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ON THE SIZE DISTRIBUTION OF EMPLOYMENT AND ESTABLISHMENTS

Abstract

Recent arguments that employment growth occurs disproportionately at small establishments are fundamentally misleading because they confuse regression to the mean with structural shifts in the size distribution of establishments and with an aging effect within cohorts.

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What are the sources of employment and unemployment? In a sparsely travelled approach to this most fundamental question in economics, a few recent studies have analyzed employment growth across establishments of various sizes. These studies generally conclude that employment growth has been disproportionately concentrated in small establishments. This in turn has given rise to the folk wisdom that small establishments are the only vibrant part of the economy. To some concerned with a public policy in favor of job creation, such studies have suggested that employment policies be targeted toward the smaller establishments that appear to be the wellsprings of growth.¹ Such an investment in jobs at small establishments may be unnecessary or short-lived because in many cases the Horatio Alger-like rise of the small firm may just be regression to the mean. This paper will present new evidence of a large transient component in the level of employment within individual establishments over time.² This instability of jobs lends itself to a regression fallacy.

A stochastic model that resolves the paradox raised by previous studies that small establishments grow faster than large but the distribution of establishments by size remains unchanged is developed in Section I. Section II uses a new longitudinal sample of establishments to analyze changes in the distribution of employment within cohorts. A set of regressions with controls for industry region, corporate structure, and other determinants of size is presented in Section III. Conclusions are presented in Section IV.

I. SMALL IS RANDOMLY BEAUTIFUL: THE DYNAMICS OF ESTABLISHMENT SIZE

Optimum establishment size is largely determined by economies of scale, or economies of scope. Economies of scale will depend on technology and the size of the market, which will vary by industry and region. In modeling the process of employment (size) change in a longitudinal sample of establishments, I seek to embody the following characteristics: (1) a time invariant distribution, (2) a transient random error, and (3) a partial adjustment toward the mean. It is useful to start with a time invariant distribution of establishment size to show that random fluctuations and regression to the mean will easily yield a situation in which small establishments account for a disproportionate share of employment growth even though the size distribution of employment is unchanged over time.

The simplest process embodying the first two characteristics is:

$$(1) \quad S_{i,t} = X_i B + e_{it}$$

where

$S_{i,t}$ is the logarithm of the size of establishment i in period t

X_i is the vector of establishment characteristics giving optimal scale

e_{it} is a random error that may include measurement error,

e_{it} i.i.d $N(0, \sigma_e^2)$.

This transparently embodies the essential characteristics of regression to the mean [Galton, 1886] in a time invariant distribution:

$$(2) \quad E(S_{it} - S_{i,t-1} | S_{i,t-1}) = - e_{i,t-1}$$

Compared to their expected sizes, large firms are expected to shrink and small firms are expected to grow.

It is just as meaningful and valid to analyze the dynamics of size change conditional on end of period rather than beginning of period size. Think of a stochastic process that acted the same running backward or forward in time. In the process of equation 1, if S_{it} but not $S_{i,t-1}$ is known, the expectation of past change in size is

$$(3) \quad E(S_{i,t} - S_{i,t-1} | S_{i,t}) = e_{it}.$$

Here, it is expected that a large firm will have recently experienced a positive random shock. The results in this case appear to be the opposite, but this is simply an illustration of regression to the mean.³ Just as establishments that are small tend to grow (eq. 2), establishments that are small tend to have shrunk (eq. 3). There is no greater implication for policy in the former phrase than in the latter, but either taken by itself is intrinsically misleading.

The simple process above assumes complete equilibration within one period, an assumption that is relaxed in the following stochastic process. Assume that it is costly to adjust the stock of human capital employed by the establishment, that there is a fixed establishment effect over time, and that the establishment is subject to independent and serially uncorrelated errors. This yields a standard investment model that is ARMA(1,1) in first-differences,

$$4) \quad S_{i,t} = X_i B + \lambda(S_{i,t-1} - X_i B) + e_{it}.$$

where λ is a partial adjustment coefficient arising from quadratic adjustment costs, $0 < \lambda < 1$. Equation (4) says that the logarithm of establishment size is determined by exogenous characteristics X_i which are expected to vary by industry and region, by the deviation of last period's size from expected size, and by a random error term. This process includes as special cases both the random walk (Gibrat's Law) ($\beta=0, \lambda=1$) and the fixed effect model ($\beta \neq 0, \lambda=0$).

Following the process in equation (4) then, the logarithm of establishment size is normally distributed with mean $X_i B$ and variance $(1/(1-\lambda^2)) \sigma_e^2$, or

$$(5) \quad S_i \sim N(X_i B, (1/1-\lambda^2)\sigma_e^2).$$

The assumption that this distribution is time invariant implies that relative factor prices are fixed over time so employment is in fixed proportion to scale, however measured. σ_e^2 is a measure of our ignorance of the determinants of establishment size. In part, it may be due to random shocks in product demand or to tipping in product market share in response to unobserved technological innovations. If some factors of production are specialized to individual establishments, or if economies of diseconomies of scale are negligible, then optimal scale is not fully determined by the observable X's. This would result in persistent deviations from expected size, conditional on observables. Although not developed here, it could be modelled by including an individual specific time-invariant unobserved error component.

Conditional on last period's size and delaying the discussion of measurement error, the expectation of this period's size is

$$(6) \quad E(S_{i,t} | S_{i,t-1}) = (1-\lambda)X_i B + \lambda S_{i,t-1},$$

and the expected change in establishment size is

$$(7) \quad E(S_{i,t} - S_{i,t-1} | S_{i,t-1}) = (1-\lambda)(X_i B - S_{i,t-1}).$$

It is now clear that in a regression of logarithmic growth rates on the logarithm of lagged size, controlling for other characteristics, the coefficient on lagged size lies between zero and -1. At casual inspection it will appear as though size has a direct detrimental effect on growth, although nothing more need be at work than regression to the mean. In theory then, all of the job growth among the small could be accounted for by regression to the mean.

The probability that size will increase is given by

$$(8) \quad \text{Prob}(S_{i,t} > S_{i,t-1}) = 1 - F\{(1-\lambda)(S_{i,t-1} - X_i B)\},$$

where F is the cumulative normal distribution function. On average, small establishments are expected to grow.

In general, the greater the deviation of establishment size from its mean, the greater the expected subsequent movement toward the mean. In particular, the smaller the establishment, the larger its expected increase in size. Similarly, establishments found in the tails of the distribution are expected to have recently experienced the greatest random perturbation, and relatively few establishments are expected to experience great size changes. All of these patterns have been observed without explanation in the earlier literature, and follow directly from the model just presented. Previous studies then have to some degree been an exercise in demonstrating regression

to the mean.⁴

Consider how a direct effect of size on growth can be distinguished from regression to the mean. Choose a period long enough that adjustment may be assumed to be almost complete ($\lambda \rightarrow 0$). The coefficient on lagged size is expected to be -1 even if there were no direct negative effect of size on growth, and will likely be negative even with a positive direct effect of size on growth. A test of the hypothesis that size slows growth is then that the coefficient on lagged size be less than -1. A coefficient greater than -1 could arise because of (1) a positive direct effect of size on growth, (2) incomplete adjustment ($\lambda > 0$) or (3) positive autocorrelation of errors. Unobserved fixed effects can be thought of as a special case of (3) with perfect autocorrelation. The role played by each of these possible factors is not identified without extra information if the observed coefficient is greater than -1. Of course, if growth rates do increase with size, the distribution explodes -- which should be easily detectable. On the other hand, since the last two factors would both give a coefficient greater than -1, a result less than -1 would be strong evidence that size slows growth.

II. COHORT ANALYSIS OF THE DISTRIBUTION OF EMPLOYMENT AND ESTABLISHMENTS BY ESTABLISHMENT SIZE

If one is interested in determining whether growth is favored in establishments of a certain size for structural as opposed to purely random reasons, it is fruitful to start by looking at changes over time in the size distribution of a fixed sample of establishments.⁵ If small establishments grow faster than do large, it follows that, absent births and deaths, the

proportion of all establishments that are small decreases and their average size increases.⁶

Table I shows the distribution of establishments and employment by size class for a longitudinal sample of 68,690 establishments with more than 16 million employees. The sample is based on Equal Employment Opportunity (EEO) data,⁷ and is discussed at length in other work (Leonard, 1984). The tradeoff in using a longitudinal data set, of course, is that in focusing on the health of the living, one no longer pays great attention to births and deaths.⁸ In particular, growth rates estimated here are overestimates in the sense that the worst cases, establishments that shut down completely, are absent from the sample.

A substantial advantage of the EEO sample is that it allows us to follow a cohort through time and see differential growth rates by size class. Column 4 of Table I stratifies 1980 employment by 1974 establishment size class. What has previously been the standard analysis in this area amounts to comparing column 4 with column 3, both of which stratify by initial state. It is immediately apparent that growth is concentrated in smaller establishments with less than 100 employees. These establishments accounted for 10.8 percent of all employees in 1974. By 1980, the same establishments accounted for 12.7 percent of all employees. In other words, employment grew by 23.5 percent among these establishments compared to 5.1 percent overall and 2.8 percent among the establishments with 100 or more employees. These small establishments, which comprise 48 percent of all establishments, then account for 50.3 percent of total net job growth.⁹ If one includes establishments with less than 250 employees among the small, the result is more striking:

more than 100 percent of total net job growth occurs in such establishments.

Are small establishments then really the fountainheads of growth? Column 5 of Table II stratifies 1974 employment by end state: establishment size class in 1980. The obvious pattern, and one that has been largely ignored in previous studies, is that small establishments account for most net job loss just as surely as they account for most net job gain. Establishments with less than 100 employees in 1980 included 10.2 percent of all 1980 employees. The simplest way to see a central point of this paper is to compare column 5 with column 6, both of which stratify by terminal size. Six years earlier, these same establishments employed 12.2 percent of the work force. This simple finding is important: the small have shrunk. Comparing columns 5 and 3 shows that many of these establishments must have become small since 1974.

III. REGRESSION ANALYSIS

Table II presents estimates of regressions of the logarithm of employment growth between 1974 and 1980 controlling for industry, region, size, corporate structure, occupational structure and federal contractor status, using the longitudinal EEO sample of 68,690 establishments. Do establishments of different sizes have different growth rates once industry, region, etc., are controlled for?

The evidence in regression 1 of Table II, which controls for initial size, only seems to give a clear answer. The elasticity of growth rate with respect to size in 1974 is $-.124$. As initial size increases by 10 percent, growth rate declines by 1.2 percent. Growth rates appear to fall

significantly with initial size.

The sample is longitudinal, so none of these differences can be due to differential birth or death rates, or to differences in the composition of the sample over time. Moreover, industry and region are controlled for, so these differences cannot be attributed to different efficient scales in various industries or regions. These estimates, with a more extensive set of controls, may appear on casual inspection to confirm recent findings [Armington and Odle, 1982; Birch, 1979; Teitz et al., 1981] that employment growth is concentrated in small establishments.

The stochastic model of change in establishment size presented in section I shows why such an interpretation of the distribution of growth by establishment size can be misleading. With regression to the mean a negative coefficient on lagged size is likely even if the direct effect of size on growth is positive. Strong evidence that size hinders growth would be a coefficient less than -1. The estimated coefficient is significantly greater than -1. While the possibility of unobserved fixed effects or positively serially correlated errors prevents us from rejecting the hypothesis that size hinders growth, this result does indicate that all of the apparent size differential in growth rates could be accounted for by regression to the mean.

Regression 2 of Table II is identical in specification to regression 1 with the exception that it controls for 1980 size rather than 1974 size, and is so a logical extension of Table I. Now it appears that growth rates are significantly higher in establishments that end up large. Again, in light of the stochastic model of section I, there is no contradiction between observing

that small establishments are more likely than small to have grown while the small are more likely to have shrunk. The near identity of standard errors across regressions merely reflects the high correlation of size across years.

There are several possible interpretations of regression 2. Multiplying both sides by -1, it is a bivariate regression of shrinkage rates on terminal size. It then says that the small in 1980 shrunk more since 1974 than the small in 1974 grew by 1980, although the difference (between -.126 and -.124) is insubstantial. In a measurement error context, regression 2 can also be read as a reverse regression. From equation 4 it follows that:

$$(9) \quad S_{it} - S_{it-1} = \frac{1-\lambda}{\lambda} \alpha_i B + [1-\frac{1}{\lambda}] S_{it} + \frac{1}{\lambda} e_{it}$$

The coefficients on the X variables are so expected to be $1/\lambda$ times greater in the reverse regression. As is well known in the case of measurement error affecting the dependent variable and one independent variable, the forward and reverse regressions can be used to bound the true parameter. As a reverse regression, regression 2 implies $\lambda = 1.144$, which would be upward biased by measurement error. If we add the stability constraint, λ is bounded by .876 ($=1-.124$) and 1. This seems a slow adjustment to optimal size, in which case positive serial correlation of the errors, or unobserved fixed effects, may be suspected. In either case, there is no compelling evidence here that size has a negative effect on growth beyond what would be expected from regression to the mean.

To see how easily the estimates of size effects in Table II could arise, consider the following simplified case. Let y be the 1980 logarithm of size, x the 1974 logarithm of size, S_{yy} and S_{xx} the respective variances, and r_{xy}^2 their correlation. Now in simple regressions, $b_{yx} = r_{yx}^2 \cdot S_{yy}/S_{xx}$ and

$b_{xy} = r_{yx}^2 \cdot S_{xx}/S_{yy}$. Since the model in this paper assumes constant variances over time, $S_{yy} = S_{xx}$, and so $b_{xy} = b_{yx} = r_{yx}^2$. This yields an important insight into Table II's results: $b_{(y-x)x} = -b_{(y-x)y}$. The expected coefficient from a regression of growth on initial size is equal in magnitude and opposite in sign to the expected coefficient of growth on terminal size. For illustration, suppose $r_{yx}^2 = .885$. Now the expected coefficient from a simple regression of $y-x$ on x is $b_{yx}-1$, or $-.125$. The expected coefficient from a simple regression of $y-x$ on y is $1-b_{xy}$ or $.125$. This illustrates that the size effects estimated in Table II can arise quite easily without any true direct effect of size on growth.

Regression 2 of Table II read in conjunction with regression 1 also shows other interesting shifts in the distribution of establishment size. Employment is more volatile at establishments that are government contractors or single. Establishments that are nonclerical, white-collar intensive exhibit significantly greater growth rates, and significantly lower shrinkage rates within industry and region. This may reflect pervasive technological change favoring white-collar intensive establishments. Optimal scale appears to have increased for such establishments.

Optimal establishment size is a function of both the technology of production and the size of the market, so we allow growth patterns to differ across industries and regions. Concerning industry specific effects, the signs of the largest effects are not always the same across equations, so the bounded estimates include zero. Mining, Chemicals, Machinery, Instruments, and Services have been the most consistent growth sectors. Across regions,

establishments have grown significantly less in the Mid-Atlantic and East North-Central regions, and significantly more in the West.

The large transient component of establishment size that gives rise to the regression to the mean phenomena analyzed above can also be of potential use in explaining unemployment. At least 13.2 percent of the EEO sample jobs in existence in 1974 no longer existed by 1980.¹⁰ Over the same period, at least 18.2 percent new jobs were created. In other words the 5.1 percent net job growth observed in this sample is the result of two much larger partially offsetting but typically unobserved flows. Labor demand is more volatile than is apparent from the usual aggregate net statistics. This volatility suggests that some unemployment could be explained by unstable jobs rather than unstable workers.¹¹

IV. CONCLUSION

Longitudinal analyses of data with large transient components are subject to the misinterpretation of what could simply be regression to the mean. In the case of the size distribution of employment, previous studies have pointed to the disproportionate share of employment growth accounted for by small establishments and claimed that these small establishments are the wellsprings of growth. I have argued here that part of the phenomenon these analysts have described may be regression to the mean.¹² None of the previously observed patterns need tell us anything more than that establishment size is subject to transient shocks, from which it then reequilibrates. Size is better thought of as an endogenous than as an exogenous variable. The size distribution of

establishments is a less dangerous guide to how economic conditions favor establishments of any given size.

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FOOTNOTES

1. The most widely publicized previous result is from Birch (1979, p. 29) who reports that between 1969 and 1976 "On the average about 60 percent of all jobs in the U.S. are generated by firms with 20 or fewer employees...."

Referring to this result Bluestone and Harrison [1982, p. 221], state

"Thus it would be hard to exaggerate the excitement that has been generated ... by the most recently published research of David L. Birch ... This has been picked up by the media in the United States, Canada, and Great Britain and repeated endlessly by advocates of a policy of switching the focus of publicly-subsidized development programs from large corporations to the 'small business community.'"

Birch's result is based on Dun and Bradstreet data that is not longitudinal, that has increased coverage over time, and that aggregates a firm from establishment records. Increasing coverage by Dun and Bradstreet of the trade and service sectors, which have many small firms, over the period analyzed by Birch may contribute to his result purely an artifact of sampling. From much less widely publicized numbers reported in Birch and MacCracken (1981, p. 6, Figure 2 and p. 16, Figure 7) for a longitudinal subsample of Dun and Bradstreet establishments, I calculate that establishments with 50 or fewer employees account for more than 100 percent of the net employment growth between 1969 and 1976, while growing by 19.5 percent over these 7 years. If anything, the small establishments studied here (see Table I, col. 4 and 5) grow even faster, by 38 percent over 6 years. The relationship between starting size and subsequent employment growth is even stronger in the data studied here than in previous studies.

2. One of the earliest demonstrations of the importance of transient components is found in Friedman [1957].

3. For excellent earlier discussions of this triumph of mediocrity and the attendant regression fallacy, see Prais [1958] and the articles cited therein. For earlier developments of related stochastic models see Gibrat [1930], Steindl [1965], and Ijiri and Simon [1977, p. 156]. These analysis typically derive a log-normal distribution of firm size from a random walk in logarithms (Gibrat's Law). Undesirably, such random walk models also imply an exploding

variance of size. Empirical evidence that size follows a random walk in logarithms (growth is independent of size) can be found in Hart and Prais [1956], and Hymer and Pashigian [1962].

4. Birch does note the volatility of jobs and seems to have given this more attention in recent work. He observes that small establishments have higher death rates, and that "establishments with the greatest odds of experiencing a big loss are the ones that have just grown the most" [Birch, 1979, p. 39]. In later work he struggles with the paradox of reconciling disproportionate job growth among small establishments with a stable distribution over time, and in his "pulsation" analogy [Birch, 1981, p. 20] comes close to the idea of regression to the mean. Armington and Odle find that much of the growth observed by Birch using Dun and Bradstreet data takes place among small establishments that are part of large companies. Teitz et al. add the qualification that growth is concentrated in just 12 to 15 percent of small establishments, and that the half-life of most new jobs is probably well under four years (p. 61). Fothergill and Gudgin present a comparative analysis of British manufacturing job growth and evidence of a much smaller decline in growth with size among both young and old establishments. Previous work suffers from the lack of a statistical model to guide the interpretation of the observed patterns.

5. For related arguments comparing static analysis and survivor technique, see Caves, et al. [1975] and Stigler [1958].

6. There is some evidence that the size distribution of U.S. employment shifted toward small establishments between 1974 and 1980, but the patterns are not overwhelming and the shifts are less than those implied by previous studies. Of all 1974 County Business employment, 52.5 percent was in establishments with fewer than 100 employees. By 1980 the share of total employment in such establishments has increased only slightly to 54.3. In the Census data, small establishments actually accounted for 64.4 percent of the net increase in jobs. However, this in itself tells us nothing about the optimal scale of establishments, or about the relative economic performance of various establishments, or about which establishments should be the focus of a public policy to promote job creation because such statistics confound changes in the size distribution of establishments with changes in the industrial or

regional composition of employment and with the births of small establishments and deaths of large ones.

7. The EEO sample is not directly comparable to the Census sample. Small establishments that are part of small companies are not required to report. Title VII of the Civil Rights Act of 1964 requires annual reports on work force demographics from all private employers with 100 or more employees, or 50 or more employees and a federal contract or first-tier subcontract or purchase order worth \$50,000 or more, with special provisions for financial institutions. In the case of multi-establishment enterprises, all establishments with more than 24 employees that belong to enterprises that fulfill the above conditions must report individually. So while the longitudinal EEO sample contains 25.7 percent of Census-reported employment in 1974, it contains only 1.7 percent of Census-reported establishments. Nevertheless, the EEO sample has enough size variation to support the regression analysis that follows. Note that temporary or casual employees are not counted, according to regulations, among employees in the EEO sample. The results reported here do not depend on a sample that overrepresents large establishments. See Leonard (1986) for a related study of a population, including the smallest establishments.

8. In the moving cross sections of the longitudinal EEO sample the average number of employees in the small size (< 100) class did not increase as fast as in the large. Net employment fell in the small class size and grew in the large, so all net employment growth by size class is found in the large class. The contribution made by small (<100) establishments which stayed small compared to those which grew (over 100) can be deduced by comparing the cohort in column 4 with the cross section in column 6. Establishments that are no longer small by 1980 can account for all of the net job creation in the small class.

9. The direct job creation by small firms may be distinguished from their indirect effect. See Meller and Marfan [1981] for evidence that employment multipliers are larger for large than small industries, based on input-output data for Chilean manufacturing.

10. It is doubtful that much of what I interpret here as permanent job losses are really temporary layoffs or temporarily unfilled vacancies. Lillian

(1984) finds an average temporary layoff duration of 6 to 8 weeks. Abraham (1983) reports vacancy rates during the 1970's of 1.7 to 3.7 percent. The first is much shorter and the second much smaller than the 13.2 percent job loss over 6 years calculated here.

11. It also raises two questions for future research: 1) to what extent are low tenure workers sorted into low tenure jobs? and 2) to what extent can the life expectancy of jobs be anticipated by workers and so enter into job security, contracting and compensation decisions? Of course, there is a great deal of evidence that unemployment is not randomly distributed across people; blacks and teenagers in particular are more likely to be unemployed. Short employment spells also appear to be more common early in working life [Hall] and to be disproportionately borne by relatively few people. For example, Akerlof and Main [1981, p. 1007] estimate that while the mean unemployment year of a white male is spent in an 18-year job, the mean length of all jobs held by white males is only 4 years. Most workers appear to eventually find their way into stable jobs.

12. A number of important questions cannot be answered with the limited panel of data examined here, but will be explored in further work. How fast is job turnover taking place, and is the rate stable over time? The six-year changes can only be a lower bound of total changes in the distribution of jobs during the intervening years. If jobs flicker on and off faster, and are not all associated with known temporary layoffs, then the potential for unemployment is greater, as is the difficulty of distinguishing bad jobs from bad people. If the duration of jobs -- not of an individual's employment, but the lifetime of the position itself -- has decreased over time, the "natural" rate of unemployment will rise. It would be interesting to observe how the variability of firm size changed over the business cycle and with changes in government policy. In addition, we lack studies of the birth and death of establishments and firms, and of how optimum size and the equilibrium distribution of size vary with factor prices, regulations, and market conditions.

Table I

The Size Distribution of Establishments and Employment 1974-1980,
EEO Sample

Size Class	Proportion of all Establishments		Proportion of All Employment			
	(1) 1974	(2) 1980	By Size Class in 1974		By Size Class in 1980	
			(3) 1974	(4) 1980	(5) 1974	(6) 1980
1-49	0.244	0.225	0.038	0.050	0.044	0.033
50-99	0.236	0.243	0.070	0.077	0.078	0.069
100-249	0.300	0.296	0.200	0.217	0.201	0.190
250-499	0.124	0.134	0.181	0.180	0.184	0.187
500-999	0.061	0.064	0.177	0.170	0.166	0.177
1000+	0.035	0.038	0.335	0.306	0.327	0.345
TOTAL	68,690	68,690	16,287,127	17,111,035	16,287,127	17,111,035

Note: All data are from the longitudinal EEO sample.

Columns 3 and 6 are moving cross-sections.

Column 3 presents the distribution of 1974 employment by 1974 size class.

Column 6 presents the distribution of 1980 employment by 1980 size class.

Column 4 and 5 follow cohorts.

Column 4 presents the distribution of 1980 employment by 1974 size class.

Column 5 presents the distribution of 1974 employment by 1980 size class.

Table II

Regression of the Logarithm of Establishment Growth on Size,
Corporate Structure, Industry and Region, 1974-1980
(N=68,690)

Variable	Regression 1		Regression 2	
	Coefficient	Standard Error	Coefficient	Standard Error
Size 74	-0.124	(0.002)	--	--
Size 80	--	--	0.126	(0.002)
Single	0.151	(0.005)	-0.041	(0.005)
Proportion White Collar	0.069	(0.007)	0.119	(0.007)
Contract	0.008	(0.004)	-0.051	(0.004)
<u>Industry</u>				
Agriculture	0.095	(0.027)	-0.008	(0.027)
Mining	0.265	(0.014)	0.190	(0.014)
Construction	0.002	(0.014)	-0.044	(0.014)
Food	0.137	(0.009)	0.032	(0.009)
Tobacco	0.051	(0.047)	-0.201	(0.047)
Textiles	0.121	(0.013)	-0.133	(0.013)
Apparel	0.101	(0.013)	-0.068	(0.013)
Lumber	0.076	(0.016)	-0.009	(0.016)
Furniture	0.101	(0.018)	-0.063	(0.018)
Paper	0.119	(0.013)	-0.034	(0.013)
Printing	0.143	(0.014)	0.024	(0.014)
Chemicals	0.171	(0.012)	0.037	(0.012)
Petroleum & Coal	0.168	(0.027)	-0.025	(0.027)
Rubber & Plastics	0.126	(0.016)	-0.024	(0.016)
Leather	0.065	(0.024)	-0.112	(0.024)
Stone, Clay & Glass	0.074	(0.014)	-0.058	(0.014)
Primary Metal	0.141	(0.014)	-0.083	(0.014)
Fabricated Metal	0.087	(0.011)	-0.044	(0.011)
Machinery, Non-Electrical	0.200	(0.011)	0.003	(0.011)
Electric Machinery	0.238	(0.012)	-0.019	(0.012)
Transportation Equipment	0.234	(0.014)	-0.115	(0.014)
Instruments	0.244	(0.018)	0.060	(0.018)
Misc. Manufacturing	0.112	(0.022)	-0.035	(0.022)
Transportation	0.087	(0.008)	0.029	(0.008)
Utilities	0.102	(0.009)	-0.002	(0.009)
Wholesale Trade	0.035	(0.007)	0.058	(0.007)
Finance, Insurance	0.040	(0.007)	0.077	(0.007)
Services	0.212	(0.006)	0.093	(0.006)

Table II, Continued

Variable	Regression 1		Regression 2	
	Coefficient	Standard Error	Coefficient	Standard Error
<u>Census Region</u>				
Mid-Atlantic & E. North Central	-0.033	0.007	-0.044	0.007
W. North Central	0.007	0.009	0.016	0.009
South	0.011	0.007	0.022	0.007
West	0.043	0.008	0.054	0.008
Intercept	0.490	0.012	-0.581	0.012
R ²	0.09		0.09	
S.E.E.	0.431		0.431	
Mean of the Dependent	0.050	0.050		

Note: The dependent variable is the logarithm of the ratio of establishment size in 1980 to establishment size in 1974, or Size 80-Size 74.

Size 74 is the logarithm of the number of employees in 1974.

Size 80 is the logarithm of the number of employees in 1980.

Single is a dichotomous variable set to 1 if the establishment was not part of the multiplant enterprise in 1974.

Proportion White Collar is the ratio of non-clerical white collar employment to total employment in 1974.

Contract is a dichotomous variable set to 1 if the establishment was part of a federal contractor enterprise in 1974.

The omitted groups in the sets of dichotomous variables are retail trade and New England.