>a</sup>	14	6955.92	2 <sup>a</sup>	14	0.59	4 <sup>a</sup>	18	0.80	2	11	39.66	3 <sup>a</sup>	6	32.86	2 <sup>a</sup>	8

Source: Appendix tables are developed from data in 1972 Census of Manufacturing, U.S. Bureau of the Census, General Summary, MC 72(1)-1, U.S. Government Printing Office, Washington, D.C., 1975.

- <sup>a</sup>Data not available for one of the size classes because of disclosure requirements; therefore ranks range from 1-4, with worst-off equal to 4.
1. Ranks within an industry for all its size classes.
  2. Ranks for size class across all industries.



A-2 VALUE-ADDED PER EMPLOYEE, 1972  
(THOUSAND DOLLARS)

	Establishment Employment Size																				
	Rank <sup>3</sup>			Rank			Rank			Rank			Rank			Rank					
	1-19	1	2	20-49	1	2	50-99	1	2	100-249	1	2	250-499	1	2	500-999	1	2	≥ 1000	1	2
ALL INDUSTRIES	17.17	4		16.34	7		16.36	6		17.47	3		18.46	2		17.09	5		23.88	1	
Food	19.68	7	3	20.70	6	3	20.91	5	2	21.85	4	3	23.75	3	2	25.66	1	3	23.98	2	8
Tobacco	13.67	6	18	10.17	7	20	14.69	4	12	16.00	3	14	19.47	2	8	13.90	5	16	41.58	1	1
Textiles	16.00	1	13	12.90	2	15	12.40	5	16	12.56	3	18	11.90	6	16	12.43	4	18	2.31	7	19
Apparel	13.70	1	17	10.28	3	19	9.13	6	18	8.75	7	20	9.55	5	18	10.07	4	20	13.04	2	18
Lumber and Wood	12.93	6	19	12.81	7	16	14.13	5	14	15.61	4	15	17.36	3	12	17.52	2	15	19.96	1	15
Furniture	13.83	2	16	12.56	6	17	12.65	5	15	13.08	4	17	a			13.72	3	17	13.85	1	16
Paper	16.49	6	10	16.29	7	9	16.84	5	7	17.66	4	10	22.42	3	3	24.38	1	4	23.36	2	10
Printing & Publishing	17.20	5	8	15.53	7	10	16.69	6	8	18.26	4	7	20.37	3	5	22.03	2	5	24.10	1	7
Chemicals	31.89	5	2	32.52	4	1	a			41.64	2	2	a			45.50	1	2	37.26	3	2
Petroleum	34.89	5	1	32.12	7	2	33.00	6	1	41.73	3	1	47.86	2	1	54.43	1	1	36.51	4	3
Rubber and Plastics	16.35	4	12	15.39	7	12	16.00	6	10	16.17	5	13	16.74	3	13	19.49	2	10	25.22	1	6
Leather	12.32	2	20	10.38	5	18	10.10	6	17	9.91	7	19	10.72	4	17	11.17	3	19	13.45	1	17
Stone, Clay & Glass	19.45	5	4	18.17	7	4	18.28	6	3	21.19	3	4	21.34	2	4	21.87	1	6	20.13	4	11
Primary Metals	17.70	6	7	17.19	7	6	18.26	4	4	17.76	5	9	19.55	3	7	20.05	2	9	21.79	1	12
Fabricated Metals	16.55	7	9	16.79	6	8	17.07	5	6	17.87	3	8	17.53	4	11	18.89	2	11	20.22	1	13
Nonelec. Machinery	17.79	5	6	17.12	7	7	17.68	6	5	18.68	4	5	19.58	3	6	21.15	2	7	23.92	1	9
Electrical Machinery	16.47	4-5	11	15.51	6	11	15.43	7	11	16.47	4-5	11	16.72	3	14	18.10	2	14	20.05	1	14
Transportation	15.00	5	15	14.90	6	13	14.64	7	13	16.44	4	12	17.98	3	10	18.63	2	12	25.52	1	5
Instruments	18.05	5	5	17.91	6	5	16.62	7	9	18.30	4	6	18.64	3	9	20.46	2	8	30.30	1	4
Miscellaneous	15.22	2	14	13.49	5	14	a			14.32	4	16	14.94	3	15	18.32	1	13	a		
Average Rank <sup>4</sup>	4.5			5.9			5.6			4.1			3.2			2.1			1.8		

<sup>a</sup> Data not available because of disclosure requirements.

1. Ranks within an industry for all its size classes.
2. Ranks for size class across all industries.
3. Where 1 = Best-off
4. Excluding All Industries.

A-3 WAGES PER EMPLOYEE, 1972  
(DOLLARS)

	Employee Size Class																					
	1-19	Rank 2		20-49	Rank		50-99	Rank		100-249	Rank		250-499	Rank		500-999	Rank		N 1000	Rank		
		Within Industry	Across All Industries		Within Industry	Across All Industries		Within Industry	Across All Industries		Within Industry	Across All Industries		Within Industry	Across All Industries		Within Industry	Across All Industries		Within Industry	Across All Industries	Within Industry
ALL INDUSTRIES	7759.47	5	7726.94	6	7646.21	7	7843.60	4	8046.15	3	8835.22	2	11069.02	1								
Food	7181.72	7 13	7275.27	6 12	7695.55	5 10	8092.00	4 11	8407.23	3 10	9054.44	2 10	10305.26	1 12								
Tobacco	5166.67	7 20	5583.33	5 19	5687.50	3 17	5597.01	4 19	5896.10	2 16	5405.06	6 19	8786.24	1 16								
Textiles	6927.84	1 16	6513.39	2 17	6333.83	4 15	6267.17	6 17	6306.58	5 15	6493.68	3 17	6235.74	7 19								
Apparel	6162.82	2 17	5534.17	3 20	5124.01	5 18	4857.53	7 20	5040.60	6 18	5185.95	4 20	7192.36	1 18								
Lumber & Wood	6033.53	7 19	6575.53	6 16	6905.37	5 13	7534.73	4 13	8113.19	3 11	8579.95	2 12	9491.53	1 14								
Furniture	6955.62	4 15	6981.24	3 14	6886.73	5 14	6760.76	6 15	a		7010.40	2 16	7525.90	1 17								
Paper	7538.96	7 11	7657.07	6 11	8197.25	5 8	8962.05	4 6	9807.93	3 2	10542.12	2 3	10666.01	1 10								
Printing and Publishing	8148.94	7 8	8422.67	6 7	8768.70	5 3	9030.25	4 5	9330.56	3 5	9871.24	2 7	11541.11	1 4								
Chemicals	8925.37	5 3	9282.59	4 3	a		9996.21	3 2	a		11060.34	2 2	11238.19	1 6								
Petroleum	10132.53	5 1	9836.73	7 1	10128.71	6 1	10714.88	4 1	12272.73	3 1	12512.20	2 1	12756.44	1 1								
Rubber & Plastics	7353.90	5 12	7070.93	7 13	7139.07	6 12	7477.14	4 14	7687.15	3 13	8441.13	2 14	10716.64	1 9								
Leather	6043.96	2 18	5860.47	4 18	5797.62	5 16	5610.33	6 18	5553.69	7 17	6021.63	3 18	8882.98	1 15								
Stone, Clay & Glass	8169.90	7 7	8574.28	5 4	8474.03	6 6	8911.79	4 7	9010.03	3 6	9182.12	2 9	9757.08	1 13								
Primary Metals	8335.00	6 6	8321.02	7 8	8519.80	5 5	9087.02	4 4	9616.41	3 3	10270.07	2 4	11847.43	1 3								
Fabricated Metals	8342.08	7 5	8517.18	6 5	8555.73	5 4	8759.81	4 8	9005.06	3 7	9593.12	2 8	11144.10	1 7								
Nonelec. Mach.	9282.95	7 2	9525.72	3 2	9479.90	4 2	9451.10	6 3	9469.60	5 4	9956.81	2 6	11345.73	1 5								
Elec. Machinery	7967.48	3 9	7713.61	5 10	7684.99	7 11	7709.05	6 12	7927.83	4 12	8460.56	2 13	10364.61	1 11								
Transportation	7640.29	7 10	7893.11	6 9	7971.53	5 9	8251.21	4 10	8832.47	3 8	10004.58	2 5	12634.77	1 2								
Instruments	8511.85	4 4	8462.37	6 6	8384.11	7 7	8487.73	5 9	8544.52	3 9	8998.58	2 11	10739.90	1 8								
Miscellaneous	7039.52	2 14	6915.70	4 15	a		6651.34	5 16	6919.31	3 14	8109.41	1 15	a									
Average Rank <sup>1</sup>		5.1		5.05		5.17		4.7		3.61		2.35		1.32								

1. Excluding All Industries
2. 1 = Best off

<sup>a</sup> Data not available because of disclosure requirements.

A-4 NEW CAPITAL EXPENDITURES PER EMPLOYEE, 1972  
(THOUSAND DOLLARS)

	Employment Size Class																		
	1-19	Rank 2		20-49	Rank		50-99	Rank		100-249	Rank		250-499	Rank		500-999	1,000	Rank	
		Within Industry	Across All Industries		Within Industry	Across All Industries		Within Industry	Across All Industries		Within Industry	Across All Industries		Within Industry	Across All Industries			Within Industry	Across All Industries
ALL INDUSTRIES	1.27	3	1.17	6	1.13	7	1.19	5	1.23	4	1.31	2	1.62	1					
Food	1.55	3	1.61	2	1.51	4	1.45	6	1.47	5	1.42	7	1.98	1					
Tobacco	0.83	5	0.67	6	0.56	7	1.07	4	1.69	2	1.11	3	2.51	1					
Textiles	1.62	1	1.40	3	1.23	5	1.48	2	1.24	4	1.13	6	0.82	7					
Apparel	0.33	2	0.26	4	0.25	5	0.24	7	0.24	6	0.37	1	0.28	3					
Lumber & Wood	1.32	4	1.19	7	1.24	5	1.20	6	1.52	3	1.66	2	2.84	1					
Furniture	0.60	5	0.63	4	0.59	6	0.66	3	a	18	0.79	1	0.67	2					
Paper	1.55	5	1.24	7	2.01	3	1.30	6	1.85	4	3.23	1	3.18	2					
Printing & Publishing	0.95	5	0.89	7	1.01	2	0.93	6	1.01	3	0.96	4	1.31	1					
Chemicals	4.13	1	2.52	5	a		3.68	2	2	a	2.93	4	3.28	3					
Petroleum	4.48	5	2.66	7	3.56	6	9.56	2	15.02	1	8.51	3	7.42	4					
Rubber & Plastics	2.06	2	2.20	1	2.00	3	1.64	5	1.36	6	1.35	7	1.76	4					
Leather	0.47	1	0.31	3	0.26	5	0.26	6	0.25	7	0.29	4	0.34	2					
Stone, Clay & Glass	2.18	1	2.06	4	1.77	6	2.13	2	2.07	3	1.87	5	1.27	7					
Primary Metals	2.03	3	3.03	1	1.43	6	1.27	7	1.47	5	1.57	4	2.19	2					
Fabricated Metals	0.93	4	0.95	2	1.09	1	0.95	3	0.78	7	0.81	6	0.85	5					
Nonelec. Machinery	1.01	3	0.84	7	0.90	4	0.85	6	0.87	5	1.12	2	1.26	1					
Elec. Machinery	3.77	2	0.87	4	0.87	3	0.84	5	0.82	6	0.68	7	4.64	1					
Transportation	1.45	2	1.08	3	1.06	4	1.01	5	0.75	7	0.76	6	1.79	1					
Instruments	0.86	6	0.86	5	0.90	4	0.85	7	1.06	2	1.02	3	1.23	1					
Miscellaneous	0.61	4	0.57	5	a		0.67	3	0.69	2	1.00	1	a	1					
Average Rank <sup>1</sup>		3.20		4.35		4.39		4.65		4.33		3.85		2.58					

<sup>a</sup>Data not available because of disclosure requirements.

1. Excluding All Industries.

2. Where 1 = Best-off.

A-5 PERCENT CHANGE IN WAGES PER EMPLOYEE, 1967-1972

	Employment Size Class																						
	1-19	Rank <sup>2</sup>		20-49	Rank		50-99	Rank		100-249	Rank		250-499	Rank		500-999	Rank		1000	Rank			
		Within Industry	Across All Industries		Within Industry	Across All Industries		Within Industry	Across All Industries		Within Industry	Across All Industries		Within Industry	Across All Industries		Within Industry	Across All Industries		Within Industry	Across All Industries	Within Industry	Across All Industries
ALL INDUSTRIES	33.02	3		31.51	6		30.72	7		32.47	4		32.31	5		35.59	2		38.82	1			
Food	39.82	2	2	33.94	5	5	33.86	6	6	34.67	4	6	33.00	7	9	42.01	1	4	38.87	3	9		
Tobacco	24.71	6	19	24.07	7	20	34.86	4	5	28.05	5	17	45.96	2	1	44.06	3	1	49.59	1	3		
Textiles	31.65	7	9	31.78	6	8	33.48	5	7	34.07	4	7	36.05	1	6	34.21	2	15	34.10	3	16		
Apparel	19.08	7	20	24.87	5	19	24.53	6	17	27.16	4	20	35.49	2	7	28.68	3	19	44.41	1	5		
Lumber & Wood	45.20	1	1	38.99	5	1	38.42	6	1	40.59	4	1	44.39	2	2	42.33	3	3	31.80	7	18		
Furniture	27.33	6	16	28.98	5	14	30.53	2	10	30.25	3	15	a			32.95	1	18	29.50	4	19		
Paper	29.34	7	13	32.71	6	7	36.24	5	3	36.43	4	5	36.74	3	5	38.68	1	7	38.26	2	10		
Printing & Publishing	33.79	4	7	28.82	7	15	30.14	6	11	31.61	5	11	34.39	2	8	34.32	3	14	50.47	1	2		
Chemicals	34.18	5	6	35.55	4	4	a			38.35	2	3	a			40.62	1	5	37.90	3	11		
Petroleum	35.22	7	4	37.11	4	3	36.87	5	2	38.20	1	4	38.15	2	4	37.25	3	8	36.71	6	13		
Rubber & Plastics	32.68	3	8	30.70	5	11	27.63	7	15	31.32	4	13	29.71	6	14	33.26	2	17	40.16	1	8		
Leather	27.05	7	18	31.52	4	10	29.82	5	12	31.65	2	10	28.43	6	15	31.60	3	20	63.94	1	1		
Stone, Clay & Glass	36.59	5	3	38.11	3	2	35.42	7	4	38.91	2	2	39.15	1	3	36.77	4	11	35.94	6	14		
Primary Metals	27.20	5	17	26.93	6	16	28.00	4	14	31.59	3	12	3.27	7	18	37.16	2	9	44.63	1	4		
Fabricated Metals	30.92	5	11	30.55	6	13	29.29	7	13	31.22	4	14	31.47	3	12	35.05	2	13	37.14	1	12		
Nonelec. Machinery	27.51	5	15	25.75	7	18	25.92	6	16	30.19	3	16	27.60	4	16	33.48	2	16	41.16	1	7		
Elec. Machinery	29.71	7	12	31.57	5	9	30.64	6	9	31.70	4	9	32.46	3	10	35.28	1	12	34.99	2	15		
Transportation	28.16	4	14	26.81	6	17	24.25	7	18	27.53	5	18	31.53	3	11	39.13	2	6	43.97	1	6		
Instruments	35.01	2	5	33.72	3	6	33.40	5	8	32.91	6	8	30.33	7	13	37.12	1	10	33.52	4	17		
Miscellaneous	31.24	2	10	30.58	3	12	a			27.42	4	19	27.29	5	17	42.93	1	2	a				
Average Rank <sup>1</sup>		4.85		5.10		5.50		5.50		3.65		3.67		3.67		2.05		2.05		2.58			

<sup>a</sup>Data not available because of disclosure requirements.

1. Excluding All Industries.

2. Where 1 = Best-off.

A-6 PERCENT CHANGE IN VALUE ADDED PER EMPLOYEE, 1967-1972

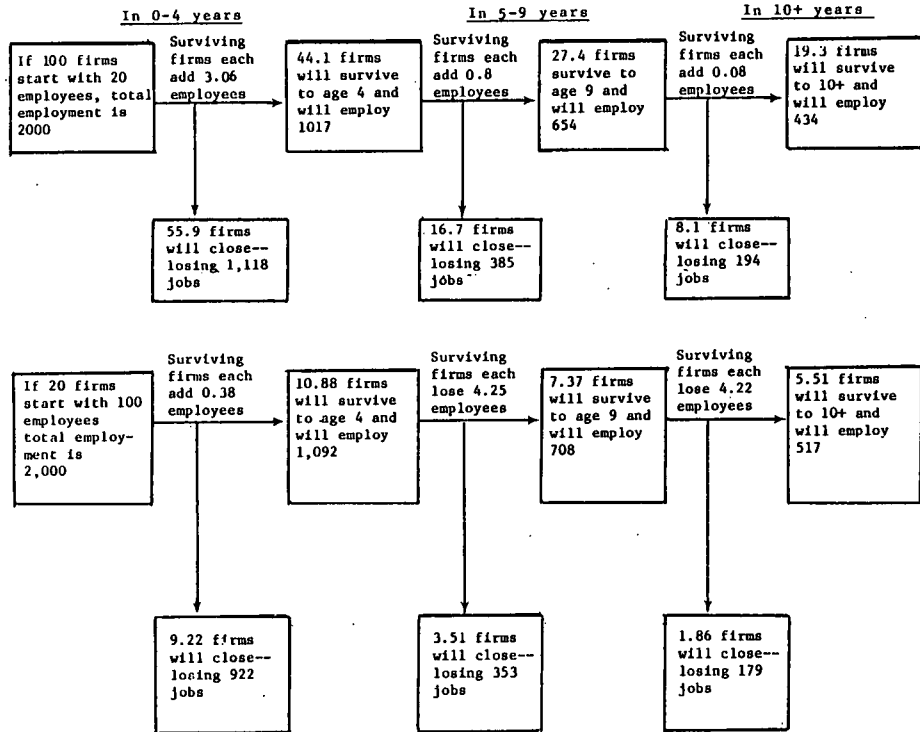
	Employment Size Class																					
	1-19	Rank 2		20-49	Rank		50-99	Rank		100-249	Rank		250-499	Rank		500-999	Rank		1000	Rank		
		Within Industry	Across All Industries		Within Industry	Across All Industries		Within Industry	Across All Industries		Within Industry	Across All Industries		Within Industry	Across All Industries		Within Industry	Across All Industries		Within Industry	Across All Industries	Within Industry
ALL INDUSTRIES	34.88	6		37.54	3		36.33	5		37.78	2		36.44	4		16.10	7		45.34	1		
Food	49.09	1	1	46.29	3	4	38.39	6	7	39.35	5	11	41.62	4	5	47.81	2	4	20.38	7	16	
Tobacco	2.86	6	20	77.87	2	1	77.85	3	1	62.11	4	2	92.39	1	1	27.87	5	16	-1.14	7	17	
Textiles	43.37	1	3	34.66	6	13	41.39	3	5	42.89	2	5	36.16	5	11	37.35	4	11	-71.59	7	19	
Apparel	14.93	7	19	26.91	6	19	28.77	5	16	31.98	4	17	48.06	1	4	37.19	3	12	47.51	2	7	
Lumber and Wood	48.62	6	2	48.09	7	3	61.30	5	2	73.25	4	1	84.29	2	2	73.29	3	1	98.61	1	1	
Furniture	35.32	2	10	33.05	5	14	35.29	3	11	39.15	1	12	a			27.63	6	17	33.82	4	12	
Paper	28.63	6	15	44.29	1	5	41.99	2	4	35.85	4	14	40.83	3	7	27.18	7	18	28.85	5	14	
Printing & Publishing	40.29	3	4	36.59	6	12	36.92	5	8	28.95	7	19	41.26	2	6	40.14	4	9	49.32	1	6	
Chemicals	37.22	5	7	41.70	3	7	a			57.61	1	3	a			44.81	2	6	37.34	4	11	
Petroleum	22.68	4	17	55.09	1	2	48.45	2	3	30.41	3	18	8.70	6	18	11.15	5	20	-13.26	7	18	
Rubber & Plastics	39.27	4	5	38.28	6	11	35.82	7	9	40.73	3	8	39.15	5	10	45.88	2	5	58.52	1	2	
Leather	21.26	7	18	32.06	6	17	35.21	2	12	34.65	3	15	32.84	5	16	33.61	4	14	50.45	1	5	
Stone, Clay & Glass	38.93	6	6	40.20	3	8	39.44	5	6	40.15	4	9	52.54	1	3	49.49	2	3	38.64	7	10	
Primary Metals	23.52	6	16	22.17	7	20	30.06	3	15	27.77	5	20	34.36	1	14	29.11	4	15	32.22	2	13	
Fabricated Metals	30.73	6	12	38.53	1	10	35.69	4	10	36.62	2	13	33.11	5	15	36.10	3	13	26.85	7	15	
Nonmetal. Machinery	29.48	5	14	29.11	6	18	28.68	7	17	32.67	4	16	35.22	3	13	39.79	2	10	46.84	1	8	
Elec. Machinery	29.48	7	13	32.79	6	15	33.36	5	14	39.93	4	10	40.27	3	8	43.65	2	8	44.24	1	9	
Transportation	36.99	5	8	32.68	6	16	22.10	7	18	41.97	3	6	39.16	4	9	44.42	2	7	56.18	1	4	
Instruments	34.80	6	11	43.62	2	6	35.01	5	13	43.19	3	4	35.66	4	12	26.45	7	19	56.59	1	3	
Miscellaneous	36.26	4	9	38.93	3	9	a			40.81	2	7	31.98	5	17	56.85	1	2	a			
Average Rank <sup>1</sup>		4.85		4.30			4.39			3.40			3.33			3.50			3.53			

<sup>a</sup>Data not available because of disclosure requirements.

1. Excluding All Industries.
2. Where 1 = Best-off.

## APPENDIX B

### TIME PATHS OF FIRMS: EXPECTED EMPLOYMENT PATTERNS: NORTHEAST MANUFACTURING



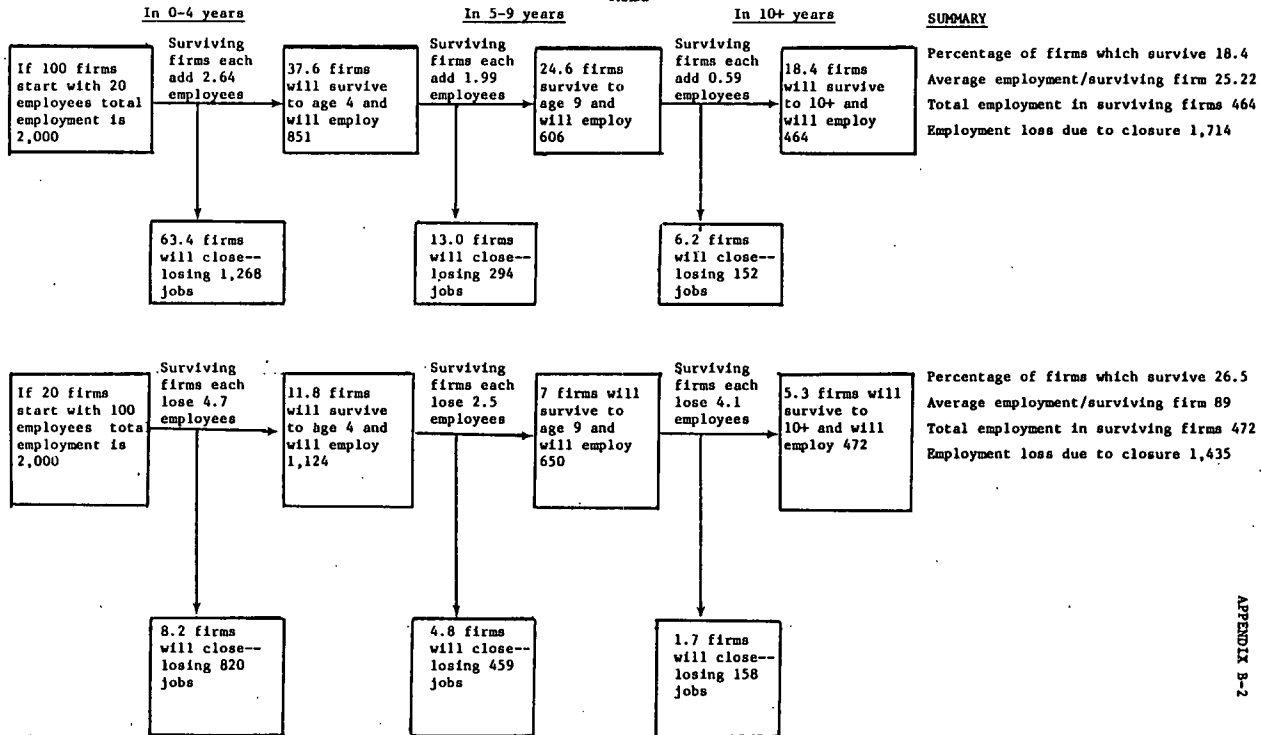
#### SUMMARY:

Percentage of firms which survive 19.3%  
Average employment/surviving firm 23.94  
Total employment in surviving firms 434  
Employment loss due to closure 1,697

Percentage of firms which survive 27.6%  
Average employment/surviving firm 91.1  
Total employment in surviving firms 517  
Employment loss due to closure 1,454

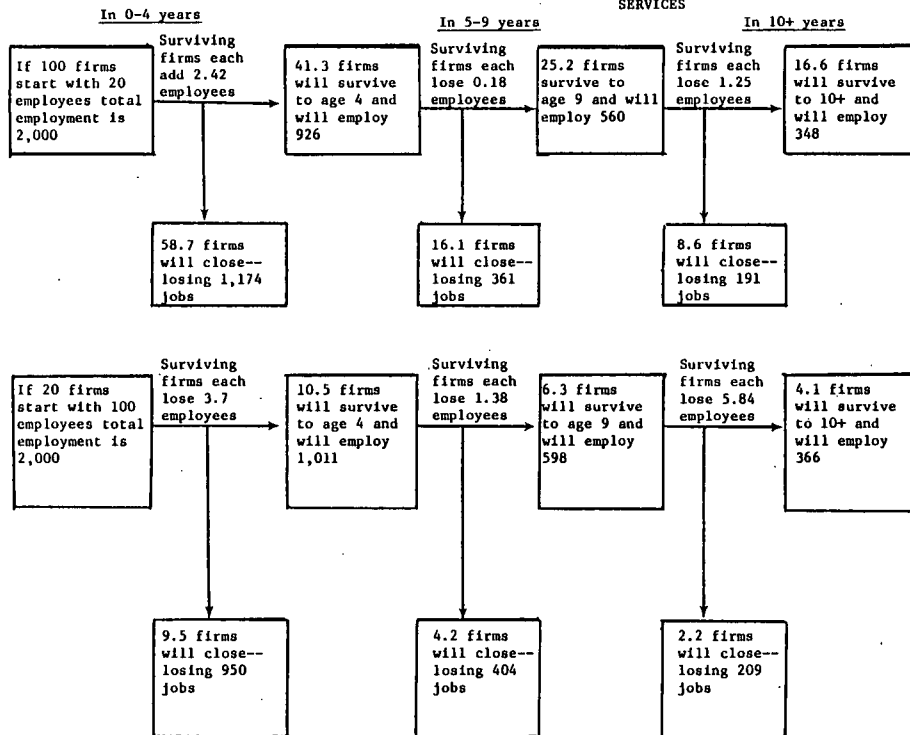
Source: Calculated from data in Appendix B, *The Job Generation Process*, David Birch.

TIME PATHS OF FIRMS:  
 EXPECTED EMPLOYMENT PATTERNS: NORTHEAST  
 TRADE



Source: Calculated from data in Appendix E, The Job Generation Process, David Birch.

TIME PATHS OF FIRMS:  
EXPECTED EMPLOYMENT PATTERNS: NORTHEAST  
SERVICES



**SUMMARY:**

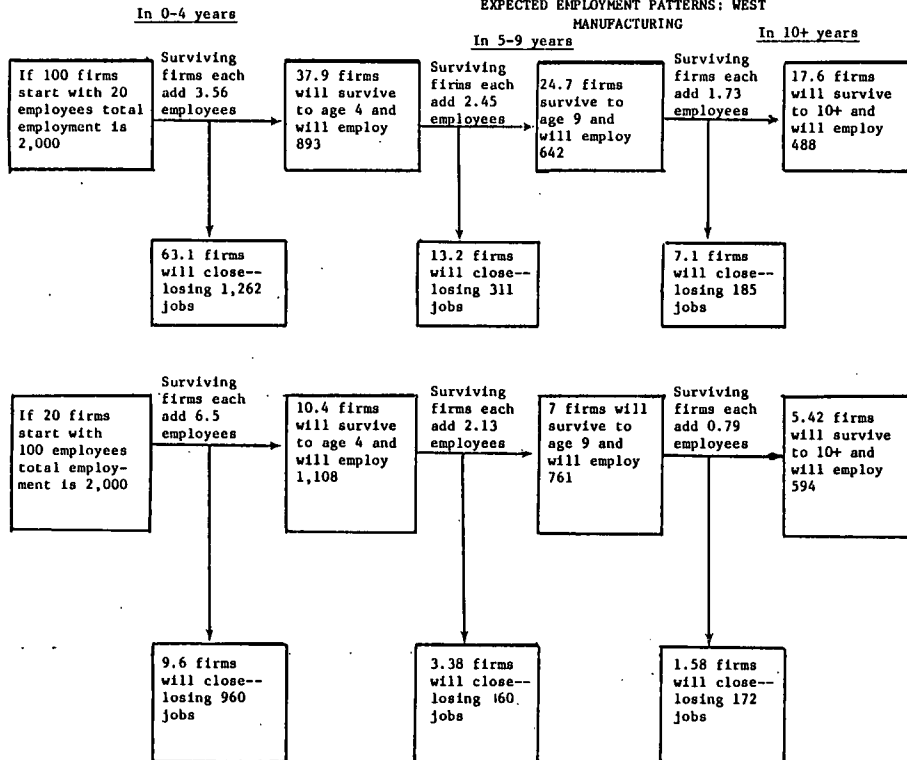
Percent of firms which survive 16.6%  
Average employment/surviving firm 20.99  
Total employment in surviving firms 348  
Employment loss due to closure 1,726

Percentage of firms which survive 20.5  
Average employment/surviving firm 89.42  
Total employment in surviving firms 366  
Employment loss due to closure 1,563

Source: Calculated from data in Appendix E, The Job Generation Process, David Birch

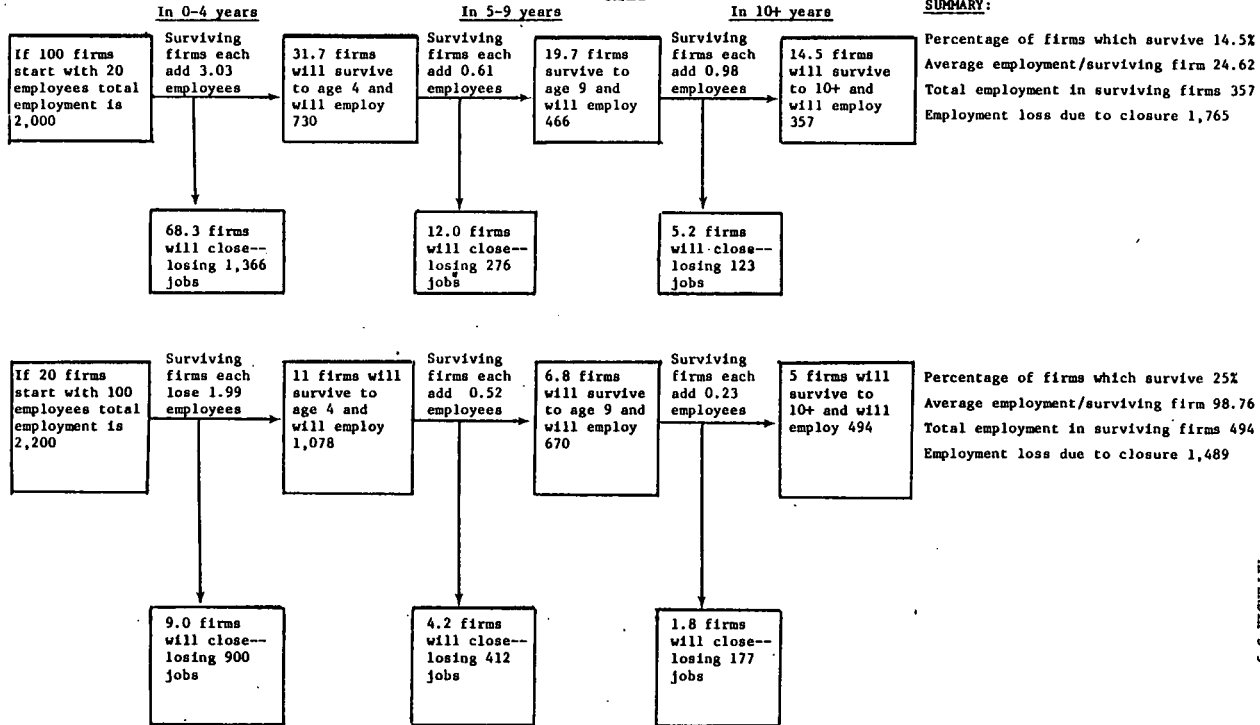


TIME PATHS OF FIRMS :  
 EXPECTED EMPLOYMENT PATTERNS: WEST  
 MANUFACTURING



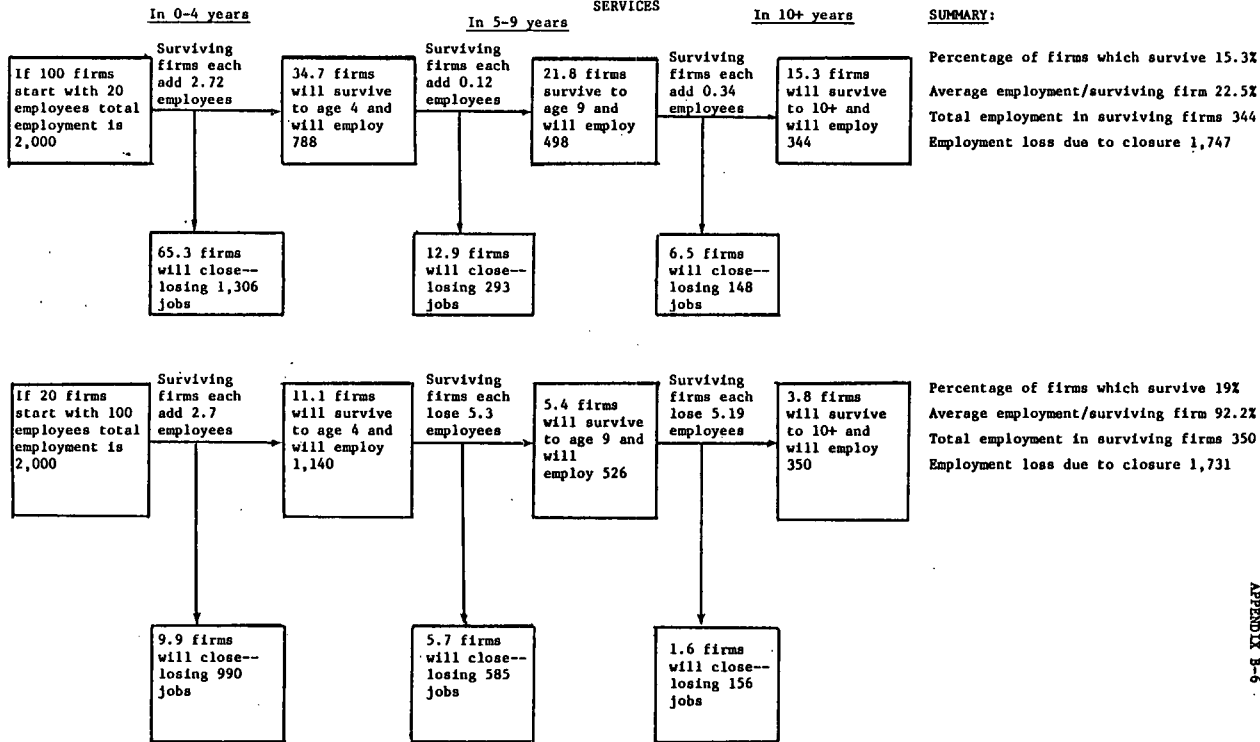
Source: Calculated from data in Appendix E, The Job Generation Process, David Birch

TIME PATHS OF FIRMS :  
 EXPECTED EMPLOYMENT PATTERNS: WEST  
 TRADE



Source: Calculated from data in Appendix E, The Job Generation Process, David Birch

TIME PATHS OF FIRMS;  
 EXPECTED EMPLOYMENT PATTERNS: WEST  
 SERVICES



Source: Calculated from data in Appendix E, The Job Generation Process, David Birch.