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LOAN REQUEST OUTCOMES IN THE U.S. SMALL BUSINESS ADMINISTRATION BUSINESS DISASTER LOAN PROGRAM

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INTRODUCTION

Although the long-term effects of disasters and the factors that affect the ability to recover have received a great deal of attention recently, the recovery literature is limited and uneven in terms of the units of analysis studied and the research findings. Nigg and Tierney (1990) note that the majority of empirical studies on recovery have taken the individual as the unit of analysis. These works have focused on the emotional effects of catastrophic events and the individual's ability to recover from these psychological impacts (Bell, 1978; Huerta and Horton, 1978; Nigg and Mushkatel, 1985).

A smaller number of studies of short- and long-term recovery have been conducted on larger social units such as the family (Bolin, 1976, 1982; Bolton, 1979; Quarantelli, 1982). These family based studies are considered more sophisticated theoretically and methodologically than studies focusing on the individual because they are based on multivariate analyses of how families respond to disaster warnings (Drabek, 1969; Drabek and Key, 1976; Perry, 1983).

Finally, a number of studies have focused on entire communities impacted by disasters and the community characteristics that facilitate or impede recovery (Rubin, 1981; Rubin et al., 1985). Other studies conducted at the community level have focused on the long-term socioeconomic effects of disasters (Friesema et al., 1979; Rossi et al., 1978).

However, the processes and outcomes associated with the recovery of private businesses have almost never been addressed in the disaster recovery literature. This lack of knowledge is even more glaring when it is realized that small businesses have few aid options available to them in the aftermath of disasters. Some small businesses may be able to secure a commercial loan or receive local or state funds made available following a disaster, but these are few in comparison to what is available to individuals and households. For instance, individuals or households may receive material assistance from such private agencies as the Red Cross and Salvation Army. They may also receive state and federal level assistance such as individual and family grants administered by the Federal Emergency Management Agency (FEMA) and their counterparts at the state level. The U.S. Small Business Administration (SBA), however, is the only federal agency charged with the responsibility of providing assistance to businesses following a disaster declaration.

SBA disaster loans are a desirable source of recovery assistance for businesses due to their relatively low interest rates (four per cent and eight per cent). This is especially the case for disaster victims with uninsured losses. Unlike many large-scale enterprises, few small businesses are insured against hazards (Mittler, 1992). Further, a few small businesses may be able to shut down their operations and withstand cash-flow interruptions for long periods of time, "but most disrupted businesses need to resume normal operations as quickly and economically as possible in

order to stay viable" (Nigg and Tierney, 1990:1; see also: Krembs and Perkins, 1981; Toigo, 1989). Thus, it seems necessary for small businesses to get back into business quickly, finance and make necessary repairs, and avoid the accumulation of additional debt. These should all be positive factors in the ability of a small business to recover from a disaster.

Finally, the recovery of small businesses following disaster would seem to be extremely important for local and state economies. Economists and regional planners have stressed the importance of small businesses as major generators of new employment at the local and state level (Birch, 1979; Teitz et al., 1981; Richman, 1983). According to Alesch et al. (1993), small businesses accounted for half of all private sector output, received 15.6 per cent of all federal prime contracts, and employed 58 per cent of all private sector employees in 1988. Small business generated 48.5 per cent of all new jobs in the United States from 1984 to 1988.

With the vulnerability of small businesses on one hand and their importance to state and local economies on the other, success in obtaining an SBA loan, as well as the speed of assistance, may be crucial for a disaster-stricken business and the larger community.

With these points in mind, the following research attempts to isolate those factors associated with success in obtaining SBA loans and favorable loan terms. More specifically, it will explore the relationship between community socioeconomic characteristics, proprietor attributes, business characteristics, and magnitude of

disaster losses, and loan decisions. The analysis is based on a sample of 262 businesses that applied for SBA loans following the October 1, 1987 Whittier Narrows earthquake.

REVIEW OF LITERATURE

As indicated earlier, few studies have focused on the recovery of private businesses. There are a handful of exceptions. Focusing on small businesses impacted by the 1983 Coalinga, California earthquake, Durkin found differential recovery-related problems for businesses. Those businesses that had the most difficulty recovering were those that (1) were marginally profitable or not at all viable prior to the earthquake; (2) businesses that lost expensive inventories in the earthquake; and (3) small retail businesses that leased rather than owned, were dependent on favorable locations to attract customers, and could not qualify for credit.

In related work, French and associates (1984) focused on household and business recovery following the 1983 Coalinga earthquake. Regarding sources of recovery assistance, businesses relied heavily on personal savings, loans from local banks, and the assistance of a local development agency funded by the Economic Development Administration. The SBA Disaster Assistance Program was the least helpful to Coalinga businesses and residents.

Kroll et al. (1990) focused on the economic impacts of the Loma Prieta earthquake on small business. From a sample of 1,800 firms in Oakland and Santa Cruz, California, they found that federal assistance was least used among area firms. Less than five

per cent of the Oakland firms sampled, and approximately 10 per cent of the Santa Cruz firms sampled received assistance from SBA. Firms in both locales expressed dissatisfaction with SBA services.

Recent experimental research has shown that industry classification and pre-disaster profitability impact the vulnerability and recovery potential of small businesses (Alesch et al., 1993). Utilizing a variety of earthquake scenarios, the most vulnerable businesses were those "with low ratios of net worth to total assets, high ratios of net fixed assets, and those highly dependent on sales turnover" (144). Businesses such as restaurants, travel agencies, and grocery stores fell into this category. On the other hand, firms with higher levels of net worth, lower levels of fixed net assets, and lower sales turnover had the best chances of survival. Accounting firms, electronics firms, and computer firms, among others, fell into this category.

These business specific studies suggest that factors such as the type of business, pre-disaster profitability, and whether the business property is owned or leased may be related to the recovery capacity of a business. These same factors may also be related to successfully obtaining SBA loans.

This analysis also takes into account several key findings in the literature on family and household recovery. One major finding is that, while the nature of the relationship is unclear, the ability to recover from disaster losses is related to the utilization of post-disaster services (Bolin, 1982). Aid and social support have been found to be important factors in affecting

recovery outcomes of victims (Bolin, 1982; Bolin and Bolton, 1986). For example, in a longitudinal comparative study of disaster in the U.S. and Nicaragua, Bolin and Bolton (1983) found that families receiving greater amounts of aid reported recovering at a more rapid pace than families receiving little to no post-disaster aid. Bolin (1989) reported similar findings in a study of family recovery following the 1987 Whittier Narrows earthquake. Bolin's research clearly indicates that use of available aid is one, if not the most, important factor in family and household recovery. This may also be the case for small businesses.

Other research has focused on the link between such victim socio-demographic characteristics as socio-economic status (SES), age, and ethnicity, and service utilization.

The evidence on the influence of socio-economic status is mixed. For example, Quarantelli (1989) found that lower status and upper status individuals and families seem to know better "how to work the system" than do those from middle class backgrounds. Cochrane (1975) found that low family income was associated with reluctance to seek aid, with a smaller percentage of lower income families and individuals seeking aid from the federal government than middle and upper income groups.

Rossi and his colleagues (1983) found, however, that more affluent families tended to avoid applying. Feld (1973) argued that higher SES families, because they have more options, were less likely to utilize federal housing assistance programs; whereas, Bolin (1982) found that higher SES families used all federally-

sponsored services, including mobile homes, more often than lower-SES families. Finally, Bolin and Bolton (1986) and Wijkman and Timberlake (1988) have found social class to be positively related with aid utilization and recovery.

Age also influences service utilization and recovery but in a more direct way. The majority of research indicates that older people lose more in disasters (Moore, 1958; Poulshock and Cohen, 1975; Bell, 1978). Friedsam (1962) and Moore (1958) have shown that elderly families have a greater need for rehabilitation and recovery aid and therefore request more services. However, the elderly receive proportionately less assistance than young disaster victims (Poulshock and Cohen, 1975; Kilijanek and Drabek, 1979; Rossi et al., 1983), even when older victims sustain extensive damage to their homes (Drabek et al., 1979).

Ethnicity also seems to play an important role in service utilization and recovery. In a study of two tornado stricken communities in Texas, Moore (1958) found that Black families require disproportionately greater amounts of aid to recover than their White counterparts. More recently, Bolin and Bolton (1986) concluded that White families recover more quickly and at higher rates than do Black families. Looking across a number of ethnic and religious categories as well as disaster agents, income was found to be important for both racial groups. Families with higher incomes and lower loss levels were more likely to report having recovered than their less well-off counterparts.

The household recovery literature suggests that social factors play a role in the willingness to seek assistance as well as the extent to which assistance translates into benefits for the victim. It is possible that such factors as age and ethnicity are also associated with the SBA's decision to grant assistance and at what terms to business applicants.

Another relevant finding is that losses sustained influence recovery. Bolin and Bolton (1983) found that families reporting greater losses recovered at a slower pace than families with fewer losses. Bolin (1989) also found that households with low disaster loss levels and that encountered few problems with temporary sheltering, as well as those that received federal aid and support from family and friends, were the most likely to indicate they had recovered. This paper will explore the relationship between losses sustained and receiving SBA loans.

Very little research has focused on the relationship between the larger, pre-disaster socio-economic climate of a community and the economic recovery of smaller social units such as households or businesses. Rossi et al. (1978) conducted a nationwide study of disaster impacts utilizing census data on demographic, housing, and economic conditions within metropolitan areas and counties. They found no discernible effects on changes in housing stocks or population at the county level, nor were consistent effects found to survive more than a few months. Friesema and associates (1979) reached similar conclusions in their study of long-term social and economic disruptions resulting from natural disasters.

More frequently, disasters have been found to at least alter the pace, if not the direction, of pre-disaster, larger socio-economic trends. Haas et al. (1977) found that disaster events tend to exacerbate pre-disaster trends, including economic and population change. Following the devastating tornado that struck Xenia, Ohio in 1974, Francaviglia (1978) found that reconstruction followed and intensified pre-disaster trends. Commercial development, contrary to plans, continued along pre-disaster paths, and the weak, pre-disaster central business district continued to decline.

This analysis will explore the relationship between the larger, community socioeconomic context and the recovery opportunities of smaller social units, namely businesses.

To reiterate, this paper is focusing on decision-making in SBA's business disaster loan program. Taking into consideration a variety of findings in the literature, a four-component model was developed to analyze loan request outcomes, or more specifically to answer the questions: Who got loans? What accounted for the favorability of terms associated with those loans? The four components of the model are community context, owner characteristics, business characteristics, and earthquake effects. The models is depicted in Table 1 and will be fully explicated in the analysis section.

Table 1. Independent Variables Included in the Model for Explaining SBA Loan Request Outcomes

Variable
Community Context:
City in which business was located
Owner Characteristics:
Race of primary owner
Age of primary owner
Gender of primary owner
Citizenship status of primary owner
Business Characteristics:
Structure was owned or leased
Number of years primary owner had managed the business
Industry classification
Credit availability
Earthquake Effects:
Owner claimed earthquake related business losses
SBA verified business losses

RESEARCH DESIGN AND METHODOLOGY

The Whittier Narrows earthquake was the first event to affect a major metropolitan area in the United States since the 1971 San Fernando earthquake. It provided an excellent opportunity to study the effects of earthquakes on businesses in a major urban setting. Additionally, the event provided an opportunity to explore the influence of community context (e.g., expanding business opportunities, economic development activities) on business recovery because damage due to the earthquake was spread over a fairly wide geographic area. Finally, the affected area, greater Los Angeles, is ethnically diverse, allowing researchers to assess how event impacts and recovery may differ as a function of ethnicity.

Sampling

The Communities. Businesses included in the analysis were all businesses in each of four severely damaged Southern California cities that met two basic requirements: (1) businesses had to apply for disaster loans as a result of damage sustained in the earthquake; and (2) were something other than small-scale landlords.[1] Alhambra, Compton, Monterey Park, and Whittier were

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[1]Nigg and Tierney's initial conception of a small business followed the typical proprietor-operator model: the gasoline station, the corner market, and so on. They point out that individuals who own property they rent out to others are qualified to apply for SBA disaster loans to cover what are "technically" business losses. Although a large proportion of the SBA loan applicants in the Whittier earthquake were in this category, their rental income supplements income from another source. An example may be a retail manager who owns and rents a small house for supplemental income. For SBA purposes this individual would be

the four study communities chosen for analysis. These four communities were selected from a larger group of seven high-damage communities to take into account differences in population characteristics and community socio-economic climates.

As indicated in Table 2, the four selected communities differ markedly in their socioeconomic makeup, although they are roughly similar in size and geographic location in the greater Los Angeles area. Whittier, the most seriously affected community, is largely Anglo with a high median household income. Incomes are also relatively high in Monterey Park, but Anglos constitute less than 20 per cent of the population. Monterey Park is one of the few cities in the country with a majority Asian population, a continuing trend. Similar in size to Whittier, Alhambra has a median income of about $20,000 and a large Hispanic and Asian population. The last of the four communities is Compton, a low-income community in which about three-fourths of the population is Black. Unemployment was highest by far in Compton (12 per cent), while the other three cities had relatively low rates.

These four communities also had diverse business climates at the time of the earthquake based on a number of social indicators. For instance, all four communities saw some increase

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considered a business owner. For purposes of the study, Nigg and Tierney excluded any businesses that consisted of four residential rental units or less, the rationale being that the remainder of the sample would include a substantially higher number of cases that would actually constitute the major income source for the owner. As a result of this threshold, 59 per cent of the actual applicant cases were not included in Nigg and Tierney's sample.

Table 2. Community Characteristics

	Alhambra	Compton	Monterey Park	Whittier
Population	64,615	81,286	54,338	69,717
1970-80 Change(%)	+4	+3	+10	-5
Unemployment(%)	4	12	5	5
Median Income	20,065	14,292	22,568	24,392
Ethnic Populations(%)				
Hispanic	38	21	31	23
Asian	28	2	51	2
Black	1	74	2	1
1970-80 Business Trends(%)				
Retail	+8	-30	+8	-12
Manufacturing	-1	+6	-26	+23
Service	+44	+18	+58	+52

between 1970 and 1980 in housing units, but that increase was only 2 per cent for Compton, while the housing market in Monterey Park grew at a 15 per cent rate. Additionally, all four communities saw some increase in the number of business establishments, especially in the rapidly-growing service sector. However, Compton's gains were minimal and were easily offset by the 30 per cent loss in the total number of retail businesses. While the other three communities experienced high percentages of net gains in the number of businesses, Compton experienced a 6 per cent net loss.

The Businesses. Data on the key variables used in the analysis of decision-making and loan outcomes were obtained from the SBA business loan case files. The files contained all information relevant to the loan application including the extent

of disaster damage, financial data, and loan decisions. Of the 803 applications submitted in the four cities, 309 businesses, or 41 per cent of all those who applied, met the criteria for study inclusion as described above.

Table 3 provides data on selected aspects of the businesses included in the analysis. Due to differences in community size and because of differential earthquake impacts, sample sizes varied by community. The largest subgroup of businesses in the sample were located in the City of Whittier (N=214); the smallest number (N=17) were in Compton, which was the furthest of the four communities from the earthquake's epicenter. Reflecting the ethnic diversity of the region and the impacted communities, a large proportion of the businesses that applied for loans were minority-owned. Proprietor ethnicity roughly followed community demographics: Compton business owners were mostly Black; Asians predominated as business owners in Monterey Park; and three-fourths of the business owners in Whittier were Anglos. The only exception is Alhambra where Hispanics were underrepresented as business owners and Asians overrepresented, relative to their population size.

Along gender lines, just under one-half of the businesses were male-owned. The next most frequent ownership pattern, which was particularly common in Monterey Park, was the male-female partnership. Female proprietors were well represented in all four communities, with the largest proportion being in Compton. Approximately three-fourths of the businesses owned the buildings in which they were operating at the time of the earthquake, as

Table 3. Proprietor and Business Characteristics

	Alhambra	Compton	Monterey Park	Whittier	Total
Ethnicity of Primary Owner(%)					
Anglo	43	29	14	75	62
Hispanic	9	0	4	14	11
Black	0	71	0	0	23
Asian	48	0	82	12	4
Gender of Primary Owner(%)					
Male	39	47	35	49	46
Female	24	41	17	21	22
Male/Female Partnership	37	12	48	30	32
Owner-occupied(%)	76	82	96	72	75
Earthquake Insured(%)	12	0	4	4	5
Average Verified Losses($)	94,164	29,274	70,190	124,662	110,301
N per City	(55)	(17)	(23)	(214)	(309)

opposed to owning only the inventory and equipment and leasing the space. Proportionately, owner occupancy was highest in Monterey Park and lowest in Whittier.

Not surprisingly, owners in this study were largely without earthquake insurance to cover losses. Overall, only 5 per cent of the applicants reported being insured for earthquake damage. Businesses in Alhambra were most likely to have some form of insurance.

During the loan application process, the SBA verifies disaster losses in various categories, including real property, leasehold improvements, inventory, equipment, and machinery. Average losses

varied by community. Businesses in Whittier had the highest verified losses, averaging about $124,600 in damage, and businesses in Compton had the lowest losses, at just over $29,000.

Method of Analysis

Logistic regression was used to assess the model of loan outcomes due to the categorical nature of the dependent variable. "Loan outcomes" is a trichotomous variable: a business either received an 8 per cent loan (coded 0), did not receive a loan (coded 1), or received a loan at the favorable 4 per cent interest rate (coded 2).

When dealing with categorical dependent variables, values on the dependent variable must be interpreted as probabilities, restricted to between zero and one. A standard linear regression model with a categorical dependent variable, however, would produce values of Y outside the zero-one constraint. In sum, the incorrect assumption of linearity

> would lead to least squares estimates which (1) have no known distributional properties, (2) are sensitive to the range of data, (3) may grossly understate the magnitude of true effects, (4) systematically yield probability predictions outside the range of 0 to 1, and (5) get worse as standard statistical practices for improving the estimates are employed (Aldrich and Nelson, 1984:30).

In this research, logit coefficients are estimated for the probabilities of not receiving a loan from the SBA and receiving a loan at the 4 per cent interest rate, with received a loan at the 8 per cent interest rate set as the reference category.

Hypothetical SBA applicants are produced and their probabilities of belonging in each of the three categories computed.

ANALYSIS

Businesses in the four study communities had different experiences with the SBA business disaster loan program, as indicated in Table 4.[2] In looking at loan approval rates, there was variation by community. Total figures indicate that 52 per cent of all applicants were approved and 22 per cent were denied SBA loans; however, obtaining a loan was easier in some communities than in others. For instance, only 23 per cent of the Compton applicants had their loans accepted (i.e., they were considered by the SBA for a loan), compared with approximately one-half for the other three cities. Slightly more than one-half of the Compton applicants were denied SBA loans. Businesses in Monterey Park had slightly higher loan withdrawal rates--that is, applicants made a decision not to continue with the application process or SBA withdrew the applicant for not submitting the necessary financial documentation--but rates were roughly comparable for the four communities. In sum, business applicants in Alhambra and Whittier were more likely than other applicants to obtain SBA disaster loans, and Compton business owners were by far the least likely.

Business finances are analyzed by SBA not only for determining who receives a loan, but in order to set interest rates and loan payback periods. According to the SBA, 4 per cent loans are given

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[2]The original sample of 309 businesses was reduced to 262 due to missing data problems.

Table 4. Loan Outcomes by Community

	Alhambra	Compton	Monterey Park	Whittier	Total
Loan Outcome(%)					
Approved	55	23	50	54	52
Withdrawn	20	23	27	21	22
Denied	25	54	23	25	26
Interest Rate(%)					
4%	46	50	36	78	70
8%	54	50	64	22	30
Loan Amount($)	134,270	10,875	55,378	110,806	108,393
Loan/Loss Ratio(%)	123	36	79	81	89

to businesses that are determined unable to obtain credit "elsewhere"--that is, unable to obtain a loan on the commercial loan market. The 4 per cent rate is also given to businesses that the SBA determines would be unable to pay back an 8 per cent or 9 per cent loan because of "hardship." Those applicants that SBA determines to have credit available elsewhere and non-profit organizations are given rates of 8 per cent and 9 per cent, respectively. Although the SBA will make loans to businesses with credit available elsewhere, officials state they would rather have those businesses obtain commercial loans. The 4 per cent loans are desirable not only due to their low interest rate but because of their longer payback periods. Loans at 8 per cent and 9 per cent have a three year payback cap, whereas loans at 4 per cent can have payback periods of 30 years.

Table 4 also indicates that interest rates for the loans approved varied by community. Approximately two-thirds of all

businesses that obtained loans received the 4 per cent interest rate, but businesses in Whittier and Compton were more likely than businesses in the other two communities to receive the favorable terms. (Put in absolute terms, the largest number of low-interest loan recipients were in Whittier, because there were more applicants from this city.) In contrast, Monterey Park businesses fared the worst, with 64 per cent of the owners receiving loans at the 8 per cent rate. Alhambra businesses also did not fare well with 54 per cent of the owners receiving loans at the 8 per cent rate.

There was also variation in the loan/loss ratio, i.e., the extent to which the loans business owners received approximated their disaster losses, as verified by the SBA. As Table 4 indicates, loan amounts covered approximately 89 per cent of the verified losses, when averaged across the four communities. Loan/loss ratios varied from a low of 36 per cent in Compton to a high of 123 per cent in Alhambra. Whittier and Monterey Park were closer to the average with ratios of 81 per cent and 79 per cent, respectively.

Explaining Differential Outcomes

Operationalization. As indicated earlier, a four component model was developed to analyze differential loan outcomes. The components are: community context; owner characteristics; business characteristics; and extent of earthquake effects (see Table 1). The sole indicator of **community context** was the city in which the business was located. Due to the few number of applicants from

Compton (N=14), Monterey Park (N=22), and Alhambra (N=46), applicants from these three cities were combined into one category (coded 0) to compare against Whittier (coded 1), the city in which the majority of applicants were located (N=180).

Four variables were employed to measure **owner characteristics:** race; age; gender; and citizenship. Two dummy variables were created to look at how loan outcomes differed for Blacks and Hispanics (N=40) and Asians (N=61). White (N=161) applicants were set as the reference category since they applied in the largest numbers. Blacks and Hispanics were combined due to their few number of applicants.[3]

Dummy variables were also created for female applicants (N=61) and male-female partnerships (N=85). Male applicants were set as the reference category due to their larger numbers (N=116).

Age was utilized as a continuous variable. The youngest applicant in the analysis was 25 with the oldest being 83.

Finally, citizenship was the last variable utilized to measure owner characteristics. It was simply coded 0 if the applicant was not a U.S. citizen (N=31) and 1 if the applicant was a U.S. citizen (N=217).

Four variables were used to measure **business characteristics:** whether or not the applicant owned or leased the business property; how long the applicant had managed the business; the industry

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[3]The author recognizes the transgression committed by lumping together Black and Hispanic applicants. However, there were too few Black and Hispanic applicants to statistically analyze them separately.

classification of the business; and whether the applicant had credit available elsewhere.

Whether the applicant owned or leased the property was simply coded as 0 for lease (N=72) and 1 for own (N=190).

Employed as a continuous variable, years managed was used to assess the length of time the applicant had been managing the current business. It was considered a proxy of owner experience.

A series of dummy variables was created to look at the impact of industry classification on loan outcomes. With businesses in the finance, insurance, and real estate classification set as the reference category (due to the large number of applicants included in this category (N=147)), three dummy variables were created for retail trade, services, and other.[4]

SBA's determination that credit was available elsewhere was included in the analysis as a proxy for business success and as a check against SBA's decision-making process. SBA will not deny assistance to a business if they have credit available elsewhere (i.e., the business could receive a commercial loan), but the agency would rather have the business utilize those "other" resources. And when SBA approves a loan for a business with credit

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[4]The "other" category was comprised of 20 businesses. Six were from the manufacturing sector, seven from the wholesale trade sector, and seven spread out over numerous classifications other than those included in this analysis. The industry classifications or sectors used in this model correspond to the major headings of the Standard Industrial Classification (SIC) codes.

Although it would it have been more suitable to create separate dummy variables for manufacturing and wholesale trade, the small number of applicants in these categories forced the collapsing of these businesses into one category.

available elsewhere, the loan is typically made at the 8 per cent rate, with a payback period of no more than three years. Credit available elsewhere was coded 1 for yes (N=59) and 2 for no (N=181).

The last component of the model, **earthquake effects**, was measured by two variables: total applicant claimed business losses due to the earthquake and total SBA verified business losses. Both variables were included as continuous variables set in dollars.

The **dependent variable, loan outcomes**, was broken into three categories: did not receive a loan; received a loan at the 4 per cent interest rate; and received a loan at the 8 per cent interest rate. In the multinomial logistic regression used to assess the model for predicting SBA loan outcomes, the 8 per cent rate was set as the reference category. This allowed for comparisons of those who did not receive a loan and those who received a loan at the favorable 4 per cent rate against the 8 per cent rate category. It must be noted that since the dependent variable is expressed in negative terms, the discussion on who did and did not receive a loan may seem awkward.[5]

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[5]A positive coefficient for **did not receive a loan** implies that the independent variable increases the probability of not receiving a loan, i.e., the likelihood of receiving a loan has been diminished. For example, a positive coefficient for age would indicate that an increase in age results in an increase in the probability of **not receiving a loan**. In other words, older applicants would be less likely to receive a loan than younger applicants. Statistically, however, the category for receiving a loan must be expressed in negative terms.

Results. Table 5 reports the logit coefficients for **not receiving** an SBA business disaster loan, and receiving a loan at the 4 per cent interest rate. In looking at the probability of **not receiving** an SBA disaster loan, age, own/lease, and credit available elsewhere were significant predictors.

Age had an inverse relationship (-.061, <.01) with not receiving an SBA loan. As age increases so does the probability of not receiving an SBA business disaster loan. In simpler terms, as age increases so does the probability of receiving a loan from the SBA, relative to receiving a loan at the 8 per cent interest rate. Being older also significantly decreased the probability of receiving the favorable 4 per cent interest rate (-.068, <.01).

Older applicants may have amassed more financial assets and thus the SBA recognized the ability to repay a loan. However, recognizing the possibility that older applicants may not have a sufficiently long period of productive time left to repay a loan, the SBA issued them loans at the 8 per cent interest rate with a payback period of three years or less.

The positive coefficient (1.953, <.01) for credit availability indicates that a move towards not having credit available elsewhere (coded 2) results in an increase in the probability of not receiving a loan. Thus, applicants with credit available elsewhere were significantly more likely to receive a loan from the SBA than applicants without credit availability, relative to receiving a loan at the 8 per cent interest rate.

Table 5. Logit Coefficients for the Probabilities of Not Receiving an SBA Disaster Loan, and Receiving a 4% Loan (N=262)

Independent Variables	Did Not Receive Loan	Received 4% Loan
Business Context:		
CITY	.647	1.258*
Owner Characteristics:		
BLACK AND HISPANIC	.094	-.710
ASIAN	.829	.581
FEMALE	-.242	-.133
MALE/FEMALE	-.220	.441
AGE	-.061**	-.068**
CITIZENSHIP	-.180	-.789
Business Characteristics:		
OWN/LEASE	-2.022*	-1.199
YEARS MANAGED	.044	.048
RETAIL TRADE	1.039	.630
SERVICES	.051	-1.288
OTHER	1.518	1.511
CREDIT AVAILABLE ELSEWHERE	1.953**	4.523**
Earthquake Effects:		
CLAIMED LOSS	-.0000016	.0000005
VERIFIED LOSS	.0000001	-.0000011
X^2=59.407***		Pseudo R^2=.2391

*$p \leq .05$ **$p \leq .01$ ***$p \leq .001$

As expected, applicants who own their business property were significantly less likely than applicants who lease their property

(-2.022, <.05) to not receive an SBA loan. In other words, owners of business property were significantly more likely to receive loans from the SBA than those applicants who lease their business property. Further, applicants who own their business property were also significantly more likely to have credit available elsewhere (-.274, <.01). Credit availability and ownership seem to form a cluster of variables that indicate the ability to repay an SBA loan.

In sum, being an older proprietor, having credit available elsewhere, and owning the business property all work in favor of the loan applicant. Again, ownership of property was significantly related to credit availability. These interrelated variables point to the same factor; having the available resources to repay a loan. Age may enter into the equation as a sign of experience and knowledge of the business and financial world. More likely, older applicants had amassed more financial assets than their younger counterparts. Indeed, older applicants were more likely to own their business property than younger applicants.

In looking at the probability of receiving the favorable 4 per cent interest rate, Table 5 reports age (-.068, <.01), credit available elsewhere (4.523, <.01), and the city in which the business is located (1.258, <.05) to be significant predictors.

Being older and having credit available elsewhere decreases the probability of receiving the favorable 4 per cent interest rate, relative to receiving the 8 per cent interest rate.

The location of the business had a significant impact, with businesses from Whittier significantly more likely to receive the 4 per cent interest rate than businesses in Alhambra, Compton, and Monterey Park. This is interesting when considering that Whittier was the more affluent of the four high-damage communities.

In all, older applicants and applicants with credit available elsewhere were significantly more likely to receive loans from the SBA but significantly less likely to receive the favorable 4 per cent interest rate than younger applicants and applicants without credit available elsewhere. Owning the business property also increased the probability of receiving a loan, but had no significant impact on interest rate. Finally, business location had no significant impact on receiving a loan, but it did affect interest rate, with businesses in Whittier more likely than businesses in the other three communities to receive the favorable 4 per cent interest rate. The earthquake effects component of the model had no significant impact on the probabilities of not receiving a loan or receiving a loan at the favorable 4 per cent interest rate.

The model chi-square of 59.407, significant at the .005 level, indicates, however, that the model as a whole was a significant predictor of loan outcomes. A pseudo R^2 of .2391 indicates that 24% of the variance in loan outcomes was explained by the model.

These findings can also be interpreted in light of typical patterns of variation among business owner characteristics. Based on the data, Table 6 presents nine of what might be considered

Table 6. Probabilities of Not Receiving an SBA Disaster Loan (P(Y=1))[9], Receiving a 4% Loan (P(Y=2))[99], and Receiving an 8% Loan (P(Y=3)) by the Model Independent Variables (N=262)

	WM	WF	WMF	AM	AF	AMF	BHM	BHF	BHMF
X1	1	1	1	0	0	0	1	0	0
X6	50	53	54	46	45	51	45	48	48
X7	1	1	1	1	0	1	1	1	1
X8	1	0	1	1	0	1	0	0	1
X9	6	10	11	5	1	4	9	7	6
X10	0	0	0	0	1	0	0	0	0
X11	0	0	0	1	0	0	0	0	0
X12	0	0	0	0	0	0	0	0	0
X13	2	2	2	1	2	2	2	2	2
X14	160	99	120	81	36	23	23	14	30
X15	114	33	79	49	38	22	19	06	19
P(Y=1)	.254	.545	.238	.593	.750	.334	.671	.761	.489
P(Y=2)	.704	.442	.715	.013	.245	.614	.322	.214	.385
P(Y=3)	.042	.014	.047	.394	.005	.052	.007	.025	.126

[9] Logit: Z1 = 2.490(Intercept) + .647$_{X1}$(City) + .094$_{X2}$(Black/Hispanic) + .829$_{X3}$(Asian) - .242$_{X4}$(Female) - .220$_{X5}$(Male/Female) - .061$_{X6}$(Age) - .180$_{X7}$(Citizenship) - 2.022$_{X8}$(Own/Lease) + .044$_{X9}$(Years Managed) + 1.039$_{X10}$(Retail Trade) + .051$_{X11}$(Services) + 1.518$_{X12}$(Other) + 1.953$_{X13}$(Credit) - .0000016$_{X14}$(Claimed Loss) + .0000001$_{X15}$(Verified Loss)

[99] Logit: Z2 = -2.39(Intercept) + 1.258$_{X1}$(City) - .710$_{X2}$(Black/Hispanic + .581$_{X3}$(Asian) - .133$_{X4}$(Female) + .441$_{X5}$(Male/Female) - .068$_{X6}$(Age) - .789$_{X7}$(Citizenship) - 1.199$_{X8}$(Own/Lease) + .048$_{X9}$(Years Managed) + .630$_{X10}$(Retail Trade) - 1.288$_{X11}$(Services) + 1.511$_{X12}$(Other) + 4.523$_{X13}$(Credit) + .0000005$_{X14}$(Claimed Loss) - .0000011$_{X15}$(Verified Loss)

"typical" loan applicants.[6]

The typical Black or Hispanic female had the highest probability of not receiving a loan from the SBA (.761). In other words, the Black or Hispanic female had the worst probability of

[6] As indicated in the methods section, what is of concern in the analysis is the parameter P, the probability that Y is equal to one of the three loan outcomes. To visualize the impacts of the independent variables on P, "typical" cases are created and probabilities of being in each of the three loan outcome categories are computed. In Table 6, race and gender of the primary owner were incorporated as controls when computing the hypothetical applicants and are incorporated as the table headings: WM=White male; WF=White female; WMF= White male/female partnership; AM=Asian male; AF=Asian female; AMF=Asian male/female partnership; BHM=Black or Hispanic male; BHF= Black or Hispanic female; and BHMF= Black or Hispanic male/female partnership. Using means, medians, and modes the "typical" applicant was produced for each of the above categories. NOTE: The figures for claimed earthquake losses and verified earthquake losses are set in thousands of dollars.

receiving a loan from the SBA among all applicants. This hypothetical person was among the youngest of the typical applicants, and she leased her business property. These factors worked against her when applying for a loan. On the other hand, the White male/female partnership had the lowest probability of not receiving a loan (.238), i.e., they had the best success in obtaining loans from the SBA. Being a partnership and owning their business property certainly helped the typical White male/female partnership. Also, on average the primary partner was among the oldest owners, greatly enhancing their chances for receiving a loan.

Having a business in Whittier decreased the probability of the typical White male/female partnership of receiving a loan, but it played a much stronger, significant role in determining interest rate, with Whittier businesses much more likely to receive the favorable 4 per cent interest rate. Indeed, the impacts of not having credit available elsewhere and operating a business in Whittier resulted in the typical White male/female partnership having the best probability (.715) of receiving the favorable 4 per cent interest rate.

CONCLUSIONS

To summarize, significant findings of the research showed older applicants, business applicants that could obtain loans from commercial institutions, and applicants that owned their business property had the greatest success in obtaining SBA business

disaster loans. No significant relationships were found between business location, race of the proprietor, gender of the proprietor, citizenship status, years managed, industry classification, and two measures of earthquake losses and having a loan approved.

Younger applicants, applicants that could not obtain loans on the commercial market, and applicants from the city of Whittier had the greatest success in obtaining the favorable 4 per cent interest rate.

Although race and gender of the proprietor were not significant predictors of receiving a loan or the favorable 4 per cent interest rate, certain socio-demographic groups did not fare as well as others. For instance, Black and Hispanic males and females had the lowest rates of ownership and credit availability. Black and Hispanic males and females also tended to be the youngest applicants within the sample, along with Asian females. All these factors worked against Black and Hispanic male and female applicants. Along with Asian female applicants, they had the lowest approval rates of all applicants. With the exception of Asian males, White applicants were the most likely to be endowed with the necessary resources to be approved for an SBA loan. Indeed, Whites had the highest approval rates at 58 per cent followed by Asians at 47 per cent, and Blacks and Hispanics at 42 per cent.

In all, the findings of the research showed the SBA to be lending heavily to businesses that had the means to obtain

commercial loans. The ability to repay would seem to be a major criteria for the SBA when making loan decisions. This would be consistent with the policies of a commercial lending institution. However, SBA's primary goal is to assist disaster-stricken businesses that cannot receive loans on the commercial market. One SBA respondent stated their responsibility as such:

> We understand that we're in the risky loan business and we do take risks that banks would not take. But we do that because we believe it's our mandate to do that. That's why Congress gave us 4 per cent money and 30 year terms and said...you can't decline someone for lack of fixed money collateral, meaning the occasion is there if they want SBA to make loans and SBA is there simply because the banks aren't going to do it (Dahlhamer, 1992).

This practice was not followed after the Whittier Narrows earthquake. Businesses with credit available elsewhere were significantly more likely to receive loans than businesses without credit. Of course, about 70 per cent of businesses in the sample were reported as not having credit available elsewhere. Thus only a small proportion of businesses had credit. However, only 52 per cent of the applicants in the sample received loans. (SBA generally claims approval rates of 80 per cent.) Approximately one-third of these businesses had credit available elsewhere. Thus, a large number of businesses that needed the SBA the most received no assistance from this source.

The findings of this research, although limited due to the small sample size and single event, suggest the need for further evaluative research of SBA's business disaster loan program. How is

the loan program implemented? Are the problems of meeting its mandate related to the implementation process? These questions would provide a starting point for an overall evaluation of the program.

Further, given the small number of businesses with earthquake insurance (or other forms of hazard insurance; see Mittler, 1992), more consideration should be given to comprehensive insurance programs. Current disaster relief programs provide little "financial incentive for prospective victims to take preventative action through insurance or other forms of risk reduction" (Alesch et al., 1993:149).

Finally, the inconsistent effects of age and the non-significant contributions of race and gender of proprietor, given the variation of loan outcomes across racial and gender categories, suggests that future analyses be sensitive to interaction effects. In order to look at the interactions among the model variables, log-linear analysis will be employed in future analyses of the data.

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