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**Factors affecting business mortality: A case study of the
restaurant industry on Oahu, Hawaii**

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University of Hawaii, 1988

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Ann Arbor, MI 48106

FACTORS AFFECTING BUSINESS MORTALITY:
A CASE STUDY OF THE RESTAURANT INDUSTRY ON OAHU, HAWAII

A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE
UNIVERSITY OF HAWAII IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF

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IN ECONOMICS

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ABSTRACT

This study examines and hopes to improve upon the explanation of why businesses exit from an industry. This field has thus far been largely neglected. As shown by the literature in Chapter II, very few theoretical studies have attempted to model the exit process. However, there have been a large number of empirical studies that have contributed to the field. These studies can be divided into three categories: (1) studies that measure the mortality of business firms; (2) studies that explain the observed pattern of business mortality; and (3) studies that attempt to predict future failure of individual firms.

The literature on business firm mortality indicated that focusing on a single industry and on variables within a particular type of firm would be most logical and productive since these variables can be age-related. Thus, the restaurant industry was selected as a case study.

The analysis of the restaurant industry in Oahu revealed that the probability of exit decreased with a firm's age. The estimated mortality functions were able to accurately predict the observed exit of firms. None of the macroeconomic explanatory variables contributed to the

predictive power of the model. Additionally, there appeared to be no significant correlation between high entry rate to the high exit rate of firms. In summary, the findings of the study suggest that variables related to the age of the firm determine to a large extent the firms survival or failure.

The analysis concludes with an interview of both former and current owners/managers of the firms in the case study. The empirical results suggest a unique role of cash reserve in determining the firms survival or failure. Finally, it is concluded that the variables associated with firm's age were much more important in explaining business exits than the variables associated with shifts in the mortality function.

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CHAPTER 1

INTRODUCTION

Entry and exit of business firms occupy a prominent role in economic theory. The entry of firms into an industry is counted upon to eliminate excess profits and the exit of firms is expected to reduce the excess capacity and weed out inefficient producers. The potential entry of a firm has been considered one of the major determinants of an industry's performance and in the new contestable markets theory. The conditions of entry and exit are the major determinants of contestability.

While the entry of firms into an industry has received a lot of attention, the exit of firms has been largely neglected. The first purpose of this study, therefore, was to review the economic literature in order to assess the current state-of-the-art. As reported in chapter 2, a prior belief that the exit process is relatively neglected is only partially correct. Indeed very few theoretical studies have attempted to model the exit process. However, there have been a large number of empirical studies that have examined the exit of businesses from an industry. These studies can be categorized as follows:

- (1) studies that measure the mortality of business firms;

(2) studies that explain the observed pattern of business mortality; (3) studies that attempt to predict future failure of individual firms.

The first group of studies clearly established that the mortality of firms in industries that were dominated by small firms follow a pattern similar to "infant mortality" in biological populations; that is, the conditional probability of a firm's survival was found to increase with age. Studies in the latter two groups lacked a sound theoretical underpinning and their findings were inconsistent and difficult to generalize.

The above assessment of the state-of-the-arts leads to the conclusion that the study of the exit process should focus on variables within the firm since only these variables can be age related and on a single industry. For these reasons the Oahu restaurant industry was selected for a case study. The organization of this paper is as follows: Chapter 3 is devoted to statistical analyses of the industry. Chapter 4 presents the results of the survey of former owners and managers of failed restaurants while Chapter 5 shows the results of the survey of current restaurant owners and managers. Chapter 6 provides a brief summary.

CHAPTER 2

REVIEW OF THE LITERATURE

2.1 Introduction

The purpose of this chapter is to review previous research studies dealing with the exit of business firms. These studies fall into two categories: theoretical and empirical analyses. A few theoretical studies that have been made are reviewed first. A review of the empirical studies follows. The empirical analyses differ in their objectives: studies that measure business mortality, studies that explain observed patterns of mortality, and studies that attempt to identify firms that are likely to fail in the future.

2.2 Theoretical Contributions

Economic theory provides one decision rule on the exit process of a business firm. According to microeconomic theory, firm will exit an industry if it cannot cover its variable costs. The theory, however, was developed for a different purpose--to explain how the price system guides resource allocation in a decentralized economy. A number

of assumptions were made in order to focus on this purpose. Among them was perfect information, certainty, and homogeneous products and business firms. Furthermore, the business decision-maker is assumed to be a profit-maximizer rather than a utility-maximizer. Time is also implicitly assumed away with the use of comparative statics analysis.

While these assumptions were extremely useful in developing a theory to explain the role of the price system in a decentralized economy, they present some problems in studying the exit process. First, in the exit process, time is important since we are trying to explain the timing of the event. Second, exit of a firm may be consistent with utility maximization but not with profit maximization. Third, firms are not homogeneous. Fourth, firms may not know the demands facing the firm or all of the costs being incurred. Fifth, in the real world the demand and the costs facing the firm fluctuate and, thus, are not known with certainty. This uncertainty is an important factor in the exit process. The theoretical studies reviewed in this section introduce one or more factors that are assumed away in the traditional microeconomic theory.

Daniel (1980) suggested that negative economic profit may not be a sufficient condition for business exit because the business decision-maker may be a utility-maximizer rather than a profit-maximizer. According to Daniel, there are implicit benefits of continuing the business including positive entrepreneurial psychic income, expected market growth, expected benefits from successful product innovation, and expected increases in market share. The study, however, failed to show how a firm would survive if it did not have sufficient financial reserves to cover the excess of explicit costs over explicit receipts.

Jovanovic (1982) emphasized that the decision to exit would be made if the expected profitability of the firm, given the estimation of the individual's ability, was less than the individual's known wage as a worker in another firm. However, because the decision-makers do not have perfect information regarding their own abilities. There is an element of uncertainty. Jovanovic introduced a model that recognizes differences in the managerial abilities of individuals as well as differences between their perceived and actual abilities. Suppose that at the start of their businesses, each of these individuals believed that they could earn the same profit at any given industry price. In other words, they had the same

estimation of their managerial abilities. At the end of the period, however, calculation of their realized profits would be a factor in determining the estimation of their managerial abilities for the next period. These new estimates of managerial ability would reflect the perceived inefficiency of these individuals, taking into account stochastic random disturbances. However, some individuals may overestimate their true inefficiencies, which would lowering their expectations of profitability. Exit would take place if this expected level of profitability fell below the income that the individual can earn as a worker in another firm.

This model also shows that firms that have been in business for a long period of time would have accumulated more information and thus would be better able to more precisely estimate their managerial abilities than younger firms. Younger firms have fewer opportunities to make observations regarding the results of their managerial decisions. Also, whenever firms experience high costs resulting from random shocks, they may perceive the results of these shocks as evidence of poor managerial ability and may decide to leave the industry. This adds to the expectation that the exit rate should be higher in the early years of operation.

Garrod and Miklius (1987) emphasized, first, the importance of negative cash flow or inadequate cash reserves as a factor in the exit decision. The net cash flow is determined by the contribution margin--the excess of price over variable costs--times the excess level of sales over the breakeven level of sales. With the implicit assumption that all business transactions are made on a cash basis, the exit decision would be made if sales in period n combined with the excess of sales over the breakeven levels from the $n-1$ previous periods were less than the breakeven level of sales. Thus, this rule suggests that the mortality rate in a given period decreases as firms operate for longer periods of time. Additionally, this exit decision model was extended to include the uncertainty of demand for the product, costs of production and the availability of financing. Each of these lead to the shifts in the mortality function.

Second, they also proposed that a firm may exit the market if actual performance continues to fall below their expectations. The model assumes that although firms may not know the demand for their products or all of their costs, they do have some expectations of sales and costs. Additionally, firms learn more about the demand and costs of their products over time by observing the differences between actual and expected performances. That is, firms

have prior estimates of the distribution of sales and use observed sales to revise these estimates. Such firms may decide to exit if their posterior estimates fall below a certain level. This is due to the possibility that a lower actual level of sales and/or a higher actual level of costs than expected levels might create negative cash flow problems.

They also pointed out that if the firm has no strong prior beliefs on the expected distribution of sales and costs. The decision to exit can be based on the test of composite hypotheses. That is, the exit will not take place if some measure of performance is greater than a critical value (d). This model, however, may not be realistic since it assumes a common distribution of expected performance in the first and subsequent periods. To overcome this weakness, they introduced an alternative model that assumes that the distribution of expected measure of performance, say, sales, starts at some level and then increases to a higher level as the firm becomes more established. Thus, the faster the growth in sales and the larger the cash reserves, the less likely the firm is to exit from the market. For each of the cases discussed above, there is a common general shape of the mortality function. The probability of exit is highest for the first period and decreases as age increases.

Third, they pointed out that when demand or sales are stochastic, the structure as well as the level of costs are important determinants of profitability. Their study shows that profits for firms with the greatest flexibility will always exceed the profits of firms with less flexibility. Thus, the less flexible the technology, the more likely the firm is to exit from the industry.

Finally, they showed that the existence of lower exit costs does have an impact on the higher speed of the exit decision process. The present value of the expected net benefits from continuing business in the next period must be weighted against the net benefits from exiting the industry at the present time. That is, not only do we have to look at the expected future benefits from continuing operation and the current discount rate, but we also have to look at the current salvage value of the business. All three will have an impact on the firm's mortality function.

2.3 Empirical Contributions

2.3.1 Estimation of Business Mortality.

McGarry (1930) was the first one of several studies that estimated mortality of retail stores. The sample

included grocery, drug, hardware and shoe retail stores in Buffalo, N.Y. that opened and closed during the period 1918-1928. The study found significant differences in mortality rates among the four different types of retail stores. Furthermore, mortality was found to be related to the age of firm, i.e., the conditional probability of surviving one extra year increased with firm's age.

Other studies of mortality of retail stores were Hallas (1936), Starr and Steiner (1939), and Star and Massel (1981). Hallas (1936) estimated mortality of ten types of retail stores in 142 Colorado towns during the 1927-1935 period. Starr and Steiner (1939) estimated mortality among eleven retail trades in 207 Indiana towns during 1930-1937. Much more recently Star and Massel (1981) estimated survival rates for various types of the 17,252 retail businesses started in Illinois in one single year, 1974. The transfer of ownership was defined as a "discontinuance."

Hutchinson, et. al. (1938) examined the experience of all business enterprises, except financial concerns and public utilities, in the city of Poughkeepsie, N.Y. The study used data covering a period of 94 years, 1844-1936 inclusive and two definitions of mortality: (1) change of ownership was assumed not to terminate the business as long as its identity could be traced; and (2) change of

ownership was assumed to terminate the business. As shown in Table 2.1 and Figure 2.1, the study indicated that mortality was greatest in services, followed by retail trade and manufacturing. Furthermore, mortality was found to be related to the age of the firm in all lines of business. In particular, mortality was high during the immediate period after entry of the firm but decreased with the firm's age.

Churchill (1955) provided business survival estimates for the U.S. based on the experience of firms in the immediate post World War II period (i.e., 1947-1954.) In this study, which used 6.3 million business records of firms in different lines of business, change of ownership was considered termination of business. The cumulative mortality estimates that were derived by Churchill for manufacturing, retail and services are shown in Table 2.2 and Figure 2.2 and are consistent with those of Hutchinson, et. al. (1936.)

TABLE 2.1

CUMULATIVE MORTALITY OF BUSINESS ESTABLISHMENTS
BY MAJOR INDUSTRY DIVISION, POUGHKEEPSIE, 1844-1936

AGE IN YEARS	MANUFACTURING		RETAIL TRADE		SERVICES	
	(1)*	(2)**	(1)*	(2)**	(1)*	(2)**
1	23.1	24.0	29.6	32.5	32.7	32.9
2	34.6	37.1	43.8	45.8	45.7	47.2
3	46.9	49.8	53.2	55.0	55.1	56.8
4	54.7	57.8	59.4	61.1	61.8	63.7
5	60.2	63.2	64.3	66.2	66.9	69.0
6	65.5	67.7	68.4	70.4	70.8	73.0
7	67.8	70.4	71.5	73.5	74.3	76.3
8	70.2	73.3	74.1	76.3	76.9	79.3
9	72.6	76.0	76.2	79.6	79.2	81.5
10	74.6	78.7	78.2	80.8	81.2	83.4

* Not counting change in proprietorship as a new business.

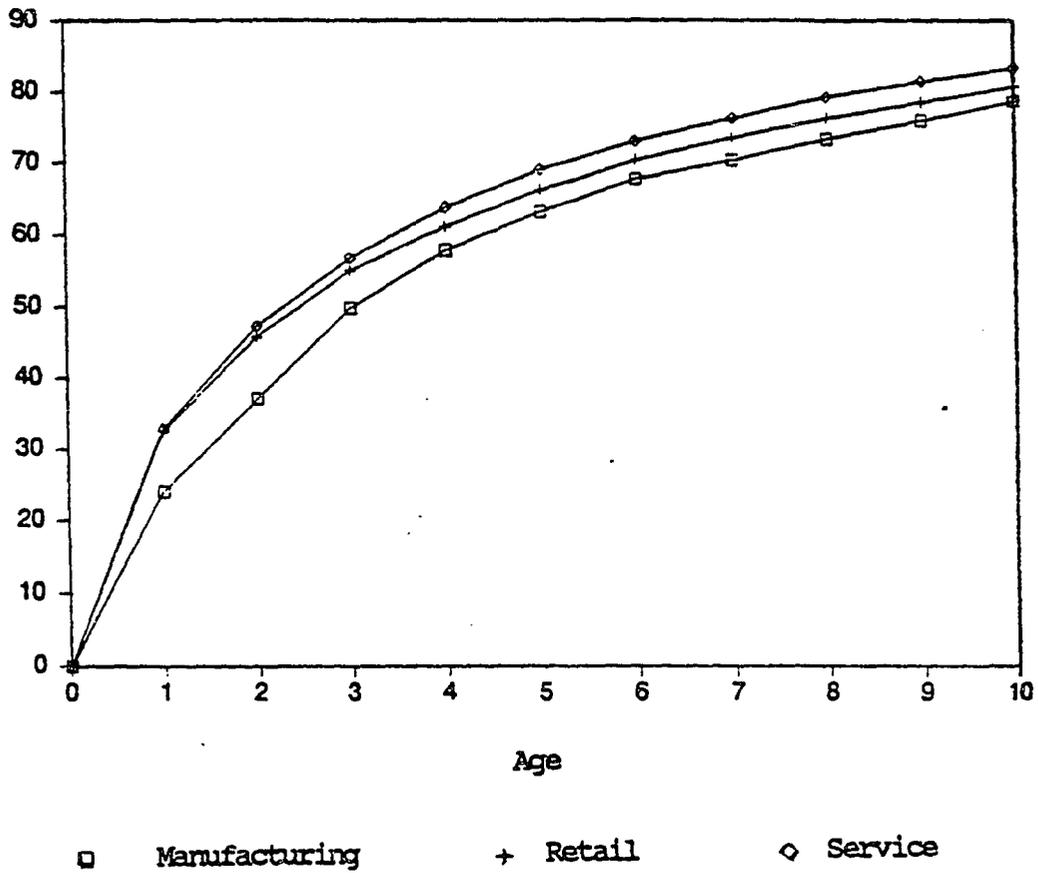
** Counting change in proprietorship as a new business.

Source: Hutchinson, et. al. (1938).

FIGURE 2.1

CUMULATIVE MORTALITY FUNCTIONS
BY MAJOR INDUSTRY, POUGHKEEPSIE, N.Y., 1844-1936
(Counting change in proprietorship as a new business)

Percentage



Source: Garrod and Miklius (1987).

TABLE 2.2

CUMULATIVE MORTALITY OF BUSINESS ESTABLISHMENTS
 BY MAJOR INDUSTRY DIVISION, U.S., 1947-1954
 (Counting change in proprietorship as a new business.)

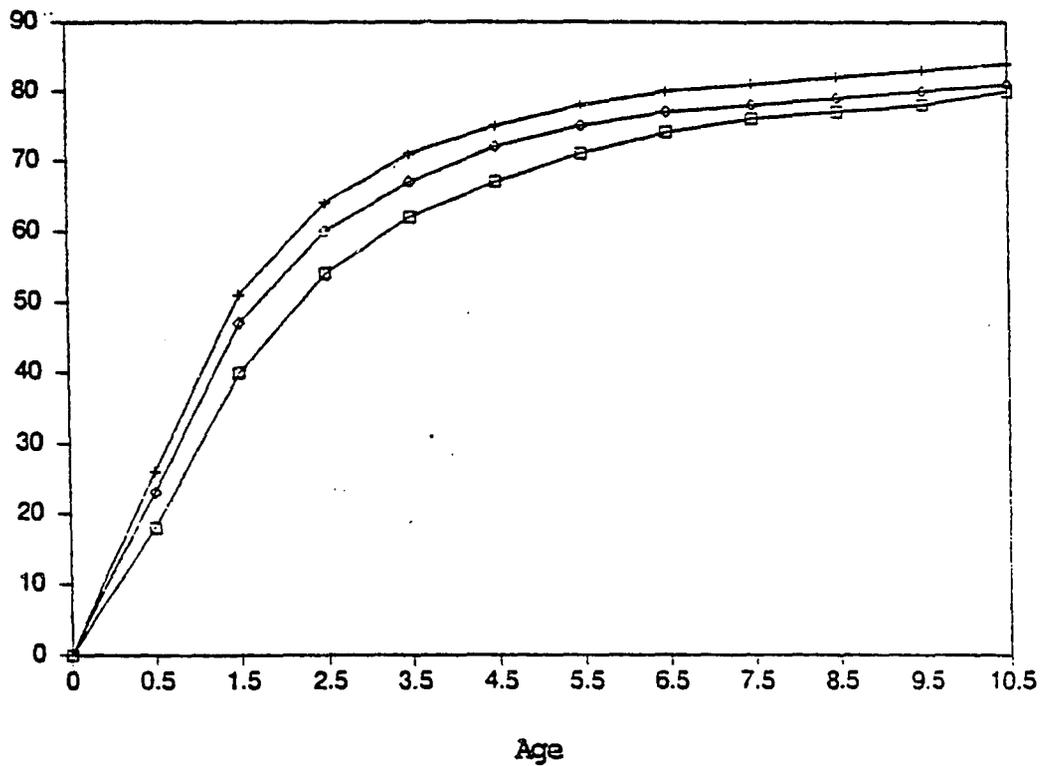
AGE IN YEARS	MANUFACTURING	RETAIL TRADE	SERVICES
0.5	18	26	23
1.5	40	51	47
2.5	54	64	60
3.5	62	71	67
4.5	67	75	72
5.5	71	78	75
6.5	74	80	77
7.5	76	81	78
8.5	77	82	79
9.5	78	83	80
10.5	80	84	81

Source: Churchill (1955).

FIGURE 2.2

CUMULATIVE MORTALITY FUNCTIONS
BY MAJOR INDUSTRY, U.S. , 1947-1954
(Counting change in proprietorship as a new business)

Percentage



□ Manufacturing + Retail ♦ Service

Source: Garrod and Miklius (1987).

Lomax (1954) used data compiled by Hutchinson, et. al. to experiment with various possible mathematical forms for business mortality functions. He found that for retail trade and services, the hyperbolic function,

$$F(t) = 1 - (a/(a+t))^b$$

provided the best fit, where a and b are parameters and t is age of the firm. For firms in manufacturing industries, the exponential function provided a better fit.

$$F(t) = 1 - e^{a/b(e^{-bt} - 1)}$$

The correlation coefficients were 0.99, 0.98 and 0.96 for retail trade, services and manufacturing respectively indicating a high correlation between mortality of a firm and its age. Both alternative specifications conform to the desirable boundary conditions and monotonic behavior exhibited by the data. However, one advantage of the hyperbolic specification is that it yields fairly simple expressions for conditional and cumulative probabilities.

The parameter values of hyperbolas for all available data sets and the median life expectancies are reported in Table 2.3. The results show that while there are

TABLE 2.3

ESTIMATED MORTALITY FUNCTION PARAMETERS USING HYPERBOLAS

Item	Estimated Parameters ^a		Standard Error	Log (Likelihood) Function	Median Life Expectancy (years)
	A	B			
<u>Poughkeepsie, 1844-1936^b</u>					
Manufacturing	3.81 (9.88)	1.08 (14.82)	0.00880	36.45	3.43
Retail Trade	2.01 (21.77)	0.84 (36.73)	0.00437	44.15	2.58
Services	2.03 (10.76)	0.91 (18.33)	0.00949	35.63	2.32
<u>Poughkeepsie, 1844-1936^c</u>					
Manufacturing	4.20 (13.20)	1.26 (19.12)	0.00685	39.21	3.08
Retail Trade	1.91 (11.28)	0.87 (19.59)	0.00891	36.32	2.33
Services	2.32 (7.35)	1.03 (11.91)	0.01346	31.78	2.23
<u>U.S., 1947-1954^c</u>					
Manufacturing	1.73 (12.25)	0.85 (21.56)	0.08275	38.97	2.18
Retail Trade	0.98 (1.53)	0.78 (22.22)	0.09437	37.67	1.40
Services	1.05 (10.13)	0.73 (19.37)	0.01196	36.08	1.66
<u>Illinois - Businesses Started in 1974^c</u>					
Retail Trade	6.97 (2.53)	1.91 (3.14)	0.02128	17.23	2.76
<u>Honolulu, Hawaii 1971-1985^b</u>					
Restaurants	1.68 (14.1)	0.76 (6.49)	0.01017	40.88	2.51

a. Asymptotic t-ratios in parentheses.

b. Not counting change in proprietorship as a new business.

c. Counting change in proprietorship as a new business.

Source: Garrod and Miklius (1987).

differences in mortality of firms in different types of businesses and differences in mortality of firms in the same type of business among the available data sets, the hyperbolic cumulative mortality function appears to fit the data in all sets and for every type of business. More importantly, there are two causes of business mortality--those associated with firm's age and those associated with shifts in the mortality function.

Given the shape of the cumulative mortality function and the "typical" mix of firms by age in a given industry, one would expect the causes associated with firm's age to be much more important in explaining business exits than the causes associated with shifts in the mortality function.

2.3.2 Explanations of Business Mortality

The studies reviewed were primarily concerned with measurement of business mortality in different lines of business. Some of them, however, also attempted to explain the observed patterns of business mortality. Hutchinson, et. al. (1938) tested the widely belief that, "Lack of training for the business in question is probably a frequent cause of failure."¹ As part of their study, business establishments were divided into two groups,

those with proprietors who had been engaged in a related occupation the year before entering the business in question and those with proprietors entering from unrelated occupations. The study found, however, that the previous occupation of the proprietors did not affect the longevity of the new business.

Churchill (1955) did not attempt any explanations, although her findings partially support the Hutchinson's results: "While about two-thirds of the combined newly established and newly acquired businesses in the postwar period survived their first full year of operation, this proportion fell to around one-half for newly established firms. This initial advantage for the firms acquired by transfer tended to diminish with age: the proportion of firms surviving more than four years without change in ownership is little different for those newly established and for those acquired by transfer."² Thus, it is not the experience or the skill of the entrepreneur which affects business mortality, but it is the variables related to age of the firms which are the main determinants of business firm survival.

Business mortality differs across various lines of business. Hutchinson (1938) attributes the difference, in part, to the negative correlation between business mortality and the amount of capital required to enter the

business. They argue that, "When large amounts of capital are at stake, the risk is usually reduced by making a more or less thorough investigation of the prospects in advance of investment, and by employing a trained manager."³ Furthermore, the entrepreneur with a large amount of capital has many investment opportunities but that, "The man with small capital is apt to have little experience at his command and a relatively small choice of opportunities, and he almost inevitably enters an overcrowded field in competition both with many others of his kind and with those who have more resources and experience to lick them."⁴

It was not possible to test these propositions directly since no data were available on the amount of capital invested in different types of enterprise. Therefore, they compared average gross sales, average number of employees, and the proportion of businesses surviving three years or more, in the wholesale, retail and services industries. A positive relationship were found between size of firm and its length of life. This interpretation, however, is not warranted since they were not able to separate the effect of the firm's size from the effects of other variables affecting mortality in different lines of business.

Star and Massel (1981) in their study of retail business survival in Illinois also tested the hypothesis that the size of a retail business is associated with a higher rate of survival. Although they indeed find a positive correlation, the size of the firm was measured by sales volume in the last year rather than in the first year of business. Therefore, it is not possible to separate the effect of firm's growth on survival, which is assumed to be positive, from the effect of size. Furthermore, the observed relationship between firm size and survival rates may merely reflect the relationship between "typical" annual sales in different types of retail establishment and the survival rates in those lines of business and not the size of establishment.

A number of studies were conducted specifically to explain exit rates for various industries. Mansfield (1962) regressed exit rates in the steel, petroleum refining, rubber tire, and automobile industries during 1916-1954, 1921-1957, 1937-1952, and 1939-1959, respectively, on several independent variables which included the average size to minimum efficient size ratio of the firms and the ratio of the average rate of return in that specify industry to the average rate of return in all manufacturing during the same period. He found a statistically significant negative relationship between

these variables and the exit rates. More specifically, he estimated that doubling an industry's profitability or the ratio of firm's average to minimum efficient size would decrease the exit rate by 15 percent.

Marcus (1964) constructed a multiple regression model to find the determinants of firm exit rates. He hypothesized that the exit rate is positively related to the proportion of loss firms (PLF)--firms earning less than the opportunity rate of return. He also postulated that the exit rate is negatively related to the ratio of sunk-to-variable costs. For example, the lower its ratio of sunk-to-variable costs, the higher is the likelihood that the firm will be able to recover some of those sunk costs and thus survive. Finally, he stated that the exit rate is negatively affected by profit expectations. If a decision-maker expects future profits to materialize, he will likely stay in business.

To calculate the PLF, Marcus used data from the Internal Revenue Service. He looked at the proportion of firms earning zero or negative income, in other words firms that were assured to have earned less than the opportunity rate of return (the PLF). Because the ratio of sunk-to-variable costs could not be obtained, the capital-output ratio was used as a proxy. As was stated earlier, the exit rate is affected by profit

expectations. However, because of the absence of information on true expectations, the next period's realized rate of return was used.

Marcus specified his model as follows:

$$EX_{it} = a_0 + a_1 PLF_{it} + a_2 (K/O)_{it} + a_3 r_{it+1} + U$$

where:

EX_{it} = the exit rate for the i^{th} industry in period t ,

PLF_{it} = the proportion of loss firms for the i^{th} industry in period t ,

$(K/O)_{it}$ = the capital-output ratio for the i^{th} industry in period t ,

r_{it+1} = the realized rate of return for the i^{th} industry in period $t+1$.

Marcus tested his model by using two sets of data. The first was prepared by Crum (1953).⁵ In 1945 and 1946, the IRS presented age distributions of all corporations. By considering decreases in the number of corporations between 1945 and 1946 as corporate deaths, Crum was able to compute exit rates for 17 age groups. However, Crum

only had data for firms earning zero or negative income, The coefficient, however, was statistically significant and carried the correct sign.

The second set of data which was prepared by the Office of Business Economics (OBE), was based on a tabulation of employers filing Social Security tax returns for 1951-55. Seventeen manufacturing industries were analyzed in the study. The results showed that all of the coefficients had the correct signs, but the coefficient for the capital-output ratio was found to be statistically insignificant.

The results of the model using both data sets confirm the PLF as a significant determinant of the exit rate. That is, the proportion of firms in an industry experiencing economic losses is positively related to the industry's exit rate.

Marcus extended his analysis by looking at what determines an industry's PLF. He postulated that the PLF depended on the proportion of poorly performing firms in the industry, specifically the proportion of "small" or "young" firms.

In this model:

$$PLF_i = a_0 + a_1^{s} PLF_i + a_2^{a} PLF_i + a_3 r_i + U$$

where:

PLF_i = the proportion of loss firms in the i^{th} industry,

PLF_i^s = the size-predicted proportion of loss firms in the i^{th} industry,

PLF_i^a = the age-predicted proportion of loss firms in the i^{th} industry,

r_i = industry profit rate in the i^{th} industry.

Distributions of corporations by size were available annually, while age distributions were only available for 1959-60. No industry detail was provided. Thus, it was further assumed that size and age effects were independent from each other but were common to all industries.

Using these assumptions, the mean PLF for the j size group was computed from observations across the different age groups. This estimator was denoted as PLF_j^s . Similarly, the mean PLF for the k age group was computed from observations across different size groups and was denoted by PLF_k^a .

The results for the age-effect show that the first two years of existence are the most precarious for new firms. The PLF declines up to the sixth year, after which there

is no discernible pattern. Marcus concludes that the "economic childhood" for new firms lasts six years.

Based on the 1959-60 data, the results for the size effect show that survival is critical until the firm grows to about \$100,000-\$250,000 in assets. The PLF stabilizes up to about \$50 million, and begins to decline rapidly at higher asset values. Thus, the larger the firm, the more likely it is to survive.

In 1959, the IRS reported the size and age distributions of firms by industry. Based on this information, Marcus calculated the size- and age-related loss proportions for each of 22 manufacturing industries. He found that the coefficient of the industry profit rate was not significantly different from zero, while the coefficients of the other two independent variables were significant and had the correct signs.

In conclusion, Marcus showed that the PLF can be used for estimating exit rates by industries. Assuming size and age effects were the same in all industries, the study found that firms two years or younger or having less than \$100,000 in assets (in 1959 dollars) faced a high probability of incurring losses. However, Marcus points out that the size effect also depends on industry characteristics.

Altman (1971) is the most frequently cited analysis of the various business failure studies. In this study, the effects of changes in macroeconomic variables on business failure rates were examined using a multiple regression model. For this purpose, the Dun & Bradstreet (D&B) failure rates during 1947-1970 were used as the dependent variable, while GNP lagged one quarter, the money supply and the Standard and Poor's Index of common stock prices were used as independent variables. The results showed that these independent variables were inversely related to the D&B's failure rate.

Fredland and Morris (1976) conducted a comparative cross-section analysis of small business firms to discover the differences between a group of failed businesses and a group of going concerns. But in addition to firm size and age, experience of management, firm location, characteristics of borrowings, diversification of firm product mix, and legal form of organization were also considered as explanatory variables in a firm's survival.

Firm size was measured in terms of employees, annual sales and fixed assets. Since larger firms are more apt to survive exogenous crises or managerial mistakes and are better able to take advantage of economics of scale, it was expected that larger firms would be more likely to be found in the group of surviving firms. Regarding firm

location, states were grouped by per capita income in 1970 and by percentage of population growth over 1960-70. In areas where population is growing rapidly and incomes are relatively high, demand is likely to be strong and correspondingly failures of firms few. Firm age and managerial experience, as measured by years of managerial experience and years of experience of the chief executive, are postulated to have strong relationships with the going concern group. In term of borrowing behavior, failing firms are less able to generate internal capital and should be more prone to borrowing. However, lenders should be reluctant to grant such loans. Diversification is viewed as a sign of business success. Also, it was postulated that more corporations should fall into the failure group since managers are more likely to declare such firms as failures because their personal assets are not in jeopardy.

Emphasizing that they were not endeavoring to identify the causes of business failure, but merely differences between failed and going concerns, Fredland and Morris drew on data from Dun and Bradstreet for 2,080 failures in 1971 and 1,987 going concerns as of 1972. Subsamples were also drawn for five industry divisions (manufacturing, retail, wholesale, construction and services) and for eight two-digit and four-digit Standard Industrial

Classification (SIC) categories. These industries were chosen for their historically high failure rates and/or because of their large concentrations of small businesses. When subsamples were combined, the observations were weighted to reflect the proportions of the population they represented.

In contrast to Marcus (1964), the results showed that there was some question of whether failure was related to firm size. However, the data included only relatively smaller firms. The relationships regarding age of firm and managerial experience were as expected. Regarding location, firms were found to be more likely to fail in rapidly growing, high income areas, probably because entry rates are high in economically expanding areas and failure rates are high for young firms. The loan variables were inconclusive; however diversification contributed to the likelihood of staying in business. Finally, failures are relatively more likely to be corporations. As far as industry results are concerned, size and age are important for the manufacturing industry while location is significant for the more customer-oriented businesses--retail and wholesale trades and services.

DiPietro and Sawhney (1977) used the same dependent variable, i.e., D&B business failure rate during 1957-1975, and the same three independent variables as

Altman (1971) but included the price-to-wage ratio as another explanatory variables. Their estimation efforts, however, failed due to multicollinearity among the independent variables.

DiPietro and Sawhney (1977) also examined the relationship between static and dynamic managerial competency and the business failure rate. Static managerial competency was measured by the relationship between the D&B failure rates during 1920-1975 and time. Dynamic managerial competency was measured by the relationship of the D&B failure rate and GNP. Although the results of regressions showed the negative relationships, the interpretation that this represented an improvement in "static" or "dynamic" managerial competency is unwarranted. Their results merely showed that over time the D&B failure rates have decreased.

Clute and Garman (1980) attempted to determine if variations in the money supply and the quantity of credit extended by commercial banks were the causes of unexplained variations in the D&B rate of business failure. Ordinary least squares regression analysis was used to determine these relationships. Each explanatory variable was used with a lag by employing a polynomial

distributed lag model. The results showed that the independent variables had inverse, lagged effects on the rate of business failure.

Rose, Andrews and Giroux (1982) argued that Altman's (1971) model assigned relatively little explanatory power to economic factors. Therefore, they reexamined the effects of economic changes on the business failure rate. The dependent variable was the D&B quarterly failure rate for the period 1970-1980. The independent variables in the final six-variable model included the Standard & Poor's 500 composite stock price index, gross private domestic investment/GNP, profit after tax/income originating in corporations, the prime rate, the ninety-day treasury bill rate, and retail sales/GNP. The model appeared to have a high explanatory power with an R^2 of 0.912. It was concluded, therefore, that economic conditions did influence business failure and played a highly significant role in the failure process.

Altman (1983) updated the original Altman (1971) study by reexamining the change in the D&B business failure rate over the period 1951-1978 to aggregate economic indicators. These indicators included economic growth activity, credit availability or money market activity, capital market activity and business population characteristics. Economic growth activity was measured by

real GNP and corporate profits, while the nation's monetary stock, free reserves and interest rates were used as measures of money market and credit conditions. The change in the Standard & Poor's 500 Index of stock price (S&P) was chosen as the measure of capital market activity. Finally, the change in new business formation was also included in the model since it was more likely that younger firms had a higher probability of failure than the older ones. The results supported the earlier findings that a firm's propensity to fail is increased during periods of reduced economic growth, poor stock market performance, tight credit conditions and increased business formation.

MacDonald (1986) investigated the effects of growth and sunk costs on firm exit. High growth should make exit a less attractive decision alternative. Higher ratio of fixed to total costs should discourage an exit of firm from the industry. Thus, the exit rate should be negatively related to both growth and sunk costs.

MacDonald used data of 46 food manufacturing industries during 1976-82 that came from the U.S. Establishment and Enterprise Microdata (USEEM) file developed by the Small Business Administration (SBA) and Dun and Bradstreet. The data set consisted of all establishments (SIC. 2011-2141) in the food and tobacco

industries and included 25,000 firms. The exit measures were defined and constructed for each industry through a comparison of 1982 records with 1976 records. Exit was defined to have occurred when a firm appeared in the 1976 listing but not in the 1982 listing. MacDonald found that there was a wide variation in exit rates among the different industries and concluded that this was due to exit and entry among smaller fringe producers in each industry.

MacDonald regressed the exit rates on growth, measured by growth in industry employment during 1976-82, and capital commitments, measured by the natural log of the asset value of an efficiently sized plant. The asset value of an efficiently sized plant was defined by the ratio of fixed assets to sales in the industry multiplied by the minimum efficient scale of plant (MES). MES referred to the shipments size of a plant located at the midpoint of the industry distribution of plant sizes by value added. The results showed that the coefficient for growth was negative but not significant, while that for capital commitments was negative and significant.

According to MacDonald, Deutsch (1984) argued that there may be cost advantages to multi-plant production. To test this, the share of industry employment in single establishment firms was calculated from the USEEM data and

included in the model. The data indicated a positive and significant relationship where the exit rate increased as the share of single plant firms rose. The coefficient for capital commitments was still negative and significant.

2.3.3 Prediction of Business Failure

Recognizing that predictive ability could be regarded as an evidence of the usefulness of financial ratios, a number of studies attempted to investigate it in a bankruptcy prediction context. The study began with the work of Beaver (1966), who attempted to find the best single ratio that would discriminate between failed and non-failed firms. Failure was defined as the inability of a firm to pay its financial obligations as they matured. The sample consisted of 158 failed firms as reported in Moody's Industrial Manual during 1954-1964. The analysis was made by comparing the failed firms and the non-failed firms of similar size. The study postulated a negative relationship between the probability of failure and the size of the reservoir of liquid assets and/or the net liquid-asset flow from operation (i.e., cash flow). Additionally, a positive relationship between the probability of failure and the amount of debt held and/or the amount of liquid assets used for operations were also

hypothesized. A list of 30 ratios which measured liquid assets, debt and liquid asset flows from operations were tested by using simple analytical tools such as profile analyses and dichotomous classification tests. Of the proposed predictors, the ratio of cash flow-to-total debt was found to be the best predictor, i.e. the mean value of the ratio of cash flow-to-total debt for the non-failed firms was greater than that of the failed firms.

Altman (1968) used a linear multivariate discriminant analysis procedure to investigate twenty-two variables from financial statements. These variables were classified into five standard ratio categories: liquidity, profitability, leverage, solvency, and activity. The sample which was composed of sixty-six manufacturing corporations, were divided into a group of thirty-three failed firms declaring bankruptcy under Chapter X during the period 1946-1965 and a group of thirty-three non-failed firms that were chosen on a stratified random basis. The final discriminant function contained five variables that gave the best bankruptcy predictions--working capital/total assets, retained earnings/total assets, earning-before-interest-and-taxes/total assets, equity market value/book value of total debt, and sales/total assets. This bankruptcy prediction model was proposed to be an accurate forecaster

of failure up to two years prior to bankruptcy. The model, however, becomes less accurate as the number of years prior to bankruptcy increases.

Deakin (1972) used both the dichotomous classification test and discriminant analysis in testing the predictive ability of all ratios that had been used in Beaver's study on a new sample of industrial firms. Failure was defined as, "those firms which experienced bankruptcy, insolvency, or were otherwise liquidated for the benefit of creditors."⁶ The sample of thirty-two failed firms that experienced failure between 1964 and 1970 was matched with the non-failed firms on the basis of industry classification, year of the financial information provided, and assets size. The results, were generally consistent with those observed by Beaver (1966), for a marked difference in the predictive ability of the cash/sales ratio in the three years before failure.

Blum (1974) introduced an alternative model that examined the predictive ability of various financial ratios by using a sample of 115 industrial firms, with liabilities greater than \$1 million, that failed during 1954-1968. These failed firms were matched with 115 non-failed firms that were in a similar industry, and were comparable in term of annual sales, number of employees, and fiscal year. Blum's model included the

three common denominators underlying the cash-flow framework: liquidity, profitability, and variability, i.e., net quick assets/inventory, cash flow/total liabilities, rate of return to common stockholders, etc. The quick assets referred to cash and equivalent, plus accounts and notes receivable. The results showed an accuracy of more than ninety percent when failure occurred within one year of the financial statements date and tended to decline as the number of years increased.

While earlier studies concentrated on the usefulness of financial ratio analysis in predicting failure of medium and large asset-sized firms, Edmister (1972) developed and empirically tested nineteen common financial ratios to predict small business failure. The sample of 42 cases were drawn from the Financial Growth Data Bank containing 192,000 statements submitted by SBA borrowers during the period 1954-1969. Because the sample of annual data did not provide good predictions, the empirical analyses used data from tri-annual financial statement. The final results showed that the seven-variable discriminant function demonstrated an accurate prediction of small business failure. These variables were annual funds flow/current liabilities, equity/sales, quick ratio/Robert Morris Associates (RMA) trend, net working capital/sales, current

liabilities/equity, inventory/sales, and quick ratio, in which the last four variables were divided by their respective RMA ratio.⁷

The most recent study was done by Gentry, et. al. (1985) to determine the predictive ability of the funds flow statement which shows the changes in the movement of funds in the operation of a business during a given period. The statement reflects decisions involving the uses--commitments of funds to invest in assets or repay liabilities--and the sources of funds--raising of funds through additional borrowing or reducing asset investments. The study used Helfert's (1982) cash-based funds flow model and redesigned it to include only eight major funds flow components: funds from operations, working capital, financial, fixed coverage expenses, capital expenditures, dividends, other asset and liability flows, and changes in cash and marketable securities. The study showed that the components from the cash-flow-based funds flow model offered a viable alternative for predicting failure. The dividend funds flow component was a significant variable in the model with a smaller relative dividend component being associated with a higher probability of failure.

2.4 Definitions of Business Mortality

A search of the literature revealed that many definitions of business mortality had been used in the previous studies. In the majority of cases, business mortality was considered in term of bankruptcy which referred to formal liquidation and reorganization proceedings conducted under the federal bankruptcy statutes. For this study, however, the term business mortality referred to the exit of firms from the industry for any kind of reason. The "exit rates" were expressed as a ratio of the total number of discontinued firms over the total number of firms in existence at the beginning of the year. On the other hand, the "entry rates" referred to the ratio of the total number of new entrants over those in existence at the beginning of the year.

Due to the unavailability of pre-packaged database in this area, it was necessary to rely on public information. Therefore, firms that were no longer in business were derived by comparing the directory of one year with the one of the following year. From this information, it was possible to determine not only the number of firms exiting the business but also the number of firms newly entering the business in each year for the period's study. It should be noted that each firm was

identified by name without regard to location. This implied that when a new name appeared in the directory, the firm was treated as a new one. On the other hand, when a name did not appear the following year, then, that firm was assumed to be no longer in business.

The criterion of firms exiting the business as defined above does present certain weaknesses as to the acceptability of a definition of business mortality. First, firms might have changed their names even though there was no change in ownership. Second, firms might be taken over by new owners with no change in the firm's names. The treatment of the firm's exit in the first case instead of the second one was impractical in reality. However, the unavailability of detailed information restricted the consideration of these issues. Finally, it is believed that these cases represent a small percentage of all business failures and would not significantly affect this study.

2.5 Summary

As this review indicates, there are several studies examining the exit of firms from an industry. However, there are only a few theoretical contributions on the exit

process and they do not provide sufficient guidelines for empirical studies.

The numerous empirical studies dealing with exits of firms can be classified into three categories: studies that measure business firm mortality, studies that attempt to explain the observed patterns of mortality, and studies that attempt to identify firms that are likely to fail in the future.

The findings of the first category of studies are the most definitive. These studies found that the mortality of business firms is similar to "infant mortality" in biological populations, i.e., the conditional probability of a firm's survival increases with age.

The findings of studies falling into the two remaining categories are difficult to generalize. These studies generally lack theoretical foundations. Although they utilize a large number of independent variables to explain firm exit in various industries, there is no theoretical reason for selection of these particular variables. Interpretation of the results, therefore, are difficult and the results are not mutually consistent.

Furthermore, a large number of these studies use the readily available failure rate index compiled by Dun & Bradstreet, Inc. as a proxy for firm exits. But the D&B index is based on declarations of bankruptcies as a

measure of exit and as shown in Table 2.4, bankruptcies account for a relatively small proportion of exits in all industries. In fact, filing for bankruptcy does not necessarily imply exit of the firm from the industry. There are two bankruptcy processes: liquidation and reorganization. While liquidation involves dismantling of the firm and the selling of its assets, reorganization is a rehabilitation procedure that allows the firm to continue operating while making a financial settlement with its creditors. Most bankrupt firms attempt to reorganize first and liquidate only when reorganization is unsuccessful. The D&B failure index, therefore, is not an appropriate proxy for exits of firms from the industry.

In short, the previous studies do not provide a good theoretical explanation of business firm mortality, but do find that the mortality of business firms is age-related. Given the current state-of-the-art, it appears that a study that focuses on one industry and variables within the firm could yield useful insights into the study of business mortality. Because of data, financial, and time considerations, the restaurant industry on Oahu was selected as a case study.

TABLE 2.4

NUMBER OF DISCONTINUED AND BANKRUPT BUSINESSES PER 10,000
OPERATING CONCERNS BY INDUSTRY, 1951-1955 AVERAGE

INDUSTRY	NUMBER OF DISCONTINUED BUSINESS	NUMBER OF BUSINESS BANKRUPTCIES	RATIO OF BANKRUPTCIES TO DISCONTINUANCES
<u>Manufacturing:</u>			
Food & Kindred Products	450	57	0.13
Textile Mill Products	910	76	0.08
Apparel	1,080	116	0.11
Leather & Leather Products	780	146	0.19
Lumber & Timber Products	1,820	17	0.01
Furniture and Fixtures	660	174	0.26
Paper & Allied Products	350	51	0.15
Printing and Publishing	330	21	0.06
Chemicals & Allied Products	590	56	0.09
Stone, Clay & Glass Products	640	38	0.06
Metals, Primary & Fabricated	500	63	0.13
Machinery, Except Electrical	690	57	0.08
Electrical Machinery	630	114	0.18
Transportation Equipment	550	85	0.15
<u>Retail:</u>			
Groceries	560	19	0.03
Motor Vehicles	1,080	26	0.02
Automotive Parts	600	17	0.03
Shoes	540	47	0.09
Lumber & Building Products	550	44	0.08
Appliances, Radio & T.V.	830	89	0.11
Home Furnishings	700	74	0.11
Eating & Drinking Places	950	24	0.03
Drugs	270	24	0.09

Source: Miklius, et. al. (1976)

Notes to Chapter 2

1. Hutchinson, et. al. (1938), p. 506.
2. Churchill (1955), p. 16.
3. Hutchinson, et. al. (1938), p. 502.
4. Ibid., pp. 502-503.
5. Crum, William L., "The Age Structure of the Corporate System," Berkeley: University of California Press, 1953.
6. Deakin (1972), p. 168.
7. Variables denoted as Robert Morris Associates. RMA relatives are calculated by dividing the original ratios by RMA's Annual Statement Studies average ratios for firms in a similar industry and of similar size.

CHAPTER 3

RESTAURANT MORTALITY: STATISTICAL ANALYSIS

3.1 Introduction

To study the phenomenon of business mortality, the restaurant industry was selected due to the alleged high mortality of firms in this industry. Furthermore, the Island of Oahu was selected because of the heavy concentration of restaurants in this region and the relatively low cost of contacting former and current owners of restaurants. The eating and drinking places industry in Oahu is presented in Appendix A.

For the purpose of this study, the restaurant business was defined as all established foodservice operations including fast food establishments, family restaurants, fine dining businesses, coffee shops, etc. A historical record of all of the restaurants was obtained from the listing of names in the Yellow Pages of the Hawaiian Telephone Company directory for the Island of Oahu during the period 1971-1986. The same source allows one to compile a time series not only of all the restaurants that were in business at the beginning of each year, but also the number of new entrants into the restaurant business.

By comparing the restaurant listings in one year with those for a previous year, the number of exits were also obtained. Entry was defined by appearance of a new restaurant's name in the directory and exit by disappearance of the same. Since the restaurant was identified by name alone, the transfer of business to a new owner was not considered discontinuance unless there was a concurrent change of the restaurant's name. All three types of data are shown in Table 3.1 and are illustrated in Figure 3.1. All three time-series show an increasing trend in the total number of restaurants, the number of new entrants and the number of restaurants exiting the industry.

This chapter is devoted to analyses of available restaurant industry data. The following section estimates the restaurant mortality functions and examines the differences in the mortality functions for the various types of restaurants. The mortality function, that is estimated in section 3.2, is then used to determine the contribution of the non age-related mortality to the observed variations of the exit rates. The conclusion is reached that almost all variation in exits is attributable to age-related factors.

TABLE 3.1
NUMBER OF RESTAURANTS, ENTRIES AND EXITS
OAHU RESTAURANT INDUSTRY, 1971-1986

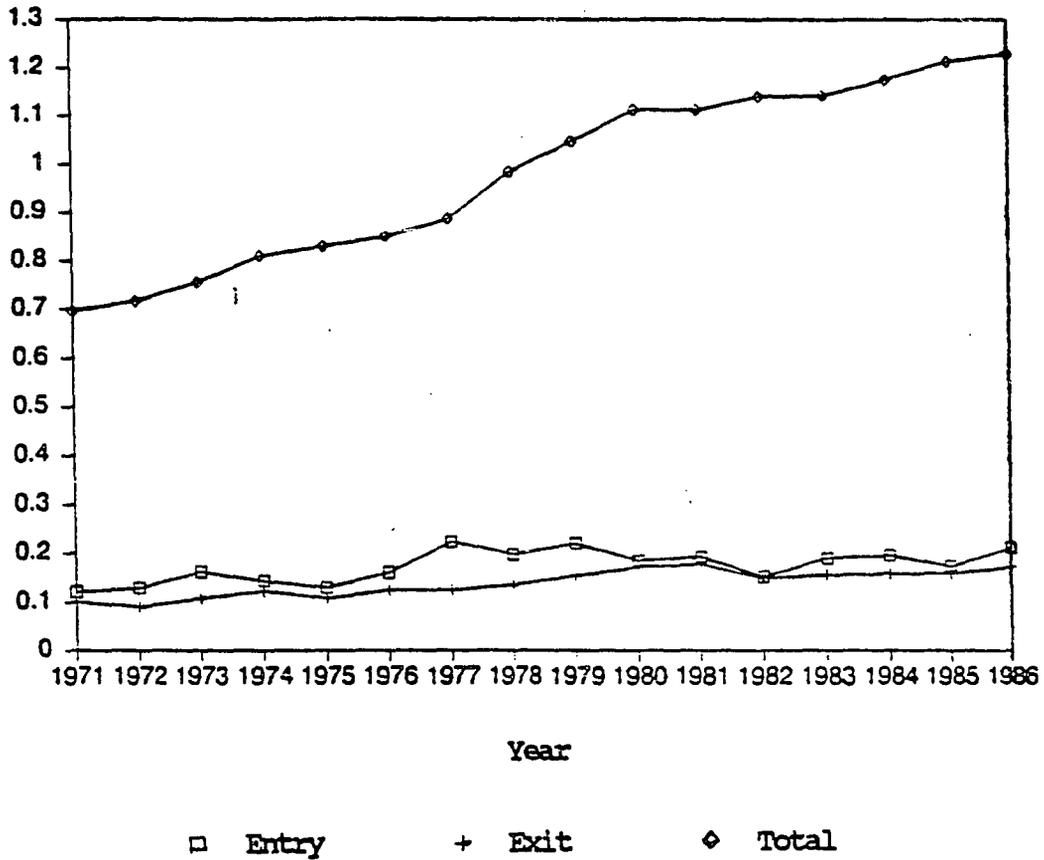
YEAR START	TOTAL NUMBER OF			ENTRY RATES***	EXIT RATES
	RESTAURANTS*	ENTRIES**	EXITS**	(PERCENT)	(PERCENT)
1971	697	121	101	17.4	14.5
1972	717	129	91	18.0	12.7
1973	755	162	108	21.5	14.3
1974	809	143	123	17.7	15.2
1975	829	130	109	15.7	13.2
1976	850	161	125	18.9	14.7
1977	886	223	125	25.2	14.1
1978	984	197	135	20.0	13.7
1979	1,046	220	154	21.0	14.7
1980	1,112	185	172	16.6	15.5
1981	1,112	192	177	17.3	15.9
1982	1,140	152	150	13.3	13.2
1983	1,142	190	156	16.6	13.7
1984	1,176	196	158	16.7	13.4
1985	1,214	174	159	14.3	13.1
1986	1,229	212	172	17.3	14.0

- * The total number of restaurants at the beginning of each period.
** The total number of entries and exits during the period.
*** The entry and exit rates express as a ratio of the total number of entries and exits over the total number of firms in existence at the beginning of the period.

FIGURE 3.1

TREND OF TOTAL RESTAURANTS, ENTRIES AND EXITS
OAHU RESTAURANT INDUSTRY, 1971-1986

Number of Restaurants
(Thousands)



3.2 Estimation of the Oahu Restaurant Mortality Function

In order to estimate the mortality function, it was necessary to calculate the mortality rate of the restaurants in the sample. The mortality rate is defined as the number of discontinued firms over the total number of entrants in a given period of time. The cumulative and conditional mortality functions are shown in Table 3.2 and illustrated in Figure 3.2. The pattern is very similar to those found for other industries dominated by small firms, i.e., the probability of exit decreases with age of the firm. The median life expectancy of new entrants into the restaurant industry during 1971-1983 is 2.7 years. Approximately one-fourth of all restaurants survived 10 years or more.

From other studies, the estimated cumulative mortality function of restaurants in Oahu are compared with the mortality functions of restaurant industries in other locations (Table 3.3 and Figure 3.3). The shapes of the mortality functions are significantly different due to the use of different definitions of mortality and the diverse characteristics of the selected sample. For example, the Colorado study included only restaurants that were started in 1927 and the Illinois study included only restaurants in business in July 1925. Table 3.4 presents the

TABLE 3.2
CONDITIONAL AND CUMULATIVE MORTALITY RATES
FOR RESTAURANTS IN HONOLULU, HAWAII: 1971-1985

AGE (YEARS)	CONDITIONAL MORTALITY	CUMULATIVE MORTALITY
1	0.283	0.283
2	0.205	0.430
3	0.175	0.530
4	0.112	0.582
5	0.130	0.636
6	0.082	0.666
7	0.079	0.693
8	0.071	0.714
9	0.084	0.738
10	0.088	0.761
11	0.045	0.772
12	0.065	0.787
13	0.045	0.796
14	0.056	0.808

FIGURE 3.2

CUMULATIVE MORTALITY FUNCTION, OAHU RESTAURANT, 1971-1985
(Not counting change in proprietorship as a new business.)

Cumulative
Mortality

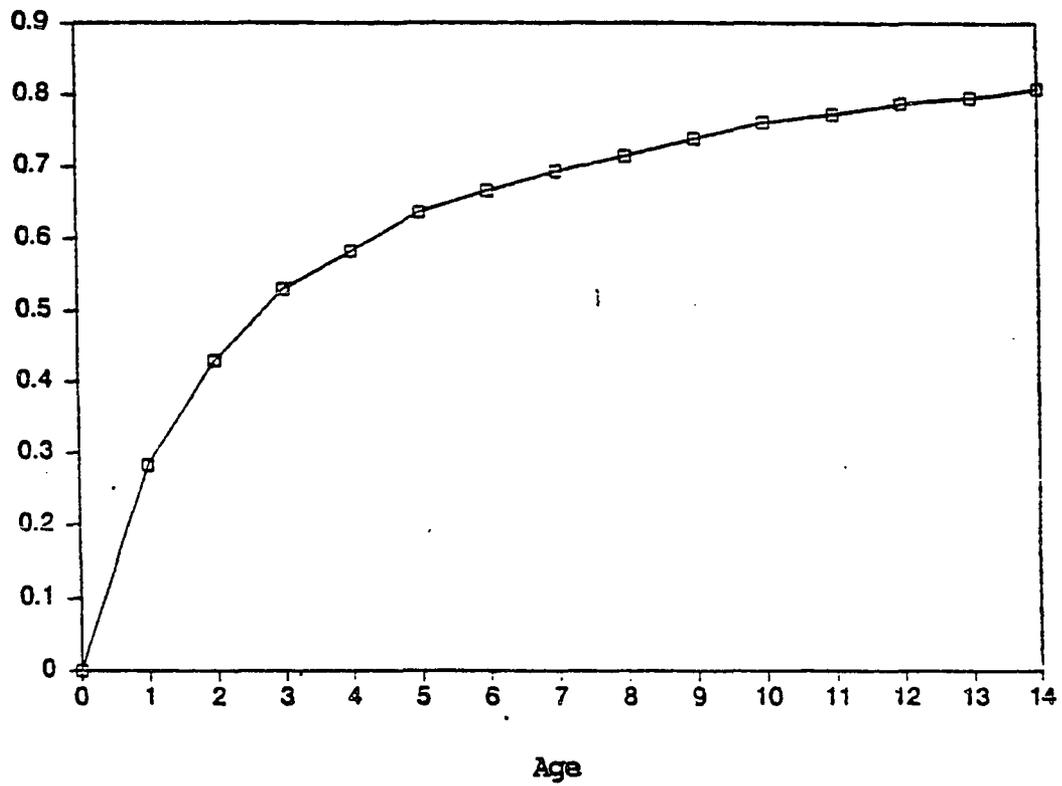


TABLE 3.3

CUMULATIVE MORTALITY FUNCTION, RESTAURANT INDUSTRY
IN ILLINOIS, POUGHKEEPSIE, AND COLORADO

AGE (YEARS)	ILLINOIS* (1925-1930) ^a	POUGHKEEPSIE* (1844-1926) ^c	COLORADO** (1927-1935) ^d
(Figures in percentages)			
1	28.5	35.0	55.5
2	44.5	48.0	71.1
3	53.7	59.0	75.1
4	60.6	67.1	80.4
5	64.7	71.7	83.8
6		75.9	86.1
7		81.8	88.4
8		84.2	88.4

Median Life Expectancy 2.60 Years 2.18 Years 0.9 Years

Estimated Function: $F(t) = 1 - (a/a+t)^b$

Estimated Parameters:

a	2.01 (0.1449) ***	2.99 (0.7027)	0.57 (0.0702)
b	0.84 (0.04)	1.33 (0.2125)	0.80 (0.0460)

* Not counting change in proprietorship as a new business.

** Counting change in proprietorship as a new business.

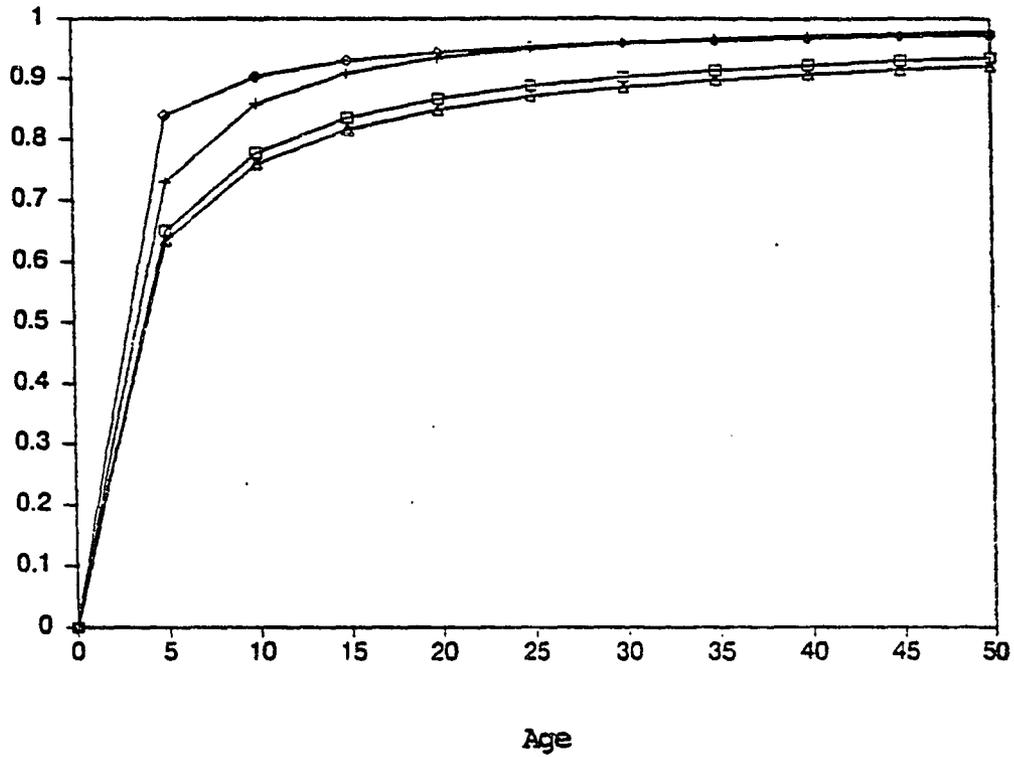
*** Standard errors in parentheses.

Sources: a. Converse (1932).
c. Hutchinson, et. al. (1938).
d. Hallas (1936).

FIGURE 3.3

ESTIMATED MORTALITY FUNCTIONS: RESTAURANT INDUSTRY IN ILLINOIS, POUGHKEEPSIE, COLORADO, AND OAHU

Cumulative Mortality



□ Illinois + Poughkeepsie ◇ Colorado △ Oahu

TABLE 3.4

TEST OF THE CONDITIONAL PROBABILITIES:
RESTAURANT INDUSTRY

AGE (YEARS)	ILLINOIS* (1925-1930) ^a	FOUGHKEEPSIE* (1844-1926) ^b	COLORADO** (1927-1935) ^c	CAHU* (1971-1980)
(Figures in percentages)				
1	28.5	35.0	55.5	28.3
2	22.5	19.9	35.5	20.5
3	16.6	21.1	14.3	17.6
4	15.0	19.6	21.4	11.2
5	10.4	14.1	18.2	12.9
6		14.7	14.8	8.2
7		24.2	17.4	
8		13.3		

Residual Sum of Squares:

Unrestricted (RSS_U) = 28.404 (18 degree of freedom)

Restricted (RSS_R) = 82.302 (24 degree of freedom)

$$F^* = \frac{(RSS_R - RSS_U) / (df_R - df_U)}{RSS_U / df_U}$$

$$F^* = 5.693$$

$$\text{Critical } F = F(0.99; 6, 18) = 4.01$$

* Not counting change in proprietorship as a new business.

** Counting change in proprietorship as a new business.

Sources: a. Converse (1932).
c. Hutchinson, et. al. (1938).
d. Hallas (1936).

conditional probabilities of restaurant mortality in various locations and a test of their similarity.

3.3 Mortality by Legal Form of the Firm

Several studies reviewed in the previous chapter found that exit rates differed among different legal types of organizations. Usually corporations had the lowest mortality, followed by partnerships and sole proprietorships. In order to identify the restaurant exit rates by legal types of organizations, the new entrants that discontinued their operations during 1971-1981 were investigated in this study. The classification of these restaurants by legal form of organization was traced from the files of registration records at the Business Registration, Department of Commerce and Consumer Affairs.

From a subsample of 1,433 restaurants included in the original data set, it was possible to classify restaurants by legal type of organization and to estimate a cumulative mortality function for each type. The subsample included 1,021 corporations, 140 partnerships and 272 sole proprietorships.

The cumulative mortality function for each type of organization is shown in Table 3.5 and Figure 3.4. The results are difficult to explain since partnerships appear

TABLE 3.5

CUMULATIVE MORTALITY FUNCTION: OAHU RESTAURANTS
BY LEGAL FORM OF ORGANIZATION, 1971-1981

	CORPORATION	PARTNERSHIP	SOLE PROPRIETORSHIP
Number of restaurants	1,021	140	272
AGE	PERCENT	PERCENT	PERCENT
1	19.5	29.3	18.0
2	30.7	43.6	29.8
3	39.2	55.7	37.5
4	45.5	60.7	39.3
5	50.2	66.4	44.1

Median Life Expectancy	4.96 years	2.53 years	9.14 years
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Estimated Function: $F(t) = 1 - (a/a+t)^b$

Estimated Parameters:

a	2.52 (0.167)	2.26 (0.393)	1.30 (0.406)
b	0.64 (0.029)	0.93 (0.11)	0.37 (0.067)

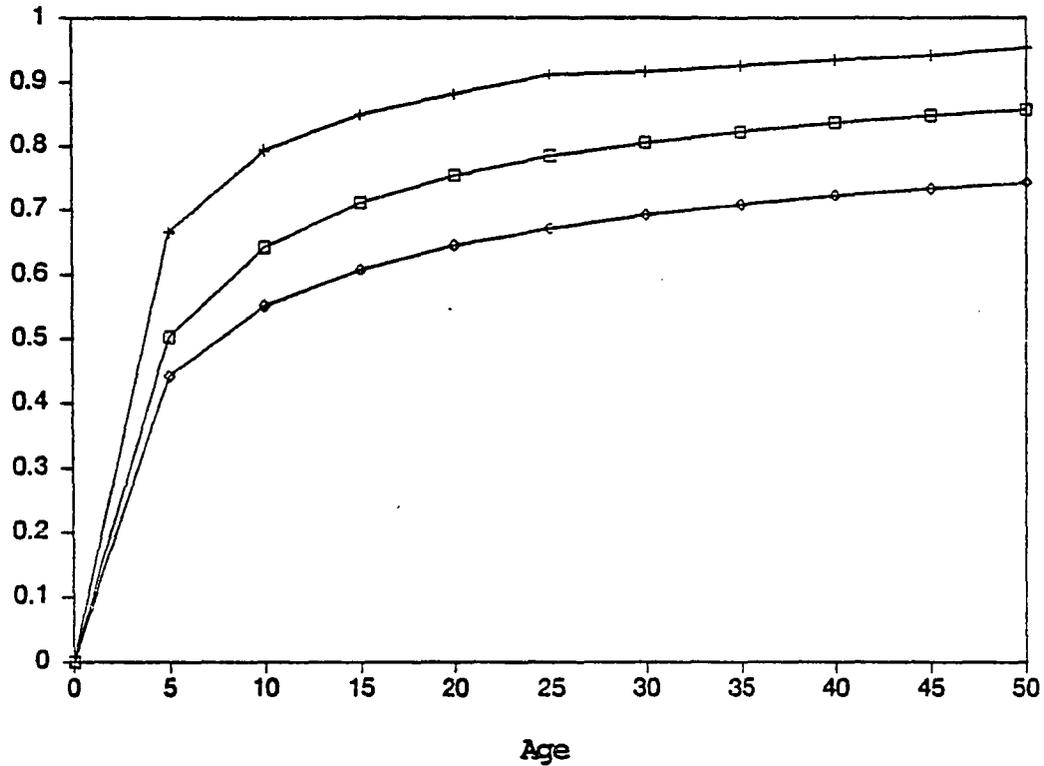
Standard errors in parentheses.

Source: Business Registration, Department of Commerce & Consumer Affairs, Hawaii State Government, 1971-1987.

FIGURE 3.4

ESTIMATED CUMULATIVE MORTALITY FUNCTIONS: OAHU RESTAURANTS
BY LEGAL FORM OF ORGANIZATION, 1971-1981

Percentage



□ Corporation

+ Partnership

◇ Sole Proprietorship

to exhibit a much higher mortality than either corporations or sole proprietorships. Given the nature of the data, there was no prior theoretical reason to explain why legal form of the firms should affect their mortality.

3.4 Estimation of Mortality Unrelated to Age of Firms

Of the restaurants in business at the start of 1986, 1,018 or 82.8 percent were started since 1971. With such a large proportion of "young" restaurants in the total population, one would expect age-related mortality to dominate over the mortality that is unrelated to age of the firms. To test this proposition, the number of exits of restaurants started since 1971 was estimated for each year using the cumulative mortality function estimated in section 3.2. These estimates are reported in Table 3.6. They show that many restaurants would have exited the industry if all mortality was attributable to age.

As a next step these exit estimates were compared to the actually observed exits reported in Table 3.7. The differences between the observed and the estimated number of exits are shown in Table 3.8. These residuals are relatively small suggesting that almost all variation in restaurant exits can be attributed to age-related mortality.

TABLE 3.6

ESTIMATED NUMBER OF EXIT: OAHU RESTAURANTS, 1971-1985

AGE (Years)	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
1	34	37	46	41	37	46	63	56	62	52	54	43	54	56	49
2	18	19	24	21	19	24	33	29	32	27	28	22	28	29	
3	12	13	16	14	13	16	22	20	22	19	19	15	19		
4	6	7	9	8	7	8	12	10	12	10	10	8			
5	7	7	9	8	7	9	12	11	12	10	11				
6	4	4	5	4	4	5	7	6	7	6					
7	3	3	4	4	3	4	6	5	6						
8	3	3	4	3	3	4	5	4							
9	3	3	4	3	3	4	5								
10	3	3	4	3	3	4									
11	1	1	2	2	1										
12	2	2	2	2											
13	1	1	2												
14	1	1													

TABLE 3.7

OBSERVED NUMBER OF EXITS: OAHU RESTAURANT, 1971-1985

AGE (Years)	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
1	31	34	37	43	38	43	58	64	75	50	61	43	55	54	53
2	20	24	19	23	23	19	35	28	34	20	30	29	32	34	
3	14	15	16	11	14	14	28	16	19	21	16	8	16		
4	2	10	15	6	4	7	10	9	14	11	13	13			
5	5	6	6	8	7	14	7	9	12	16	10				
6	6	4	10	2	6	3	6	5	7	1					
7	4	4	6	2	4	2	8	6	3						
8	2	1	6	8	2	3	5	1							
9	3	2	5	4	1	2	9								
10	3	2	6	3	2	4									
11	0	1	3	0	3										
12	1	1	1	5											
13	0	2	2												
14	1	2													

TABLE 3.8

DIFFERENCES BETWEEN OBSERVED AND ESTIMATED NUMBER OF EXITS: 1971-1985

AGE (Years)	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
1	-3	-3	-9	2	1	-3	-5	8	13	-2	7	0	1	-2	4
2	2	5	-5	2	4	-5	2	-1	2	-7	2	7	4	5	
3	2	2	0	-3	1	-2	6	-4	-3	2	-3	-7	3		
4	-4	3	6	-2	-3	-1	-2	-1	2	1	3	5			
5	-2	-1	-3	0	0	5	-5	-2	0	6	-1				
6	2	0	5	-2	2	-2	-1	-1	0	-5					
7	1	1	2	-2	1	-2	2	1	-3						
8	-1	-2	2	5	-1	-1	0	-3							
9	0	-1	1	1	-2	-2	4								
10	0	-1	2	0	-1	0									
11	-1	0	1	-2	2										
12	-1	-1	-1	3											
13	-1	1	0												
14	0	1													

To test whether the residuals are related to changes in exogenous factors, the residuals were regressed on several aggregate variables including: Food-Away-From-Home Expenditures (FAFH) by Hawaii residents (civilian and military) and visitors and crews, Visitor Expenditures (VEX), Hawaii Disposable Personal Income (DPI), Hawaii Gross Domestic Product (both current and real GDP). These variables were collected from the Hawaii State, Department of Planning and Economic Development, State of Hawaii Data Book and the Hawaii's Income and Expenditure Accounts: 1958-1983. In addition, the number of restaurants surviving (RR) in the cohort of restaurants started each year was added in the regressions. The regression results are shown in Table 3.9.

None of the coefficients of independent variables are statistically significant and the R^2 s are very low suggesting that during the period under investigation, the aggregate economic variables had little or no effect on the incidence of restaurant exits. Inclusion of RR in the regression resulted in an improvement of the R^2 , suggesting the possibility that the entrance of a firm into the industry may contribute another explanation to the exit of firms. Therefore, another attempt was made to determine the relationship between the exit and entry rates of firms from and into the restaurant industry. If

TABLE 3.9

ORDINARY LEAST SQUARE REGRESSION RESULTS

Dependent Variable = The differences between the observed and the estimated number of exits.

Independent Variables	REGRESSION NUMBER						
	1	2	3	4	5	6	7
Intercept	-1.304 (-1.034)	-1.298 (-0.966)	-0.419 (-0.407)	-1.342 (-1.034)	-1.484 (-1.035)	-1.631 (-1.087)	-4.512 (-1.262)
FAFH	0.001 (1.062)	0.001 (0.137)	0.001 (0.135)				
VEX		-0.0001 (-0.014)	-0.0001 (-0.036)	0.0005 (1.053)			
DPI					0.0001 (1.031)		
CGDP						0.0001 (1.082)	
RGDP							0.0003 (1.229)
RR	0.010 (1.025)	0.010 (1.020)		0.010 (1.024)	0.010 (1.021)	0.010 (1.031)	0.010 (1.042)
R ²	0.016	0.016	0.007	0.015	0.015	0.016	0.019
F	0.911	0.602	0.383	0.902	0.878	0.933	1.103

T - Statistic in parentheses.

this relationship exists, the number of exits may be predictable if entry of new restaurants into the industry is known. A high exit rate is expected to be correlated with a high entry rate, since new firms normally have high infant mortality rates. Additionally, ease of entry into a restaurant industry also implies ease of exit from it.

To test the sensitivity of the restaurant exit rate to the entry rate, both rates were divided into two groups. The first group, group A, was composed of those years in which the entry rate was higher than the mean, i.e., 17.96 percent. The second group, group B, included those years in which the entry rate was less than the mean. Exit rates were then assigned to each group by using a one year distributed-lag structure of the entry rate which was considered appropriate because of the high infant mortality rate for restaurants. The results showed that the mean of exit rates of group A was 14.58 percent, and was higher than the mean of 13.77 percent for group B. Using the t-distribution, however, it was concluded that the exit rate was not significantly related to the entry rate in the restaurant industry for the period studied.

Finally, the entry of restaurants during the 1971-1986 period was regressed on the independent variables by using a one year distributed-lag structure. The results are reported in Table 3.10. Again, none of the coefficients

TABLE 3.10

ORDINARY LEAST SQUARE REGRESSION RESULTS

Dependent Variable = The Entry Rates

Independent Variables	REGRESSION NUMBER				
	1	2	3	4	5
Intercept	20.342 (14.865)	20.145 (13.665)	20.347 (14.474)	20.942 (12.088)	21.157 (11.781)
FAFH ₋₁	-0.0025 (-1.9823)	-0.0092 (-0.6187)			
VEX ₋₁		0.0041 (0.4542)	-0.0016 (-1.9217)		
DPL ₋₁				-0.0004 (-1.8617)	
CGDP ₋₁					-0.0003 (-1.9123)
R ²	0.2192	0.2314	0.2087	0.1984	0.2071
F	3.929	1.956	3.693	3.466	3.657

T - Statistic in parentheses.

are statistically significant and the R^2 s are relatively low. It is clear that a more complex model is required to estimate restaurant entries.

3.5 Summary

The cumulative and conditional mortality functions of the Oahu restaurant industry exhibited a similar pattern as those found for other industries dominated by small firms. In particular, it was found that the probability of exit decreases with age of the firm. The estimated mortality functions predicted the observed exit of firms well. However, none of the explanatory economic variables were found to be statistically significant. Additionally, the high entry rate was not correlated with the high exit rate during the period studied. These findings suggest that variables related to the age of the firm determine a firm's survival or its failure. Therefore, two surveys that are discussed in the following section were carried out in an attempt to identify the variables determining business mortality.

CHAPTER 4

SURVEY OF FORMER OWNERS/MANAGERS

4.1 Introduction

To supplement the statistical analysis reported in Chapter 3, two surveys were conducted. The first survey collected data from owners/managers of restaurants that failed. Originally this study was counted upon to provide information to test a number of hypotheses. Unfortunately, the former owners/managers of failed restaurants proved to be difficult to locate and the sample size was rather small.

Therefore, a second survey of owners/managers of restaurants that are currently in business was conducted to solicit their perceptions as to why their restaurants were successful and why others have failed. The results of these two surveys are reported in this chapter.

4.2 The Survey of Former Owners/Managers

Fourteen former owners/managers of failed restaurants were interviewed in the first survey. The sample was not a random one since it was already difficult to locate

former owners/managers and to secure their cooperation. Typically, information provided from those interviewed were relied on to locate others to be included in the sample. The interviews were unstructured (i.e., no survey instrument was used) although the attention of respondents was directed towards factors deemed important in previous studies. Questions were asked regarding the particular restaurant with which the respondent was involved. Information was also obtained with the use of hypothetical examples.

The fourteen interviewees can be readily separated into two groups: (1) seven owners/managers of restaurants that were no longer in business; and (2) seven current owners/managers of restaurants who in the past had started another restaurant that subsequently failed.¹ The first group's responses clearly indicate the importance of cash flow problems in exit decisions. That is, in 6 of the 7 interviewees, the restaurant closed when the owners ran out of money to pay bills and could not borrow the necessary funds. Although there were additional complications in the seventh case, the negative cash flow definitely shortened the business life of the restaurant.

That a restaurant fails because of a cash shortage is not surprising. All respondents emphasized that the restaurant business necessitates a long-run commitment and

none of the owners expected to earn a profit on their investment for the first 3-to-5 years of the restaurant's life. The primary concern during these years was survival and the main measure of performance used was cash flow. After the initial loans are paid off, the restaurant is expected to start showing a profit. The long-term nature of the restaurant business are supported by other evidence. For example, typical restaurant leases are for 15 to 20 years as compared to the typical 5-year lease for retail stores.

The respondents attributed their cash flow problems to "undercapitalization," which is consistent with the importance of the cash reserve position discussed above.² All respondents agreed that insufficient funding was the main cause of restaurant failure. Sufficient cash reserves to cover six to twelve months of operating expenses was suggested as a rule of thumb for the required cash reserve for starting a new restaurant.

In contrast, none of the restaurants in the second group failed because of a cash shortage. At the time these restaurants went out of business, their owners had at least one other successful restaurant in business and apparently could have maintained the two or more businesses. Thus, it was not possible from the interviews to derive a simple exit rule.

Expectations, however, played a definite role. The gross revenues of a new restaurant are expected to continue to increase with the development of repeat patronage and a new restaurant is expected to start generating a positive cash flow by the end of the first year. However, none of the restaurants in the second group ceased operation during the first months of business, when gross revenues failed to increase or when cash flow failed to become positive after a year. Instead, the owners tried to remedy the perceived problems by changing the menu and/or prices, increased advertising, etc. Thus, it appears that in this second group the timing of exit depends on the persistence of the owners and the time required to observe the effects of these changes. In some cases, it took about two years before the restaurant finally closed.

Further complications are introduced by owners attempts to sell the restaurant and the belief, shared by some of respondents, that it is easier to sell an ongoing restaurant than it is to sell an out-of-business establishment. Such a belief encourages a restaurant owner to keep operating in hope of finding a buyer and/or securing a better price. The opinion of other respondents, however, was that it is indeed easier to sell

an ongoing establishment that is doing well but that this is not true if one is trying to sell a failing restaurant.

The exit decision is even further complicated by the legal implications of the restaurant leases. Typical restaurant leases specify a minimum rent or a percentage of gross sales, whichever is higher, and generally run for 15 to 20 years. The lease obligates the restaurant owner to make these payments for the duration of the lease. If the restaurant fails, the owner has several options. One is simply to walk away from the business. In this case, the lessor takes over the assets of the establishment and sells the restaurant's equipment. A second option is for the restaurant owner to declare bankruptcy. In this situation, the lessor becomes one of the creditors and is compensated from the proceeds of sales of the restaurant's assets. To protect themselves from receiving no compensation, the lessor may ask the potential restaurant owner to guarantee lease payments with his personal assets. The third option is to sell the restaurant and seek the lessor's permission to assign the lease to the new owner. Alternatively, the new owner may merely sublease the restaurant space and the original owner may still be liable for payment of the lease rent in case of default by the new owner.

Even if the owner of a failed restaurant continues to pay the minimum rent, the lessor may declare the lease to be in default since most standard leases require the restaurant to be open for business for a specified minimum time period. In practice, many of the issues pertaining to leases of discontinued restaurants are settled in negotiations between lessors and lessees. Clearly, however, the available opportunities to get out of leases at a minimum cost undoubtedly affects the timing of exit. For example, appearance of a potential purchaser may induce the owner to decide to leave the industry immediately if the future profitability of the restaurant is questionable. However, in the absence of the potential buyer the owner may have continued operating the restaurant.

The main fixed asset of restaurants is equipment which accounts from over three-fourths to 100 percent of all fixed assets. Although there is an active second-hand market in restaurant equipment, the liquidation value of these assets is relatively low. Respondents estimated that one-year old restaurant equipment upon liquidation would return only 10 to 20 percent of its original value. The salvage value of assets, therefore, does not appear to be an important variable in exit decisions in the restaurant industry. The long-term restaurant lease is

another asset, although in the case of failure, it becomes a liability. The effect of the lease on the decision process would be indirect, i.e., the more desirable the location of the restaurant, the easier it may be to locate a potential tenant to take over the lease.

The interviews provided other possible clues about the decision process. For example, the fact that an owner/manager of a failed restaurant is also operating a successful restaurant indicates that there may be only limited transferability of experience among restaurants.³ The majority of respondents agreed that each type of restaurant has, to some extent, a unique set of characteristics. Thus, the importance of experience in determining mortality of restaurants by new entrants may have been exaggerated.

4.3 Summary

Based on the responses from the fourteen owners and managers, two important factors--inadequate cash flow and complications associated with business exit--were found to be important determinants of business mortality. Six of the seven owners and managers that were no longer in business emphasized that the critical period for any new restaurant is the first three to five years since it will

usually take that long for a firm to make a profit. Moreover, sufficient cash reserves should be set aside to cover the first six to twelve months of operating expenses before even starting the business. The situation is further complicated by difficulties in trying to sell an already failing business including the problem of dealing with the long-term nature of restaurant leases.

Notes to Chapter 4

1. Of the first group of respondents, four have since opened another restaurant and three are now in other lines of business.
2. Some respondents referred to an unfavorable debt-to-equity ratio as "undercapitalization." The reduction in the probability of survival due to this factor, however, is indirect. That is, the size of the loan repayment obligation increased the amount of sales necessary to achieve a positive or breakeven cash flow.
3. On the other hand, this same evidence could suggest that there were no economies of scale and economies of scope in restaurant management. That is, management, while possessing the entrepreneurial ability to successfully manage the existing operations, may not have had the skills necessary to also successfully manage the additional restaurant. However, for this to be true, we should also observe failure in the existing businesses after the opening and failure of a new restaurant. While the small number of firms interviewed is insufficient to make any strong generalizations, this was not generally the case.

CHAPTER 5

SURVEY OF CURRENT RESTAURANT OWNERS/MANAGERS

5.1 Introduction

A survey of current restaurant owners/managers was conducted to supplement the statistical analyses in Chapter 3 and the information supplied by the survey of former restaurant owners/managers reported in Chapter 4. An additional survey was considered to be desirable because of the small sample size of the first survey of former owners/managers and the non-randomness of the first sample.

5.2 Survey of Current Restaurant Owners/Managers

In the second survey, a random sample of 100 restaurant businesses that were operating in July 1987 was selected from the total list of 1,269 restaurants. Interviews were conducted with sixty-three owners and thirty-seven managers to solicit their views on the importance of the various factors affecting survival and the exit decision. The survey is shown in Appendix B. A distribution of the sample of restaurants by years in business is as follows:

<u>Years in Business</u>	<u>Number of Restaurants</u>
1 - 3	41
4 - 6	16
7 - 9	15
Over 9 years	28

The survey solicited respondents' perceptions of why their restaurant was successful as well as their view of why the other restaurants have failed. The responses are summarized in Table 5.1 and 5.2. Reasons are ranked by a weighing of the five most important causes of success or failure. In order of importance, the respondents attribute success of their restaurant to good location, experience in the restaurant business, and sufficient capital. Similarly failures of other restaurants were attributed to corresponding factors, i.e., poor location, lack of experience in the restaurant business and insufficient capital. Poor cost control was also considered an important factor. The discussion in this chapter focuses more specifically on these factors.

TABLE 5.1
CAUSES OF SUCCESS OF RESTAURANT BUSINESS

RANK	CAUSES OF SUCCESS	WEIGHTED MEANS
1	Location	3.85
2	Experience	3.29
3	Sufficient Capital	3.20
4	Low and Long-term Lease	3.04
5	Tight Costs Control	2.97
5	Appropriate Menu Selection	2.97
6	Lots of Advertising	2.80
7	Good Management	2.77
8	Good Employees	2.74
9	Reasonable Menu Pricing	2.46
10	Good Customer Service	2.43
11	Good Business Records	2.40
12	Lots of Supplier's Credit	2.00

TABLE 5.2
CAUSES OF FAILURE OF RESTAURANT BUSINESS

RANK	CAUSED OF FAILURE	WEIGHTED MEANS
1	Inexperience	3.80
2	Poor Location	3.62
3	Insufficient Capital	3.32
4	Poor Costs Control	3.14
5	Poor Management	3.05
6	Inappropriate Menu Selection	2.93
7	Unfavorable Lease	2.90
8	Unreasonable Menu Pricing	2.65
9	Poor Customer Services	2.61
10	Personal Problem	2.50
11	Lack of Advertising Budget	2.40
12	Less Supplier's Credit	2.25
13	Overinvestment in Facilities	2.17
14	Unreliable Employees	2.00
15	Poor Business Records	1.43

5.2.1 Role of Location

The importance attributed to location reflects a general opinion held in the trade. It is interesting that, as shown in Table 5.3, more owners than managers perceived location to be the most important factor in a restaurant's success. Those who thought that other factors were more important than location cited insufficient capital, inefficient management, and poor customer service as factors that may outweigh the advantages of a good location.

Yet, if a location is considered to be an important factor to the success of a restaurant, it is difficult to explain why so many new restaurants are established by taking over leases of failed restaurants. Table 5.4, for example, shows the numerous restaurants that were established at the addresses of failed restaurants.

5.2.2 Role of Prior Experience

Lack of experience in the business has been cited in past studies to be an important factor in business failures. To test this hypothesis, the first question was designed to determine the prior restaurant industry experience of respondents. According to their responses,

TABLE 5.3
PERCEIVED IMPORTANCE OF LOCATION
BY THE RESTAURANT OWNERS AND MANAGERS

	OWNER	MANAGER	TOTAL
MOST IMPORTANT	31	14	45
IMPORTANT BUT OTHER FACTORS ARE MORE IMPORTANT	28	21	49
OTHER FACTORS ARE MORE IMPORTANT	5	1	6

TABLE 5.4
NUMBER OF NEW RESTAURANTS ESTABLISHED
AT THE ADDRESS OF FAILED RESTAURANTS

TIMES	FREQUENCY
1	353
2	68
3	55
4	20
More than 4	<u>19</u>
Total	<u>515</u>

87 respondents had prior restaurant experience. In fact, seventy-one percent of the respondents were owners or managers of other restaurants and had an average of 5.53 years of experience. The distribution of the prior experience of respondents by type and average length is shown in Table 5.5. Clearly, the owners or managers did have prior restaurant experience when their failed restaurants were started. But this fact alone does not allow us to draw any conclusions regarding the experience of owners/managers of restaurants that failed since it is possible that the owners/managers lacked this experience at the time of the opening of the failed establishment. While it is not possible to evaluate this possibility directly, responses to the two questions that followed were designed to provide some circumstantial evidence. The respondents were asked if most restaurants were successful because their owners/managers had sufficient experience in the restaurant business. If the reply was "yes," they were asked what types of major mistakes the owner/manager without prior experience is likely to make. If the answer was "no," the respondent was asked what types of major mistakes the owner/manager with prior experience is likely to make. Eighty-one respondents agreed that most restaurants were successful because of the length of experience of their owner/managers.

TABLE 5.5
 PRIOR RESTAURANT EXPERIENCE
 BY TYPE AND NUMBER OF YEARS

TYPE OF EXPERIENCE	NUMBER*	<u>AVERAGE NUMBER OF YEARS</u>
Owner of Another Restaurant	28	5.04
Manager of Another Restaurant	49	5.81
Chef	15	6.80
Maitre De	13	3.23
Cashier	15	2.33
Others**	23	3.87
Total Sample	100	Restaurants.

* There were more responses than the number of firms studied because some restaurateurs may have more than one type of experience.

** Others refer to waiter/waitress, bus person, kitchen helper, dishwasher, bartender, supplier, etc.

However, most of them suggested that experience was a necessary but not a sufficient condition to assure restaurant success. There were no significant differences in the responses on the types of errors experienced versus inexperienced owners/managers are likely to make. In part, this may be due to the small sample of respondents who said "no." The most frequently cited errors were failure to control food and labor costs, poor recruitment and training, and overinvestment in restaurant facilities and inventory.

5.2.3 Role of Cash Reserve

The responses of former restaurant owners as well as theoretical considerations (Garrod and Miklius, 1987) point out to the importance of having a large cash reserve or sufficient capital to assure the survival of a newly established business firm. In the survey of current owners/managers, several questions were added to further probe the role that this factor plays in exit decisions.

In the theoretical model developed by Garrod and Miklius (1987), cash reserve affects the exit decision process through the cash flow problem. The cash flow problem, i.e., insufficient funds to pay for current operating expenses, has been acknowledged as the event

that triggered exit from the restaurant business by half of the former owners. To confirm this finding, the respondents in the second survey were asked if they had encountered cash flow problems during their start-up period. Fifty-seven respondents acknowledged that they did. They were further asked if, in their opinion, the shortage of money during this period was the major reason of restaurant failures and 78 respondents agreed.

There are two possibilities. The cash flow problem may arise because the owner overestimated the revenues or underestimated the costs. Two questions, therefore, were added to determine which case is more likely. From the responses, summarized in Table 5.6, it appears that the underestimation of costs is more prevalent, i.e., while more than half of the respondents reported that sales revenues were equal to or higher than they had expected, almost two-thirds of the respondents underestimated their costs. The cash flow problem, therefore, is more likely to arise from underestimation of costs rather than overestimation of revenues.

As was shown by Garrod and Miklius (1987), the role of cash reserve in the decision process is an indirect one, i.e., the lower the cash reserve relative to the operating expenses, the greater is the probability of a firm's failure. Borrowing expenses also affect cash outlays.

TABLE 5.6
ACTUAL VERSUS EXPECTED REVENUES AND COSTS

	(Percent)	
	SALES	COSTS
HIGHER THAN EXPECTED	34.9	58.8
SAME AS EXPECTED	19.1	22.2
LOWER THAN EXPECTED	38.1	11.1
NO RESPONSE	<u>7.9</u>	<u>7.9</u>
TOTAL	<u>100.0</u>	<u>100.0</u>

Depending on the type of loan, the owner may incur an obligation to repay the loan in fixed monthly payments. The respondents, therefore, were asked how much of the total investment in the restaurant came from their own savings and what the other sources of funds were.

Out of the 29 respondents who answered this question, eight said that their investments in the business came entirely from their own savings, while the remaining owners had a combination of personal saving and bank loans. However, only a few respondents in this group experienced cash flow problems.

5.3 Summary

The survey of current restaurant owners/managers were conducted to supplement available statistical data and data collected in the first survey of former restaurant owners/managers. A total of 100 personal interviews were conducted in the second survey to obtain the perceptions of current owners/managers on the major causes of restaurant failures.

The three major causes identified by the respondents were poor location, lack of experience in the restaurant business, and insufficient capital. Although poor location was cited most often, many respondents qualified

their statement and noted that a good location alone did not assure a restaurant's success. This may also explain why many restaurants are established in premises that were previously occupied by restaurants that had failed. Thus, either owners of new restaurants believe that the previous restaurant failed due to factors other than location or that even a poor location can be offset by other factors. The survey responses, therefore, lead to only a tentative conclusion that a good location is a necessary (or merely helpful), but not a sufficient condition to assure a restaurant's survival.

The lack of prior experience in the restaurant business was cited as the second major cause of restaurant failure. There was no lack of prior restaurant experience among the current restaurant owners/managers. Most of the current owners had considerable prior experience in various capacities prior to their entry into the restaurant business. Since this survey covered only current owners, it provided no data to test for the differences.

Insufficient capital was cited as the third major reason for restaurant failures. Insufficient capital will likely result in a cash flow problem, i.e., insufficient funds to cover current operating costs. Most of the current owners/managers encountered cash flow problems

during the start-up period of their restaurants. From the responses, it appears that the cash flow problem is more likely to arise from underestimation of costs than from overestimation of revenues.

CHAPTER 6

SUMMARY

6.1 Restatement of the Problem

Despite the economists' recognition that exit of business firms from an industry occupies a prominent role in economic theory, relatively little attention has been devoted to the study of the exit process. There are only very few theoretical contributions on the exit process although there is a large number of empirical contributions. These empirical studies were classified into three categories: studies that measured business firm mortality, studies that explained the observed patterns of mortality, and studies identified firms that are likely to fail in the future.

The first set of studies clearly established that the conditional probability of firm's survival increases with age, while the other two sets of studies lacked appropriate theoretical underpinnings. Furthermore, a large number of these studies used the readily available D&B failure rate as a proxy for firm exits. Unfortunately, this failure rate is based only on

declarations of bankruptcies which accounts for a relatively small proportion of exits in all industries.

In short, the previous studies did not provide a good explanation of business firm mortality, with the exception of finding that the mortality of business firms is age-related. Given the current literature, it appears that a study that focused on one industry and the variables within the firm would be more productive. The restaurant industry on the Island of Oahu was selected as a case study.

6.2 Justification of the Study

While much of the academic interest in business mortality had been directed toward either measurement of firm's mortality, investigation of the relationship between the business failure rate and explanatory variables or prediction of the business failure has been sparse. This study has incorporated both microeconomic and aggregate economic factors in an empirical analysis of the exit process. Microeconomic factors were considered by looking at the age of the firm at the time of failure and the importance of intra-firm variables in determining firm's exit. The effects of aggregate economic conditions on the business exit rates were studied. It was expected

that by focusing on a particular industry, greater insights as to the effect of the microeconomic and aggregate variables on business mortality could be obtained. Finally, an improved understanding of why a firm exits an industry would aid in estimating probabilities of business failures and possibly enhance efficient allocation of funds in the future.

6.3 Summary

The mortality functions of the Oahu restaurant industry followed the general pattern of restaurant industries with the probability of exit decreasing with firm's age. The median life expectancy of the new entrants into the restaurant industry during 1971-1983 was 2.7 years. Approximately one-fourth of these restaurants survived 10 years or more.

The exit rates of different legal types of organizations were also examined. In contrast to previous studies, the corporation did not have the highest survival rates. The explanation for this, however, is difficult since there is no a priori theoretical reason why the legal form of the firm should affect its mortality.

The explanatory power of those variables that were unrelated to firm's age on the exit of firms from the industry were also examined. These variables included food-away-from-home expenditures, visitor expenditures, disposable personal income, gross domestic product and the number of surviving firms in the cohort of restaurants. The regression results showed that during the period under investigation, these variables had had little or no effect on the exit of restaurants.

The findings above, however, do suggest strongly that variables related to the firm's age are the main determinants of a firm's survival or its failure. To identify such variables, two surveys--a survey of owners/managers of failed restaurants and a survey of owners/managers of existing restaurants--were conducted in this case study. The results of these surveys pointed to the importance of having an adequate cash reserve to a firm's survival. According to the former owners/managers, sufficient cash reserves to cover six to twelve months of operating expenses were required for starting a new restaurant. This rule of thumb was supported by the owners/managers of current restaurants. In addition, it was found that the cash flow problem was more likely to arise from underestimation of costs rather than overestimation of revenues.

Another major factor affecting restaurant mortality was poor location. However, a good location alone did not assure a restaurant's success. Therefore, it was tentatively concluded that a good location is a necessary, but is not a sufficient condition to assure restaurant's survival.

Still another major factor affecting restaurant failure is the lack of prior experience in the industry. Although most of the current restaurant owners/managers had considerable experience in various capacities prior to their entry into the business, this survey alone was not sufficient to infer that lack of experience was a cause of restaurant failures. Interviews with the former restaurateurs provided a reasonable alternative, that because of a lack of economies of scale and economies of scope in restaurant management, the importance of experience might have been exaggerated.

Finally, it was impossible to formulate any simple exit rule from the interviews with the former restaurateurs. Expectations appeared to play a prominent role, but the decision to exit or not depended primarily on the availability of firm's cash reserve.

APPENDIX A
THE EATING AND DRINKING PLACES:
THE STATE OF HAWAII

THE EATING AND DRINKING PLACES INDUSTRY

The Hawaiian economy depends heavily on visitor expenditures, defense expenditures, and receipts received from agricultural products. The visitor industry, however, accounted for over two-thirds of the total direct income from the above four major export industries in 1986 (Table 1A). Visitor expenditures increased from \$ 1,640 million in 1976 to \$ 5,550 million in 1986, a rise of more than 300 percent during the past ten years.¹ The growth of the tourist industry resulted in a substantial increase in employment opportunities in various tourist-related industries. One industry in which direct visitor expenditures was found to have a significant impact was eating and drinking establishments (Table 2A).

The relative importance of the restaurant industry to the Hawaiian economy is shown in Table 3A. In 1985, this industry employed nearly 38,000 workers, or more than 40 percent of the total jobs in retail trade. In contrast, the industry accounted for only 33 percent for the United States. The annual payrolls in Hawaii's eating and drinking places were 31.9 percent of total income, a much higher percentage than those in the United States (21.6 percent). Finally, the industry's sales as a percentage of total sales in retail trade in 1982, was relatively

TABLE 1A

DIRECT INCOME FROM MAJOR EXPORT INDUSTRIES: 1971 TO 1986
(As a percent of the total for four major industries)

YEAR	RAW SUGAR & MOLASSES	FRESH AND PRO- CESSED PINE- APPLE	DEFENSE EXPENDI- TURES	VISITOR EXPENDI- TURES
1971	11.6	8.0	40.3	40.1
1972	9.6	7.6	38.9	43.9
1973	10.0	6.4	37.8	45.8
1974	23.1	4.3	30.7	41.9
1975	12.9	4.8	34.5	47.8
1976	8.4	4.7	33.6	53.3
1977	6.8	4.9	32.7	55.6
1978	7.6	4.4	30.8	57.2
1979	8.0	4.8	28.3	58.9
1980	11.9	4.5	26.3	57.3
1981	6.3	4.2	27.9	61.6
1982	5.9	3.5	28.4	62.2
1983	6.4	3.4	28.6	61.6
1984	5.5	3.6	26.6	65.2
1985	4.6	3.0	26.4	66.0
1986	4.6	3.0	22.5	69.9

Source: The State of Hawaii Data Book; 1987, Department of Planning & Economic Development, Table 403, p. 379.

TABLE 2A

ECONOMIC ACTIVITY GENERATED BY VISITOR-RELATED
EXPENDITURES BY INDUSTRY: 1986
(Figures in percentage)

YEAR AND INDUSTRY	DIRECT VISITOR- RELATED EXPENDITURES*	TOTAL** SALES OR OUTPUT	TOTAL HOUSEHOLD INCOME
All industries	100.0	100.0	100.0
Agriculture	0.6	0.8	0.9
Textile & apparel manufacture	0.9	0.9	0.8
Other manufacturing	2.5	2.9	2.1
Air transportation	7.9	8.3	7.3
Other transportation	3.1	3.8	3.9
Wholesale Trade***	2.2	2.7	3.2
Eating & drinking places	19.0	22.1	18.2
Other retail trade ^c	8.7	11.1	14.0
Hotel services & real estate	28.7	38.2	39.5
Other services	7.5	9.2	10.1
Import	18.9	-	-

* Direct expenditures by visitors, airline and ship crews, and overseas airlines.

** Direct, indirect, and induced sales.

*** Expenditure figure refers to mark-up earned, not total sales revenue.

Source: Hawaii State Department of Business and Economic Development, Unpublished estimates based on the DBED Input-Output Model.

TABLE 3A
 NUMBER OF EMPLOYEES AND ANNUAL PAYROLLS
 BY MAJOR INDUSTRY GROUP IN RETAIL TRADES: 1985
 (Figures in percentage)

INDUSTRY GROUPS	NUMBER OF EMPLOYEES		ANNUAL PAYROLLS	
	HAWAII ^a	U.S. ^b	HAWAII ^a	U.S. ^b
Building material, etc.	1.9	3.6	2.7	5.2
General merchandise	9.1	12.1	9.7	11.0
Food stores	12.8	16.1	14.1	17.1
Automotive dealers	8.8	11.5	12.5	19.4
Apparel & accessories	7.3	6.4	8.8	5.7
Furniture & home furnishing	2.5	3.9	4.9	5.5
Eating & drinking places	43.3	33.0	31.9	21.6
Miscellaneous retail	14.3	13.3	15.4	14.5

Source: a. U.S. Bureau of the Census, County Business Patterns: 1985, Hawaii, August 1987, p.7.
 b. U.S. Bureau of the Census, County Business Patterns: 1985, United States, 1987, p.1.

high at 17.1 percent in Hawaii, as compared to 9.8 percent in the whole country (Table 4A). These brief comparisons indicate not only the importance of the industry to the Hawaiian economy, but also the relative size of the restaurant industry in the Hawaiian retail trade.

As shown in Table 4A, the growth of sales in eating and drinking places during the period 1977-1982 was much greater than that of the United States as a whole. This growth appeared to have been due primarily to both an increase in the number of tourists, which in turn led to higher expenditures for foods and consumption by local residents. Normally, the demand for food away from home showed a positive relationship with the female participation rate in the labor market. With the relatively higher female participation rate in the labor market in Hawaii than that of the United States, there seemed to be good reason to believe that the growth in local sales of the eating and drinking places was generated by an increase in the female labor participation rate. To test this belief, the demand for the industry's product which was proxied by the consumption expenditures for food away from home (FAFH) was analyzed during 1983-1985. The results in Table 5A show the decrease of Hawaii's residents for FAFH from \$684.5 million in 1983

TABLE 4A
SALES OF SELECTED INDUSTRIES: 1982

INDUSTRY GROUPS	SALES (\$ MILLION)*		PERCENT CHANGE	
	HAWAII	U.S.	HAWAII	U.S.
Retail trade**	5,102	1,039,029	58.2	48.5
Eating & drinking Places	873	101,723	82.2	65.9
Sales as a % of total retail trade	17.1%	9.8%		

* Includes only establishments with payroll.

** Excludes nonemployer direct sellers, SIC 5963.

Source: U.S. Bureau of the Census, 1982 Census
of Retail Trade, Hawaii and United States.

TABLE 5A
CONSUMPTION EXPENDITURES FOR FOOD
AWAY FROM HOME (FAFH): 1983-1985

YEAR	FAFH ^a (\$ MILLION)	VISITORS ^b (\$ MILLION)	RESIDENTS (\$ MILLION)
1983	1,600.1	915.6	684.5
1984	1,725.3	1,049.0	676.3
1985	1,890.3	1,081.0	809.3

Sources: a. The State Hawaii Data Book: 1987, Total Personal Consumption Expenditures: 1983 to 1985
b. The State Hawaii Data Book: 1984-1986, Economic Activity Generated by Visitor-Related Expenditures by Industry.

to \$676.3 million in 1984, and a subsequent increase to \$809.3 million in 1985. This trend was consistent with the trend in the female labor participation rate in the Hawaiian labor market (Table 6A).

The restaurant industry within the retail trade sector of the economy exhibits some particular features. The industry usually has a high investment in depreciable assets and capital expenditures (Table 7A). The disadvantage of the high investments required, however, is offset by the fact that the industry also earns the highest net income in the retail trade (Table 8A). On the other hand, the industry like many other industries, is dominated by small firms. As shown in Table 9A, approximately 68 percent of the number of eating and drinking establishments employed less than 20 workers, as compared with 75.3 percent for the United States.

The majority of the eating and drinking places in 1982 within the State of Hawaii were located on the island of Oahu, the City and County of Honolulu, followed by Maui, Hawaii, and Kauai, respectively. Approximately 34 percent of these firms were operated in the business district, while 25 percent were in the tourist area.³ The industry was composed of several types of restaurants that are common with other major tourist attraction states. A variety of services, ranging from fast foods to fine

TABLE 6A

FEMALE LABOR PARTICIPATION RATE*: 1983-1986

YEAR	HAWAII	UNITED STATES
1983	59.1	52.9
1984	58.1	53.6
1985	59.1	54.5
1986	59.0	55.3

* Percent of civilian noninstitutional population of female in the civilian labor force.

Source: U.S. Bureau of Labor Statistics, Geographic Profile of Employment and Unemployment.

TABLE 7A
DEPRECIABLE ASSETS AND CAPITAL EXPENDITURE
BY TYPE OF RETAIL TRADE
(Figures in million dollars)

SIC CODE	DEPRECIABLE ASSETS	CAPITAL EXPEN- DITURES (OTHER THAN LAND)
58 Eating & drinking places	37,139	5,554
54 Food stores	31,054	4,665
53 General merchandise stores	27,795	3,149
55 Automotive dealers*	9,412	1,411
56 Apparel & accessory stores	8,983	1,294
52 Building materials	7,245	869
57 Furniture & furnishings	6,005	825
59 Drug stores & proprietary	4,330	675
59 Liquor stores	1,546	137

* Excludes gasoline service stations.

Source: 1982 Census of Retail Trade, Measures of Value Produced, Capital Expenditures, Depreciable Assets, and Operating Expenses, U.S. Department of Commerce, October 1985

TABLE 8A

NET INCOME BY TYPE OF INDUSTRY: 1982
(Figures as a percentages of sales)

SIC CODE	NET INCOME PRODUCED AT	
	MARKET PRICES*	FACTOR COST
All retail trade	20.3	18.6
52 Building material & garden supply	21.2	19.5
53 General merchandise store**	23.6	21.5
54 Food stores	16.9	15.5
55 Automotive Dealers	14.2	13.5
Gasoline service station	10.9	9.9
56 Apparel & accessory stores	23.7	21.7
57 Furniture, home furnishings	21.4	19.7
58 Eating & drinking places	36.9	32.8
59 Drug stores & proprietary	22.7	21.3
Liquor stores	16.9	15.6

* This item represents net income before depreciation, license fees, and taxes other than income taxes.

** Excludes leased department.

Source: 1982 Census of Retail Trade, Measures of Value Produced, Capital Expenditures, Depreciable Assets, and Operating Expenses, U.S. Department of Commerce, October 1985

TABLE 9A

NUMBER OF ESTABLISHMENTS BY EMPLOYMENT-SIZE CLASS
THE EATING AND DRINKING PLACES: 1985

EMPLOYMENT-SIZE CLASS	AS A % OF TOTAL ESTABLISHMENTS	
	HONOLULU	UNITED STATES
1 to 4	31.1	40.2
5 to 9	18.8	17.2
10 to 19	17.6	17.9
20 to 49	21.3	18.1
50 to 99	9.3	5.6
100 to 249	1.9	0.9

Source: U.S. Bureau of the Census, County Business
Patterns: 1985, Hawaii and United States.

dining, were offered under different menus and prices. Due to the growing number of immigrants and diverse cultural and ethnic local residents in Hawaii, there existed a demand for ethnic foods, such as Japanese, Chinese, Hawaiian, Philippino, Korean, etc. The majority of these firms (65.4 percent)³ were operated under independent ownerships.

Finally, historical data of the restaurants on Oahu revealed that the fast foods experienced a much higher growth than any other types of restaurants (Table 10A). This may be due to the development of a variety of foods at a relatively cheaper prices, the well-established brand names of foods, and the convenience of dining out in these outlets.

TABLE 10A
 SELECTED FAST FOOD UNITS: 1980 AND 1987
 OAHU, THE STATE OF HAWAII

CORPORATION	NUMBER OF RESTAURANTS		PERCENT CHANGE
	1980	1987	
All Restaurants	1,112	1,269	14.1
McDonald's	26	48	84.6
Jack In The Box	11	21	90.9
Burger King	10	26*	160.0
Zippy's	9	17	88.9
Wendy's	6	13	116.7
Total	62	125	101.6

* Excludes 2 Burger King Express Mobile units.

Source: The Hawaiian Telephone Company, Oahu Yellow Pages.

Notes to Appendix A

1. The State of Hawaii Data Book 1987, Department of Business and Economic Development, Table 403: Direct Income from Major export industries, 1960-1986, p. 378
2. This includes only the establishments with payroll.
3. Fox, Morton and Danny Breatchel, Survey of the Hawaii Restaurant Industry, University of Hawaii at Manoa, School of Travel Industry Management, 1982.

APPENDIX B
SURVEY OF CURRENT RESTAURANT OWNERS AND MANAGERS:
SURVEY INSTRUMENT

QUESTIONNAIRE

Q-1. When did this restaurant open for business?
 _____ (MONTH/YEAR)

Q-2. Are you the (___) owner or (___) manager of this restaurant?
 If you are the manager, how long have you been working here?
 _____ (MONTHS), _____ (YEARS)

Q-3. Did this restaurant start as a (___) new business venture or (___) take over from the previous business?

Q-4. Did you have any prior experience in the restaurant industry?

	1. YES.	2. NO.	<u>YEARS</u>
As			
OWNER OF ANOTHER RESTAURANT.....			_____
MANAGER OF ANOTHER RESTAURANT...			_____
CHEF.....			_____
MAITRE DE			_____
CASHIER			_____
SUPPLIER.....			_____
OTHER (Please specify)			_____

Q-5. What do you think are the FIVE MOST IMPORTANT FACTORS that contribute to the success of your restaurant? Please look over and rank them in order of important by using "1" for the most important, "2" for the second most important, etc.

RANK

- a. Your Experience..... _____
- b. Good Location..... _____
- c. Low and Long-term Lease..... _____
- d. Appropriate Menu Selection..... _____
- e. Reasonable Menu Pricing..... _____
- f. Lots of Advertising..... _____
- g. Tight Costs Control..... _____
- h. Lots of Supplier's Credit..... _____
- i. Sufficient Capital..... _____
- j. Good Management..... _____
- k. Good Employees..... _____
- l. Good Customer Services..... _____
- m. Good Business Records..... _____
- n. Other(Please specify) _____

.....
Q-6. Did you know of any restaurant that discontinued its business?

- 1. YES
- 2. NO

Q-7. What do you think are the factors in the decision to discontinue the restaurant business? (Please check all that apply and rank them in order of important by using "1" for the most important, "2" for the second most important, etc.)

RANK

- () a. To avoid financial losses..... _____
- () b. Unable to earn the reasonable profits _____
- () c. Unable to solve the cash flow problem _____
- () d. Unable to solve the personal problems _____
- () e. To dispose of the firm at a profit... _____
- () f. Expiration of lease and obsolete facilities..... _____
- () g. To accept a job elsewhere..... _____
- () h. To retire..... _____
- () i. To open other business..... _____
- () j. Others (Please specify.) _____

Q-8. The following factors are supposed to cause business failures. What do you think are the FIVE MOST SERIOUS CAUSE OF FAILURE in the restaurant business? Please rank them by using "1" for the most serious cause of failure, "2" for the second most serious cause of failure, etc.

- | | <u>RANK</u> |
|--------------------------------------|-------------|
| a. Inexperience..... | _____ |
| b. Poor Location..... | _____ |
| c. Unfavorable Lease..... | _____ |
| d. Inappropriate Menu Selection..... | _____ |
| e. Inappropriate Menu Pricing..... | _____ |
| f. Lack of Advertising Budget..... | _____ |
| g. Poor Costs Control..... | _____ |
| h. Less Supplier's Credit..... | _____ |
| i. Insufficient Capital..... | _____ |
| j. Poor Management..... | _____ |
| k. Unreliable Employees..... | _____ |
| l. Overinvestment in Facilities..... | _____ |
| m. Poor Customer Services..... | _____ |
| n. Poor Business Records..... | _____ |
| o. Personal Problems..... | _____ |
| p. Others (Please specify.) | _____ |

.....

Q-9. Do you feel that most restaurants are successful because their owners/managers have sufficient experience in the restaurant business?

1. YES 2. NO

If a person without/with experience goes into the restaurant business what types of major mistakes is he or she likely to make?

Q-10 How important is the location of the restaurant for its success?

1. MOST IMPORTANT
2. IMPORTANT BUT OTHER FACTORS ARE MORE IMPORTANT
3. OTHER FACTORS ARE MORE IMPORTANT

If it is most important, would you then say that most of the restaurants failed because they were in wrong locations?

1. YES 2. NO. Why? _____

If it is not most important, please explain _____

Q-11 When you started this restaurant, what percentage of the total money invested came from your own savings?
_____ (PERCENT)

What were the other sources of fund? _____

Q-12 In general, how does your actual level of sales compare with what you expected before you opened this restaurant?

(____) % HIGHER, (____) SAME, or (____) % LOWER

REASON: _____

How about your costs? Is it (____) higher, (____) same, or (____) lower than you expected?
_____ (PERCENT)

REASON: _____

Q-13 During the start-up period, the restaurants usually have insufficient cash to pay operating expenses. Did you ever have this kind of problem?

1. YES 2. NO

If yes, how long did it take before your monthly cash intake equalled your out of pocket expenses?
_____ (MONTHS)

Was it (___) longer, (___) same, or (___) shorter than your expectation?

Q-14 Do you think that the shortage of money during this period is the major reason why restaurants fail?

1. YES 2. NO

Please explain: _____

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