TOWARDS A THEORY OF *DE*-LOCATING ECONOMIC ACTIVITIES: SOME EVIDENCE FROM THE UNITED STATES

Jeffrey P. Richetto
The University of Alabama, U.S.A.

With an ever growing number of multinational and domestic firms closing down their operations or selectively cutting back services and output, the need for a decision framework which systematically evaluates how and where these reductions should occur steadily increases. The development of such a decision framework, referred to as the de-location problem is the focus of this paper. Specifically, the study traces the development of the process of de-locating activities in the United States; a process that is explainable by the multiunit, multiproduct firm and economic retrenchment. Also, the paper investigates the impact of shifts in regional economic processes, most notably the business cycle, on the magnitude and diffusion of business failure throughout the United States. The problem of measuring the diffusion of business failure employs an information statistic model.

While nations have struggled with the twin scourges of swift inflation and slow economic growth, millions of individuals have become unemployed. Climbing interest rates have forced tens of thousands of businesses into bankruptcy and have limited other businesses from modernizing their production processes. Despite a strained retrenchment, the international economy appears to be no closer to a recovery than at the outset of this crisis. France has instituted a four-month wage and price freeze and devalued the franc by 10 percent; Canada has limited salary increases for its federal employees to only 6 percent; Belgium has prohibited cost of living increases to pensioners and wage earners grossing $530 per month; some private banks have cut off credit to whole areas of Eastern Europe, Latin America and Africa; and firms in the United States have been going into bankruptcy court at the rate of about 500 per week (Alexander, 1982; Taylor, 1982). Not since the Great Depression of the 1930s has an economic downturn had such global reach; a situation that has affected both strong and weak economies, rich and poor nations, capitalist democracies and communist dictatorships.

With an ever growing number of multinational and domestic firms and businesses closing down their operations or selectively cutting back services and output, the need for a decision framework which systematically evaluates how and where these reductions should occur steadily increases. The development of such a decision framework, referred to as the *de*-location problem is the focus of this paper. Specifically, the study traces the development of the process of de-locating economic activities in the United States; a process that is ex-

plainable by both the emergence of the multiplant, multiproduct firm and economic retrenchment. The paper also investigates the impact of shifts in regional economic processes on the magnitude and diffusion of business failure throughout the continental United States; a pattern that is reflected in such factors as capital and information networks, regional employment cycles, assembly and distribution linkages, corporate organization, product specialization and life cycle, diseconomies of scale and market structure. The problem of measuring the diffusion of business failure is viewed as involving the measurement of the entropy of a system. Therefore, this paper employs an information statistic model.

THE EVOLUTION OF THE *DE*-LOCATION PROCESS

The study of spatial aspects of economic activities and their systems has long occupied the research endeavored by geographers and economists (Weber, 1929; Hoover, 1948; Losch, 1954; Estall and Buchanan, 1961; Alonso, 1964; Smith, 1971; Hamilton, 1978; Massam, 1980). The subject transcends conventional disciplinary boundaries and, in fact, requires an interdisciplinary perspective. However, as this research subject has come to embrace agriculture, extractive industry, manufacturing, community facilities, transportation and trade, there has been an increasing fragmentation of spatial economic analysis into these narrow specializations with their own methodology, favored techniques and body of literature. Nevertheless, it is apparent that especially since the late 1960s studies in any one of the above fields have emphasized spatial form and spatial process (Isard, 1967; Pred, 1967a, 1967b; Webber, 1972; Hamilton, 1974; Richetto, 1980; Storper, 1981). That is, research at both the theoretical and applied level has attempted to articulate spatial patterns of new economic activity and explain how and why these patterns exist as well as their expected changes.

Within the context of the United States this approach to the location of economic activity has been both logical and relevant. Throughout the first 70 years of this century, the United States' economy has witnessed significant growth and development primarily due to the ever-increasing and varied economic activity sector. On the one hand, new industry and businesses emerged while at the same time existing activities were expanding all of which were seeking for a location that would provide a long-term reasonable rate of return on their investment (Chinitz and Vernon, 1960; Greenhut, 1964). Since 1970, however, the U.S. economy has undergone profound change, whereby the single most important change is reflected in the fact that the nation's economy has moved from a consumption-oriented expansionist attitude towards a planned, efficient, systematic program for economic growth and development. This period of economic transition is explainable, to a large extent, by the rise in the cost of capital, the decline in the consumer's real purchasing power and an overextended economic activity sector involving higher levels of risk, uncertainty and competition. These and other significant shifts in the economic environment have created new and demanding challenges to industrialists and business management who are interested in locating either new facilities and expanding or relocating existing operations.

An equally important challenge related to this era of economic transition may be identified — the closure and cutback in economic activities. Heretofore, few studies have investigated this aspect of the general location problem (Lever, 1973; North, 1974; Barkley, 1976, 1981; Erickson and Leinbach, 1979). That is, as the cost of capital spirals upwards and profit margins become increasingly elastic, as alarming levels of risk and uncertainty reflect rising competition between economic activities and as the consumer's purchasing behavior becomes ever more selective and planned, the likelihood of a firm or business closing down or at least curtailing and modifying its operation becomes greater, i.e., the de-location problem.

The problem of de-locating economic activities may be generalized as: (1) the closure of the whole or part of a single facility or system of facilities, (2) a permanent or temporary cut-

back in any single or set of components of the entire production process, (3) the elimination of product or service lines provided by an economic activity, or (4) any combination of the above three processes. Although failure and curtailment have long been observed throughout the United States' economic activity sector, it has been only since the early 1970s that the magnitude of these phenomena has reached critical proportions (Table 1). Until recently, location theorists have provided little, if any, insight into the facility closure and curtailment process primarily because they nor the industrial and business community looked beyond the traditional microeconomic aspects of a facility — the single facility firm. In fact, the firm was viewed as a static or given organizational element and of no spatial consequence. This viewpoint, in turn, led to another; that individual economic activities continued to be small and numerous enough so as not to influence the price or demand and supply of material inputs, labor recruitment, transport services and markets, capital and information networks and diffusion of research and development funds.

Since 1965, however, the form of the economic activity has altered significantly. Acquisitions and mergers have played an increasingly important role in restructuring the economic activity sector (Figure 1). Through its sheer scale dimensions the multiplant, multiproduct firm owning and operating many constituent productive units in vertical, horizontal and diagonally-integrated fields of economic endeavor has necessitated a rethinking of classical and neo-classical spatial economic theory. In particular, three major types of spatial adjustments that have nurtured the de-location problem are identifiable: (1) market and product diversification, (2) managerial organization and (3) inter/intra-firm linkages.

First, the nature and spatial extent of markets have become characterized by highly imperfectly competitive conditions of oligopoly whereby these larger, higher-order corporate organizations exert a degree of control over the external economic environment (Steed, 1971; Beyers, 1981). As such, the issue of selecting a location for a new activity or branch unit as well as for closure or cutback must now be examined not in isolation but in the context of a set of interrelationships involving production, exchange and consumption units along with management objectives within the corporation. Hamilton (1974), for example, reports that in the medium or short-term the multiplant, multiproduct economic activity oscillates between greater spatial concentration and greater spatial dispersion of administrative, productive and distributive functions. Both spatial processes have served a dual purpose for these economic activities: (1) to counteract threats from competitors by entering or strengthening the share of, and control over, attractive and expanding, or necessary but contracting, markets; and (2) to reduce uncertainties either by forward integration into markets to ward against competition and economic recession or by backward integration into input supplies to adapt to technological, political and other changes. Moreover, the cyclical shifts in spatial pattern reflect changes in corporate strategy and functional evolution and are related to the overall pattern of product life cycles, i.e., initiation, exponential growth, maturation and decline (Burch, 1978).

Second, the multiplant, multiproduct firm has effectively brought about the geographical separation of administrative and production functions (Pred, 1974). The process of acquisition or merger typically implies the transfer of managerial control away from local firms or units to a more centrally positioned corporate headquarters. In effect, the control over a community or region's productive resources is transferred to another community or region wherein the corporate headquarters is situated. This transfer of control is detrimental to the affected community or region in at least one of three ways: (1) greater economic risk and uncertainty, (2) profits are lost through transfer of control, and (3) key decision-making and administrative employment opportunities are unavailable or few in number. Also, the regional transfer of

Table 1: Business Failures in the United States for Select Years

Line of Industry	Mining and Manufacturing		Wholesale Trade		Retail	Trade
Year	Number	Liabilities ($000)	Number	Liabilities ($000)	Number	Liabilities ($000)
1940	2,455	66,799	1,316	20,405	8,495	58,115
1950	2,074	95,094	1,016	33,594	4,429	72,691
1960	2,612	289,635	1,473	107,156	7,386	241,094
1965	2,097	350,324	1,355	144,361	6,250	287,478
1970	2,035	817,841	984	179,041	4,650	360,603
1975	1,645	1,020,609	1,089	407,323	4,799	1,835,908
1980	1,599	1,885,017	1,284	590,913	4,910	993,539
1981	2,224	2,370,415	1,708	1,128,632	6,882	1,558,528

	Construction		Commercial Service		United States	
	Number	Liabilities ($000)	Number	Liabilities ($000)	Number	Liabilities ($000)
1940	760	13,311	593	8,054	13,619	166,684
1950	912	25,651	731	21,253	9,162	248,283
1960	2,607	201,369	1,367	99,376	15,445	938,630
1965	2,513	290,980	1,299	248,593	13,514	1,321,666
1970	1,687	231,533	1,392	298,736	10,748	1,887,754
1975	2,262	640,845	1,637	475,485	11,432	4,380,170
1980	2,355	752,109	1,594	413,502	11,742	4,635,080
1981	3,614	851,780	2,366	1,045,825	16,794	6,955,180

Source: *The Dun and Bradstreet Business Failure Record,* Business Economic Division, 1982.

managerial control increases the spatial disparity between decision-making and production units thereby strengthening the dominance of central over peripheral locations. In turn, this places units at peripheral locations at greater long-term risk because loss of local control over major decisions may create conflicts of interest between a firm's corporate system and the local or regional economy wherein the unit operates.

The third and final type of spatial adjustment associated with the multiplant, multiproduct firm is the respecification of inter and intrafirm linkages as related to branch unit closures particularly during periods of economic downturn. That is, attendant to the geographical separation of administrative and production functions these large-scale firms have developed a network of hierarchically arranged external and especially internal linkages (e.g., resource and intermediate component suppliers, market, capital and information flow and corporate organization) which serve to connect the firm's overall production process (Blair, 1978; Lorch, 1981). However, since assembly, production, distribution and administrative functions vary locationally within a multiplant corporation's system of units, not all units are equally susceptible to closure or cutback. In fact, those units whose operations are deemed to be the least efficient or whose functions can be most easily assumed by other units in the system are likely candidates for closure (Rushton, 1979). Also, higher cost units, those with higher transporta-

tion cost and poorer market accessibility, become prime candidates for closure or curtailment especially during periods of economic difficulty (North, 1974).
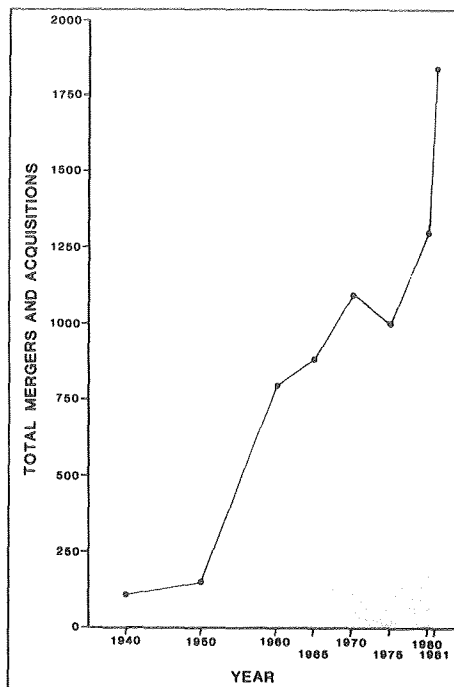

Figure 1: Total Number of Mergers and Acquisitions in the United States, 1940-1981. Source: *Merger and Acquisitions,* for select years.

In sum, it appears that the very elements which have created and long nurtured the growth and development of the multiplant, multiproduct firm also serve as inputs in the *de*-location decision. That is, during periods of economic downturn industrialists and business management should carefully weigh in their decision to close or curtail their productive process such factors as: (1) external linkages including suppliers and distributors in outlying regional markets, (2) internal linkages which connect the firm's overall system of units, (3) product life cycle and product line efficiency, (4) anticipated loss in control over a community or region's productive resources, and (5) level of uncertainty associated with reopening or reinstating a unit's original productive capacity (in lieu of the stability of the local or regionally served market, existing and potential competition, and availability and cost of local or regional production factors).

All of the above economic-based criteria have a spatial and dynamic dimension. In an effort to more fully develop the spatiotemporal nature of business failure, the study investigates the impact of business cycle on the magnitude and diffusion of business failure in the United States. For the purpose of investigating this diffusion pattern from 1940 to 1980, the United States was divided into three major regions: the North, South and West. Each of these regions was further partitioned into three census regions. The North was partitioned into East North Central, the Mid-Atlantic and New England; the South Central, East South Central and South Atlantic; and the West into Pacific, Mountain and West North Central (Figure 2).
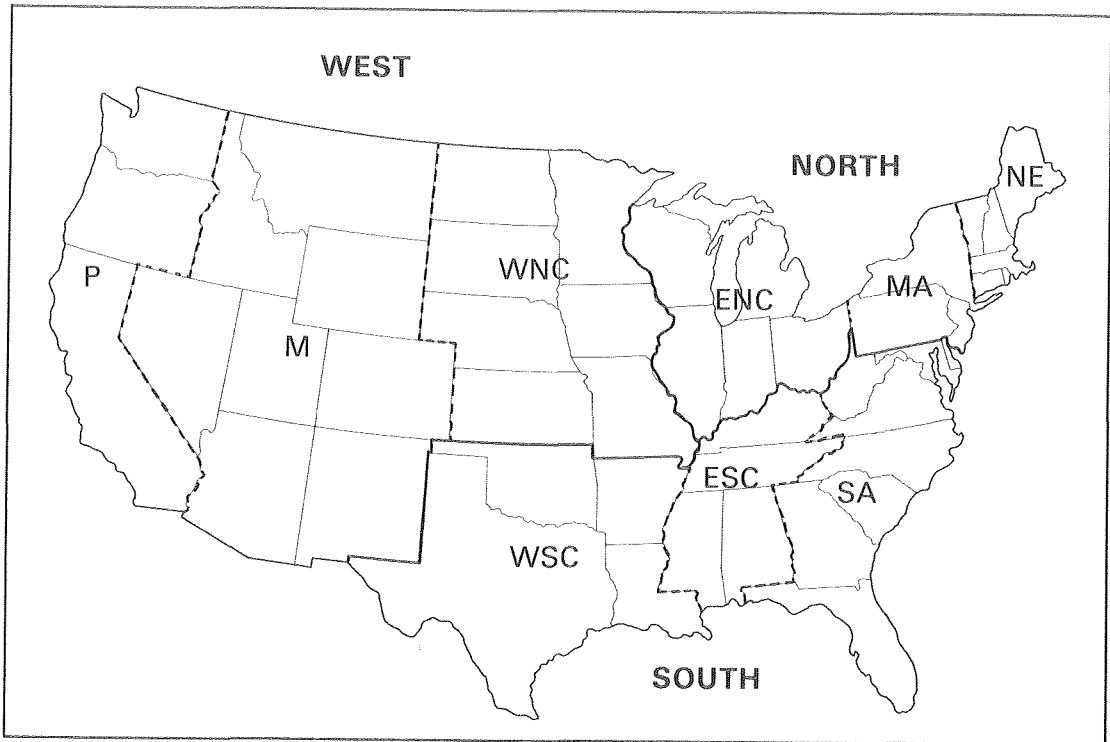
Figure 2: The Major Region, Subregion and State Partitions for the United States.

THE INFORMATION MODEL

The problem of measuring the spatial dispersion (concentration) of business failure is viewed as involving the measurement of the entropy of a system. Total dispersion occurs when system entropy is maximized, that is, when complete equality holds throughout a system. Conversely, total concentration results when system entropy equals zero. The present analysis utilizes information statistics to measure simultaneously information concerning trends in national, regional and state levels of business failure dispersion based upon the number of business failures per 10,000 concerns for selected years (Table 2). By utilizing a modification of Shannon's original formula (Theil, 1967), the total dispersion H(Y) for all states over all time periods is given by:

$$H(Y) = \sum_{t=1}^{T} \sum_{i=1}^{N} y_{it} \log_2 1/y_{it} \tag{1}$$

H(Y) takes on a maximum value of $\log_2 TN$ (complete dispersion) when all state business failure indices in all time periods are equal and a minimum value of zero (complete concentration) when one state in one time period contains all the business failures; that is, $Y_{it} = 1.0$ for any Y_{it}, and Y_{mn} equals zero for any state m in any time period n when m = i and n = t.

Equation (1) may be decomposed into between and within regional dispersion. Group states into R regions S_1, S_2, ... S_r, where each state belongs exactly to one region. Expand the expression of equation (1) as follows:

$$\sum_{i=1}^{N} y_{it} \log_2 1/y_{it} = Y_{rt} \sum_{i \epsilon S_r} y_{it}/Y_{rt} \log_2 Y_{rt}/Y_{it} + \log_2 1/Y_{rt} \tag{2}$$

where $Y_{rt} = \sum_{i \epsilon S_r} y_{it}$

such that $\sum\limits_{t=1}^{T} \sum\limits_{r=1}^{R} Y_{rt} = 1.0$

By combining equations (1) and (2) and simplifying

$$H(Y) = \sum_{t=1}^{T} \sum_{r=1}^{R} Y_{rt}\log_2 1/Y_{rt} + \sum_{t=1}^{T} \sum_{r=1}^{R} Y_{rt} \left[\sum_{i \epsilon S_r} y_{it}/Y_{rt}\log_2 Y_{rt}/y_{it} \right] \tag{3}$$

The first term on the right of equation (3) measures between region dispersion and takes on a maximum value of $\log_2 RT$ when all Y_{rt} are equal. The second term on the right of equation (3) measures the weighted within region dispersion and takes on a maximum value when all states within all regions have equal business failure indices over all time periods.

Finally, within region dispersion as computed in equation (2) can be decomposed into between and within subregion dispersion. Group states into G subregions $S_{r1}, S_{r2}, \ldots S_{rg}$, where each state belongs to one subregion and g subregions are wholly contained in region r. Expand the expression in brackets in the second term on the right of equation (3) as follows:

$$\sum_{i \epsilon S_r} y_{it}/Y_{rt}\log_2 Y_{rt}/y_{it} = \tag{4}$$

$$\sum_{g=1}^{G} Y_{grt}\log_2 1/Y_{grt} + \sum_{g=1}^{G} Y_{grt} \left[\sum_{k \epsilon S_{grt}} y_{krt}/Y_{grt}\log_2 Y_{grt}/y_{krt} \right]$$

where Y_{krt} equals the business failure index of state k with respect to region r in time period t and that Y_{grt} represents business failure in subregion g with respect to region r in time period t. By multiplying equation (4) by $\sum\limits_{t=1}^{T} \sum\limits_{r=1}^{R} Y_{rt}$

and adding the first term on the right of equation (3) the final dispersion statistic, H(Y), is given by:

$$H(Y) = \sum_{t=1}^{T} \sum_{r=1}^{R} Y_{rt}\log_2 1/Y_{rt} + \sum_{t=1}^{T} \sum_{r=1}^{R} Y_{rt} \left[\sum_{g=1}^{G} Y_{grt}\log_2 1/Y_{grt} \right] +$$

$$\sum_{t=1}^{T} \sum_{r=1}^{R} Y_{rt} \left[\sum_{g=1}^{G} Y_{grt} \left[\sum_{k \epsilon S_{grt}} y_{krt}/Y_{grt}\log_2 Y_{grt}/y_{krt} \right] \right] \tag{5}$$

where the first term on the right measures the between region dispersion of business failure over all time periods, the second term measures the between subregion dispersion over all time periods and the last expression measures the within subregion dispersion for all time periods.

BUSINESS FAILURE IN THE UNITED STATES

Not since the Great Depression has the performance of the U.S. economy been more uncertain. The identification of problem areas as well as solutions had eluded economists, policymakers and business management. Of primary significance is that the U.S. economy has devolved into five separate economies (old line industry, energy, high technology, agriculture and service) that are being pulled apart with widening differences in the growth (or decline) of output, employment, investment and profits, the impact of which has been dividing the nation into regions of haves and havenots. That is, since 1970 production, population and employment have increased steadily in the South and West (particularly the Southwest) where energy and high technology industries abound. In contrast, the industrial Northeast and Midwest have experienced relative decline. In fact, so rapid and complete has been the dis-location of labor and capital that the major metropolitan areas extending from Omaha to Washington, D.C. are in serious financial trouble with high unemployment, urban decay and eroding political power. For example, during the 1970s more than 3 million individuals moved from the North while the U.S. Bureau of the Census projects that by 1990 an additional 3.3 mil-

Table 2: Rate of Economic Activity Failure by State
(failure rate per 10,000 listed concerns)

	1940	1950	1960	1965	1975	1980
NORTH						
Mid Atlantic						
N.Y.	168.3	75.5	124.8	97.7	56.0	28.8
N.J.	78.3	38.1	74.8	55.6	87.1	53.6
Pa.	54.7	23.5	47.9	37.9	58.2	50.2
E.N. Central						
Ill.	76.7	30.4	58.9	45.0	50.4	58.0
Ind.	29.4	9.2	24.1	19.5	38.1	43.5
Mich.	45.6	29.7	52.3	23.9	70.2	76.3
Ohio	39.0	25.3	65.2	63.7	28.0	44.4
Wis.	44.5	38.5	49.5	49.3	21.3	39.1
New England						
Conn.	73.3	42.5	64.6	39.7	33.6	29.5
Me.	61.6	30.2	26.6	55.8	34.9	45.6
Mass.	68.3	57.1	34.9	52.6	47.3	37.0
N.H.	48.4	46.7	34.1	56.5	64.3	11.9
R.I.	65.6	54.6	67.8	60.6	24.8	13.7
Vt.	28.8	20.5	22.0	8.2	16.4	7.1
SOUTH						
S. Atlantic						
Del.	34.2	5.2	30.2	10.4	45.2	36.4
Fla.	57.5	30.7	93.9	89.7	26.3	24.7
Ga.	69.5	21.5	45.5	57.6	42.8	45.7
Md.	37.1	44.2	44.4	64.0	69.6	37.2
N.C.	44.7	18.1	24.9	14.0	19.2	34.2
S.C.	30.9	4.7	60.3	19.7	4.0	6.3
Va.	62.7	21.2	31.4	28.4	71.3	52.3
W.Va.	26.3	19.5	35.2	46.8	17.8	24.8
E.S. Central						
Ala.	31.0	17.2	23.9	37.9	27.6	45.2
Ky.	28.9	11.1	21.8	16.5	38.1	46.3
Miss.	36.3	17.3	25.3	21.5	27.8	38.8
Tenn.	36.0	15.1	39.8	44.8	40.8	101.1
W.S. Central						
Ark.	43.0	13.3	27.9	33.1	19.5	38.8
La.	13.6	18.2	43.6	41.4	22.0	31.9
Okla.	45.4	12.6	26.8	34.0	41.1	69.0
Texas	27.1	14.1	35.0	53.0	41.2	57.5
WEST						
W.N Central						
Iowa	28.1	9.0	19.1	23.7	19.3	29.5
Kan.	19.9	8.1	32.3	20.9	20.6	51.8
Minn.	21.6	10.8	19.9	58.7	50.7	59.7
Mo.	24.2	18.9	20.3	15.9	15.4	22.1
Neb.	49.1	14.7	12.3	22.1	30.4	57.5

N.D.	6.8	7.8	12.6	17.4	6.9	70.0
S.D.	22.6	7.5	4.3	26.0	15.8	74.5
Mountain						
Ariz.	43.4	69.9	104.4	123.7	84.8	6.3
Col.	51.6	20.1	35.1	45.9	25.7	33.0
Idaho	34.8	18.2	41.1	75.5	26.6	49.5
Mon.	12.1	5.2	14.2	6.5	29.0	79.3
Nev.	75.2	52.6	37.4	52.9	19.6	40.5
N. Mex.	19.0	6.7	29.4	57.2	27.7	37.2
Utah	54.1	31.3	31.6	211.7	14.1	15.7
Wyo.	41.7	6.8	8.1	18.1	7.6	2.6
Pacific						
Calif.	64.6	102.3	123.9	123.9	73.0	70.0
Ore.	96.3	51.2	207.1	136.9	77.9	85.9
Wash.	44.9	51.5	111.2	93.7	114.1	177.8

Source: Compiled by author from Dun and Bradstreet, *Business Failure Record,* 1940, 1950, 1960, 1965, 1975, 1980.

lion people will leave this region. Collectively, the states in the North have already lost 15 congressional seats while further losses are anticipated. Moreover, since 1960 and especially throughout the 1970s, manufacturing employment has declined in the North. Meanwhile the South and West have and will continue to be regions of high inmigration and capital investment resulting in an ever greater number of employment opportunities and the location of existing and new economic activities. The region and sub-regional implications associated with this on-going twenty year process are summarized in Figure 3.
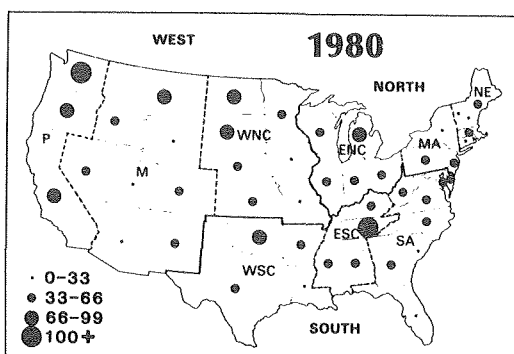

Figure 3: Rate of Economic Activity Failure by State (failure rate per 10,000 listed concerns).

Although the North, particularly the Northeast, has long suffered high rates of economic activity failure, new capital investments in the form of infrastructure, expansion of existing facilities and the location of new activities have more than offset the loss of businesses. In fact, the tenet that a capitalist economy grows by a process of creative destruction has served as a cornerstone for entrepreneurial innovation. That is, new growth industries displace older, less dynamic enterprises thus effecting differentials in growth (decline) rates. Throughout most of the United States' history these differentials were manageable. However, the pace and extent of dislocation has been creating severe region and subregional disparities and increasing ten-

sions between industries (Tables 1 and 2). The extent of these disparities becomes even more evident by a thorough review of the dispersion statistics found in Tables 3, 4 and 5.

Table 3 provides a summary partition of the dispersion statistics such that the sum of all elements add to the grand total of 4.5558, a number which is 35.2 percent of the theoretical maximum of 12.9259. The smaller the number in the table the higher degree of concentration for a particular period or spatial partition; the larger the number the greater the dispersion. It can be seen that the overall level of dispersion has decreased. Of note, 1950 and the years shortly following WWII witnessed not only lower rates of economic activity failure but also that the closure of businesses was spatially concentrated in the Northeast, MidAtlantic and Pacific subregions. However, the period dispersion statistics for between regions, 4.1151, is 98.2 percent of the theoretical maximum of 4.1699 indicating that between 1940 and 1980 there has been little regional bias in the failure rate of economic activities. In sharp contrast the period dispersion statistics for both the subregion and state level illustrate significant disparity in business failures. Thus, not only has dispersion between the major regions decreased (i.e., North, South and West), it has also done so for the subregions (i.e., West: P, M and WNC) and concomittantly the states within all subregions (i.e., Pacific: Washington, Oregon and California). Finally, the period dispersion statistics are exceedingly modest relative to the theoretical maximum values calculated for each spatial partition (excepting between major region). The interpretation of such numerical comparisons suggest strongly the tendency of concentration rather than dispersion.

What is not immediately evident, however, is that the rates at which concentration is occurring are different for the various spatial partitions. Tables 4 and 5 provide this information by expressing the indices of Table 3 as percentages. In Table 4, for example, the figures are calculated by dividing each of the dispersion indices of Table 3 into the grand total and expressing them as a percentage. These percentages reflect in a simplified fashion the findings of Table 3. The percentages of Table 5, on the other hand, are calculated by dividing the corresponding indices of Table 3 into their row totals. The interesting period trends that emerge show: (1) that between region dispersion is declining relative to a modest increase in dispersion (evidenced in 1980) at the subregion and state level and (2) there appears to be a cyclical regularity in the period dispersion statistics for all spatial partitions. In support of these findings concerning the overall pattern of business failure in the United States many underlying factors are identifiable. Although some of these factors include product life cycles, economies-diseconomies of scale, employment cycles and cyclical changes in general location factors, the remaining discussion will emphasize the impact of business cycles.

Table 3: The Dispersion Statistic by Period, Major Region and Census Region

Period	Total	Between Region	Within Region Between Census Region	Within Region Within Census Region
1940	.8176	.7330	.0588	.0258
1950	.5313	.5080	.0158	.0075
1960	.8285	.7343	.0699	.0243
1965	.8566	.7649	.0657	.0260
1975	.7134	.6517	.0449	.0168
1980	.8084	.7232	.0629	.0223
Total	4.5558	4.1151	.3180	.1227
Maximum Possible Dispersion	12.9259	4.1699	7.3398	1.4162

Table 4: Percent Total Dispersion by Period, Major Region and Census Region

Period	Total	Between Region	Within Region Between Census Region	Within Region Within Census Region
1940	17.9	16.1	1.3	0.5
1950	11.7	11.2	0.3	0.2
1960	18.2	16.1	1.5	0.6
1965	18.8	16.8	1.4	0.6
1975	15.6	14.3	0.9	0.4
1980	17.8	15.8	1.5	0.5
Total	100.0	90.3	6.9	2.8

Table 5: Percent of Period Dispersion by Major Region and Census Region

Period	Total	Between Region	Within Region Between Census Region	Within Region Within Census Region
1940	100.0	89.6	7.2	3.2
1950	100.0	95.6	2.9	1.5
1960	100.0	88.6	8.4	3.0
1965	100.0	89.3	7.7	3.0
1975	100.0	91.4	6.3	2.3
1980	100.0	89.5	7.8	2.7
Total	100.0			

THE IMPACT OF BUSINESS CYCLES ON THE RATE OF BUSINESS FAILURE

The principal phases of the business cycle are recession, recovery and intervening periods. Although postwar recessions in the United States have been distinguished by less pronounced steplike changes in investment and industrial production than prior WWII, the alarming rate of business dislocations and failures has warranted serious consideration. Gorkin (1981) states that the more severe the recession the more pronounced is the change in the share of states and regions in the value of industrial production, and the more intensive is the change in the spatial pattern of industrial growth and decline (Table 6).

Table 6 shows the industrial output share, expressed in percent, that was redistributed among regions during the stated periods. In recession years, for example, the North lost 6.30 percent of its industrial output which was redistributed between the South (4.36 percent) and the West (1.94 percent). The data also suggest that the decline in the share of industrial output in the North and the growing share of the southern and western states in industrial production between 1953 and 1975 is closely correlated with upturn and downturn phases in industrial production as a whole. In fact, the mean annual decline in the share of industrial output in the North was five times more intensive during recession years than in years of industrial recovery and that this tendency was most characteristic of the East North Central and MidAtlantic sub-regions. Moreover, the states exhibiting the greatest absolute decline in industrial production

Table 6: Redistribution of the Share of Value Added by Manufacturing in the United States by Phases of the Business Cycle, 1953-1973.

Region	Recession Years (1954, 1957, 1958, 1961, 1970, 1971)		Years of Recovery (1955, 1959, 1965, 1966, 1972, 1973)		Intermediate Years		Total (1953-73)	
	Total	Mean Annual Change	Total	Mean Annual Change	Total	Mean Annual Change	Total	Mean Annual Change
NORTH	-6.30	-1.05	-1.44	-0.24	-4.27	-0.56	-12.01	-0.60
Industrial East	-7.21	-1.20	-1.45	-0.24	-4.36	-0.37	-13.02	-0.65
New England	-0.83	-0.14	-0.15	-0.02	-0.92	-0.08	-1.90	-0.10
Mid Atlantic	-1.18	-0.19	-3.77	-0.63	-1.74	-0.15	-6.69	-0.33
E. North Central	-5.20	-0.87	2.47	0.41	-1.70	-0.14	-4.43	-0.22
W. North Central	0.91	0.15	0.01	0.00	0.09	0.01	1.01	0.05
SOUTH	4.36	0.73	1.35	0.22	2.54	0.21	8.25	0.41
S. Atlantic	2.27	0.38	0.49	0.08	0.92	0.08	3.68	0.18
E. South Central	1.13	0.19	0.55	0.09	0.55	0.04	2.23	0.11
W. South Central	0.96	0.16	0.31	0.05	1.07	0.09	2.34	0.12
WEST	1.94	0.32	0.09	0.02	1.73	0.15	3.76	0.19
Mountain	0.25	0.04	0.34	0.06	0.32	0.03	0.91	0.05
Pacific	1.69	0.28	-0.25	-0.04	1.41	0.12	2.85	0.14

Source: Calculated from U.S. Census of Manufacturers and Annual Survey of Manufacturers (select years).

were Michigan, Ohio, Pennsylvania and Illinois with a combined decrease of 6.92 percent.

Changes in industrial production by phases in the business cycle also exhibit significant differences among industry groups that are reflected not only in industrial structure but also in the overall spatial structure of industry. The general conclusion is that the share of non-durable activities in manufacturing declines in periods of economic upturn whereas the entire set of metal industries exhibits its greatest decline in periods of economic downturn. And, it is these structural peculiarities in changes of industrial production that underlie the overall spatial pattern of growth and decline of industry. However, it is an oversimplification to regard the structural characteristics of industry groups across the United States as the only factor influencing the spatial adjustments of industry witnessed during the phases of the business cycle. In fact, other processes including market and product diversification, inter/intra-firm linkages, corporate organization, employment cycles, governmental regulation and economies-diseconomies of scale aid in identifying the spatio-economic pattern of business failure (and conversely business growth) in the United States.

SUMMARY AND CONCLUSIONS

The principle of location and its application has been traditionally couched within the framework of a developing and expanding economy. The location of new and expanding activities as well as the relocation of existing operations have provided the major impetus for the development of a theory of location. More recently, however, industrialists, business management and public administrators are concerned about the alarming rate of firm closure and dislocation (i.e., the de-location problem) as they relate to economic downturn and greater levels

of uncertainty. And, while American companies are currently failing at the rate of 500 per week, this phenomenon is international in scope.

Within this context, this paper has attempted to: (1) demonstrate the need to broaden the theory of location by discussing the evolution of the de-location problem, (2) identify a set of regional economic processes underlying the de-location problem and (3) investigate the impact of shifts in these processes (business cycle) on the magnitude and diffusion of business failure throughout the continental United States. It appears that although there is neither a one-to-one or necessarily an antithetical relationship between the conventional and the de-location problem, there are a number of regional economic processes that are commonly shared. Some of these processes include product specialization and life cycle, economies-diseconomies of scale, assembly and distribution linkages, corporate structure and the business cycle.

The information analysis indicates a modest to low bias of these and other regional economic processes on the rate of business failure at the major regional level. In contrast, these same processes (especially business cycles) are shown to exert a powerful influence on the spatial pattern of business failure at both the subregion (census region) and state level. Thus, in an effort to more carefully monitor and plan against firm closings the preliminary findings of this study suggest that management decisions and policy should increasingly stress the behavior of regional economic processes at the census region and state level. Finally, more research is needed to specify the exact nature of the relationships between economic activity failure and those regional economic processes identified in this study. Also, it is felt that this information could serve to lessen the severity of economic downswings on the general viability of businesses or at the very least allow for a systematic search and evaluation for curtailment or closure of facilities and operations.

REFERENCES

Alexander, C. (1982). "What in the World is Wrong?". *Time,* 52-57.

Alonso, W. (1964). *Location and Land Use.* Cambridge: Harvard University Press.

Barkley, D. (1976). "The Factors Contributing to Industrial Outmigration from Rural Areas of Iowa." Unpublished Ph.D. dissertation, Iowa State University.

Barkley, D. (1981). "Regional Manufacturing Employment Cycles Revisited." *Annals of Regional Science,* 15, 66-82.

Beyers, W. (1981). "Alternative Spatial Linkage Structures in Multiregional Economic Systems." in Rees, J., Hewings, G. and Stafford, H. (eds.), *Industrial Location and Regional Systems,* New York: Bergin Publishers, 73-90.

Blair, J. (1978). "Establishment, Size, Market Organization and Interindustry Linkages." *Growth and Change,* 9, 42-47.

Burch, C. (1978). "How General Motors Turned Itself Around." *Fortune,* January, 86-102.

Chinitz, B. and Vernon, R. (1960). "Changing Forces in Industrial Location." *Harvard Business Review,* 38, 126-136.

Erickson, R. and Leinbach, T. (1979). "Characteristics of Branch Plants Attracted to Nonmetropolitan Areas." in Lonsdale, R.F. and Seyler, H.L. (eds.), *Nonmetropolitan Industrialization,* New York: Wiley, 57-78.

Estall, R. and Buchanan, R. (1961). *Industrial Activity and Economic Geography. London:* Hutchinson University Press.

Gorkin, A.P. (1981). "The Impact of Business Cycles on the Spatial Structure of Manufacturing in the United States." *Soviet Geography,* 20, 240-254.

Greenhut, N. (1964). "When is the Demand Factor of Location Important?" *Land Economics,* 40, 175-184.

Hamilton, F.E.I. (1974). *Spatial Perspectives on Industrial Organization and Decision-Making.* New York: John Wiley.

Hamilton, F.E.I. (1978). *Contemporary Industrialization.* London: Longman.

Hoover, E. (1948). *The Location of Economic Activity.* New York: McGraw-Hill.

Isard, W. (1967). "Game Theory, Location Theory and Industrial Agglomeration." *Papers and Proceedings of the Regional Science Association.* 18, 1-11.

Lever, W. (1973). "Cyclical Changes in Factors Affecting Industrial Location." *Land Economics,* 49, 218-221.

Lorch, B. (1981). "Mergers and Acquisitions and the Geographic Transfer of Corporate Control: Some Evidence from Canada's Manufacturing Industry." in Rees, J., Hewings, G. and Stafford, H. (eds.). *Industrial Location and Regional Systems,* New York: Bergin Publishers, 123-134.

Losch, A. (1954). *The Economics of Location.* New Haven: Yale University Press.

Massam, B. (1980). *Spatial Search: Applications to Planning Problems in the Public Sector.* Oxford: Pergamon Press.

North, D. (1974). "The Process of Locational Change in Different Manufacturing Organizations." in Hamilton, F.E.I. (ed.), *Spatial Perspectives on Industrial Organization and Decision-Making.* New York: John Wiley, 213-244.

Pred, A. (1967a). *Behavior and Location: Foundations for a Geographic and Dynamic Location Theory, Part I.* Sweden: Gleerup.

Pred, A. (1967b). *Behavior and Location: Foundations for a Geographic and Dynamic Location Theory, Part II.* Sweden: Gleerup.

Pred, A. (1974). *Major Job-Providing Organizations and Systems of Cities.* Washington, D.C.: Association of American Geographers.

Richetto, J.P. (1980). "The Environment as a Factor for Locating Nuclear Electrical Facilities in the United States." *Geografiska Annaler.* series B, 62, 39-46.

Rushton, G., *et al.* (1979). *Studies of the Locational Efficiency of Services.* Discussion paper no. 26, Department of Geography, University of Iowa.

Smith, D. (1971). *Industrial Location: An Economic Geographic Analysis.* New York: John Wiley.

Steed, G. (1971). "Plant Adaptation, Form Environments and Location Analysis." *Professional Geographer.* 23, 324-328.

Storper, M. (1981). "Toward a Structural Theory of Industrial Location." Rees, J., Hewings, G. and Stafford, H. (eds.) Industrial Location and Regional Systems. New York: Bergin Publishers, 17-40.

Taylor, A. (1982). "The Growing Bankruptcy Brigade." *Time,* 90-91.

Theil, H. (1967). *Economics and Information Theory.* Amsterdam: North Holland Publishing Company.

Webber, M. (1972). *Impact of Uncertainty on Location.* Cambridge: MIT Press.

Weber, A. (1929). *Alfred Weber's Theory of the Location of Industries,* Chicago: University of Chicago Press.