

Family Business Response to Federal Disaster Assistance

Study Objective 1. To assess the effects of *county-level* federal disaster assistance on family businesses from 1996 to 1999.

1. Does Federal Disaster Assistance to the county have a positive effect on family business survival?
2. Does Federal Disaster Assistance to the county have a positive effect on family business success?
3. Is there a statistically significant relationship between resilience capacity and natural disasters and federal disaster assistance to the county?

Study Objective 2. To assess the effects of federal disaster assistance *to the business* on family businesses from 1996 to 2006. (Using firm survey data about federal assistance receipt).

1. Does Federal Disaster Assistance paid to the business have a positive effect on family business survival?
2. Does Federal Disaster Assistance paid to the business have a positive effect on family business success?
3. Is there a statistically significant relationship between resilience capacity and natural disasters and federal disaster assistance paid to the business?

Approach

In this section, referral to several data sets (currently existing or to be developed) will occur. For clarity, a table is included with data set labels and brief descriptions of the data sets.

Data set label	Data description
1997 NFBS (National Family Business Survey)	1997 collection with 1996 business data
2000 NFBS	2000 collection with 1999 business data
2007 NFBS	NFBS wave 3 to be collected in 2007
SHELDUS (Spatial Hazard Events and Losses Data for the United States)	University of South Carolina natural disaster data from Hazard Research Lab
NFBS Panel (National Family Business Panel)	Merged 1997 NFBS and 2000 NFBS
NFBDS (National Family Business Disaster Survey)	Merged NFBS Panel and SHELDUS 1996-2000 data
NLFBS (National Longitudinal Family Business Survey)	Longitudinal data set composed of merged NFBS Panel & 2007 NFBS
NLFBDS (National Longitudinal Family Business Disaster Survey)	Longitudinal data set composed of merged NLFBS and SHELDUS 1996-2000

This study will utilize two sources of existing data and collect a third. The first source, SHELDUS, contains county-level natural disaster data. The second, the NFBG surveys, will provide baseline business data. The existing data sources will be used to meet Objective 1. Utilizing the NFBG researchers' experience and expertise, supplemental survey data will be collected in 2007 to update business outcome measures and measure direct disaster assistance to the family businesses and their responses to those disasters, and will be used to meet Objective 2.

The SHELDUS web page (www.sheldus.org) describes the database as follows:

“SHELDUS is a county-level hazard data set for the U.S. for 18 different natural hazard events types such as thunderstorms, hurricanes, floods, wildfires, and tornados. The database covers the period from 1960-2000. For each event the database includes the beginning date, location (county and state), property losses, crop losses, injuries, and fatalities that affected each county.”

Initially, SHELDUS disaster data for 1997-1998 will be selected and downloaded. These data will be merged with the NFBS Panel using FIPS codes. Since county disasters are the unit of observation in SHELDUS, the data will be reformatted to create county observation units, yielding one observation per county that can be matched with FIPS codes in the NFBS Panel. EVI also will be merged with NFBS Panel using FIPS codes, creating a completed NFBDS. To assess the feasibility of meeting Objective 1, 1997-1998 SHELDUS data were downloaded and screened by FIPS codes for the first 100 1997 NFBS cases. In those 100 test cases, 82 cases had a disaster with damages, 7 had a disaster with zero damage, and 11 had no disaster.

Using the second data set, NFBS Panel, has several advantages for the research aim.

- national representativeness and generalizability
- weights for observations so that results can be derived for the sample or transformed with the weights into national statistics
- attrition affected 2000 panel representativeness in a way that generalizability could be maintained by including business stability measures in future analyses (Winter et al., 2004)
- enough time has passed to get beyond the immediate recovery process which is an important criterion for studying small businesses that experienced natural disasters (Alesch et al., 2001)
- the FIPS (Federal Information Processing Standards) county codes have already been incorporated into the NFBS Panel to facilitate merging with county-level data
- the data set has businesses in counties which have and have not experienced disasters
- sample family businesses are small businesses based on the U.S. Small Business Administration’s (2004) definition of less than 500 employees
- 51% were located in areas with populations of less than 10,000.

For the 1997 NFBS, a probability sample of households was drawn from all 50 states by the Center for Survey Statistics and Methodology at Iowa State University. Interviewers screened more than 14,000 household telephone numbers to ascertain whether a household member was a family business owner. More than 1,100 households met the restrictive criteria that the business owner had to be in business at least a year, had to spend at least 6 hours a week or a minimum of 312 hours annually working in the business, and had to live with at least one family member.

Qualifying households were administered two different 30-minute telephone interviews: business owner and family manager. When those roles were held by the same individual, a 45-minute combined interview was administered. The response rate for the screen was 82.3%; for the interviews, it was 71.1%. The 2000 NFBS paralleled the 1997 NFBS plus questions about business social responsibility to the community. Data were gathered from 553 households, more than three-fourths of the 708 households surveyed in 1997. In households where two different people were interviewed in 1997, attempts were made to interview each individual again.

The proposed study will conduct a third set of interviews with the original 708 families in 1997 NFBS. Only business owners will be interviewed in 2007. The Center for Survey Statistics and Methodology estimates that the third set of interviews should yield about 500 respondents. A new questionnaire will be designed with comprehensive questions on survival, success, receipt of federal disaster assistance, the consequences of the disasters, the owner's decisions and responses to disasters, and mitigation practices. This survey will require 30 minutes or less of the business owners' time for both closed and open-ended questions. **The survey will repeat questions about business survival and success from the 1997 and 2000 surveys.** Other questions to be asked of business owners about experiences with natural disasters are:

1. Was the county where your business resides declared a federal disaster area anytime after 1996? (If more than once, record all.) If yes, when? What kind of disaster?
2. Did the county where your business resides receive any federal disaster assistance anytime after 1996? If yes, when? (If more than once, record all the dates.)
3. Did your family or your business receive any cash payments from any federal disaster assistance program after 1996? If yes, ask whether it was family or business. For each, ask the following:
 - When? For what type of disaster?
 - From what program or agency?
 - How was this money spent (what did you purchase with this money)?
4. Did your family or your business receive any loans from any federal disaster assistance program after 1996?
 - When? For what type of disaster?
 - From what program or agency?
 - How was this money spent (what did you purchase with this money)?
5. Did your family or business receive any payments from any federal insurance program, such as federal flood or crop insurance? If yes, ask whether it was family or business. For each, as the following:
 - When? For what type of disaster?
 - From what program or agency?
 - How was this money spent (what did you purchase with this money)?
6. Did your family or business receive proceeds from any private insurance because of damage caused by a disaster after 1996? If yes, as whether it was family or business. For each, as the following:
 - When? For what type of disaster?
 - From what program or agency?
 - How was this money spent (what did you purchase with this money)?
7. Did your business realize losses from the disaster(s) other than property damage? What were they? (check all that apply).
8. Did your business have to close following a natural disaster after 1996? If yes, when? For how long? For what types of disaster?

9. What actions did you take immediately after the disaster? (open-ended).
10. What actions has your business taken to mitigate the effects of future disasters (check all that apply).
11. What actions has your family taken to mitigate the effects of future disasters (check all that apply)?

Upon completion of the coding of reinterviews of 1997 NFBS firm owners and missing value imputation, the new data set will be merged with the NFBS Panel to create NLFBS and with NFBDS to create NLFBDS. Codebooks will be written for NLFBS and NLFBDS. Upon completion of these tasks, Objective 2 analyses can begin. Data will be provided to members of FBRG at two times: (a) when NFBDS is complete, and (b) when NLFBDS is complete.

While 1997 NFBS provides important baseline business data, this study will depend on the quality of respondent recall about disaster experiences after 1996. Literature describes this information as retrospective reports drawing from autobiographical memory (Neisser & Winograd, 1988). Two major considerations when collecting this type of information is frequency with which something has been experienced and experiential nature of the memory representation (Brewer, 1994). Episodic events using the personal recollection of a particular event (disaster experience in this study) from an individual's past is the most reliable of autobiographical memory forms (Schwarz & Sudman, 1994). From best to worst, the validity of information recalled is: (a) action carried out, (b) thoughts occurring during the event, (c) event location and time, (d) location alone, and (e) time of event (Herrmann, 1994; Kenkel, Lillard & Mathios, 2003). Our focus is actions carried out, the most valid of retrospective reports.

Statistical Analysis

Each study objective will utilize different estimation models and data sets. The statistical models for each objective will be run separately for each dependent variable, but are described as a single set because the independent variables are the same in all equations for each objective.

Objective 1 –Objective 1 assesses the effects of *county-wide* federal disaster assistance on family businesses using the NFBDS. It is expected that businesses in counties receiving larger amounts of federal disaster assistance per capita will have a higher probability of surviving and be more successful than family businesses in counties receiving smaller amounts of federal disaster assistance per capita. Resiliency capacity (RC) is expected to have a significant set of effects on survival and success of family businesses. A significant interaction between FDAC and RC is also expected.

$$FBS_{99} = f(FDAC_t, RC_{96}, FDAC_t * RC_{96}; DC_t, CM_{96}, BC_{96}, BM_{96})$$

where FBS_{99} = family business survival and success from 1996-1999;

$FDAC_t$ = Federal Disaster Assistance to the county per capita in the year of the most recent disaster;

RC_{96} = resiliency capacity from 1997 NFBS;

DC_t = disaster characteristics in the year of the most recent disaster;

CM_{96} = community characteristics from 1997 NFBS;

BC_{96} = business characteristics from 1997 NFBS; and

BM_{96} = characteristics of the business manager from 1997 NFBS.

The dependent variables will measure the survival and success of the business over time. The survival measure will utilize a question from the 2000 NSBF asking “Is the [Business Name] still in operation” to determine if the business survived from 1997 to 2000. The 2000 NSBF also asks questions about why the business closed, hence we can determine if the business closed for business or personal reasons. This model will utilize logistic regression to examine the survival of the family business (Maddala, 1983).

The success measures capture objective and subjective changes in the business between 1996 and 1999. The objective measures will include changes in gross revenue and net profits, where these measures will indicate whether gross revenue and profits increased, stayed the same or decreased over this time period. The subjective measure will indicate changes in how successful the business has been in achieving their long-range goals. A multi-nomial logit regression will be employed for these models (Maddala, 1983).

The most important independent variables for this research are those denoted by FDAC and RC. FDAC is the damage estimates reported in the SHELDUS database for each county. RC is a set of measures of the resilience capacity of family businesses. To answer the questions posed under Objective 1, attention will be paid to the sign and significance of the logit coefficients and multi-nomial logit coefficients for the FDAC, RC, and FDAC*RC variables in the models.

Positive/significant coefficients indicate that business survival and success were positively correlated with county federal disaster assistance and resilience capacity. Positive/significant coefficients on the interaction variables will indicate that more resilient family businesses receiving indirect federal disaster assistance (paid to the county) are more likely to survive and succeed than other businesses. Control variables utilized in this model include the number of disasters and the year of the most recent disaster (DC), economic vulnerability and community ruralness (CM), characteristics of the business (BC) and business manager (BM).

Objective 2 –Objective 2 assesses the effects of federal disaster assistance *to the business* on family businesses using the NLFBS. It is expected that businesses receiving cash as federal disaster assistance will be more likely to survive and more successful than businesses not receiving disaster assistance. It is expected that family businesses receiving disaster loans will be less likely to survive and less successful than family businesses not receiving disaster loans. It is expected that RC and the interaction of RC with FDAb will have significant positive effects.

$$FBS_{06}=f(FDAb_t, RC_{96}, FDAb*RC_{96}; DC_t, CM_{96}, BC_{96}, BM_{96})$$

where FBS₀₆ = family business survival and success from 1996-2006;
FDAb_t = Federal disaster assistance to the business in the year of the most recent disaster; and
All other variables are defined below.

This model includes a measure of federal disaster assistance received by the business itself. Logistic regression will be used to estimate this model for business survival (Maddala, 1977). A multi-nomial logit regression will be used to estimate this model for family business success (Maddala, 1977). The focal variables in this set of analyses are FDAb, RC, and FDAb*RC. The control variables utilized in this model include the number of disasters and the year of the most recent disaster (DC), economic vulnerability and ruralness of the community (CM), and characteristics of the business (BC) and business manager (BM).

In Objective 2, attention will be paid to the sign and significance of logit and multi-nomial logit coefficients for FDAb, RC and FDAb*RC variables. Positive, significant coefficients for FDAb and RC variables will indicate that family business survival and success were positively affected by federal disaster assistance to the business and resilience capacity. Positive, significant coefficients for FDAb*RC interaction term indicates that resilient family businesses receiving direct federal disaster assistance are more likely to survive and succeed than other family businesses.

Variables

Statistical model variables are described briefly below. Number of employees, business assets and business age are important control variables to mitigate the attrition effect when using panel data. Controlling for such variables as the baseline firm financial data prior to the disaster, EVI, and WOL help distinguish between normal closure and those resulting from disaster exposure.

FBS ₉₉ FBS ₀₆	Two dependent variable types are used: family business survival and success over time. Literature review discussed measures for dependent variables. More than one measure for each dependent variable type will be used.
Federal Disaster Assistance	
FDAC _t	County Federal disaster assistance in 1997 and 1998 will be estimated by damage estimates reported in the SHELDUS database. Objective 1 measure will be dollars per capita in the county (Downton, Miller and Pielke, (2005).
FDAb _t	The amount of federal disaster assistance received by the business to be obtained in the 2007 NFBS survey data collection.
Disaster Characteristics (DC)	
Year _t	Year of the most recent disaster
Number _t	For objective 1, this will be the number of disasters in 1997 and 1998. For objective 2, this will be the number of disasters after 1996
Community Characteristics (CM)	
EVI _{c99}	EVI measures county social and economic vulnerability using 18 indicators (Haynes et al., 2005).
UIC ₉₆	Urban influence code is a classification scheme distinguishing metropolitan counties by the population size of their metro area, and nonmetropolitan counties by degree of urbanization and adjacency to a metro area or areas; see http://www.ers.usda.gov/Briefing/Rurality/urbaninf/ .
Business Characteristics (BC)	
BC ₉₆	Business characteristics include number of employees, both paid and unpaid family members; assets, age of the business, business structure, home-based

	status and business goal orientation.
NAICS ₉₆	North American Industrial Classification System of businesses replaces the Standard Industrial Classification (SIC) system. NAICS was developed jointly by the U.S., Canada, and Mexico to provide comparability in statistics about business activity across North America.
GEN ₉₆	Number of generations of family owning this business.
Business Manager Characteristics (BM)	
BM ₉₆	Business management strategies are measured by asking owners to what extent several activities are a part of their businesses' regular practices, such as analyzing customer satisfaction, evaluating the quality of services and products, and planning advertising and promotion budgets and strategies.
BMD ₉₆	Business manager characteristics are age, gender, education, experience and hours of working in the business.
FD ₉₉	Family disruptions (death, divorce, serious illness, etc.) using 1996 and 2000 NFBS.
WOL ₉₆	Salience of lifestyle vs. profit as a motive for ownership.
Resilience Capacity (RC)	
FAP ₉₆	Family APGAR is an scale that measures the state of functional integrity of the family (Sawin and Harrigan, 1995).
SC ₉₆	Schedule congruity is an indicator of the family's cognitive predisposition to coordinate harmoniously (Stafford and Avery, 1993).
PAD ₉₆	Responses to chronic disruptions include the adjustment strategies and financial intermingling practices discussed in the review of literature.
Rda ₀₆	Private responses to natural disasters will include the actions taken by the business and family after the natural disaster. This information will be gathered from retrospective interviews of business owners in 2007. See the proposed survey questions in the previous section. This component will be included only in the analyses for Objective 2.

Attrition is a major concern when collecting longitudinal data. However, attrition is less a concern in this study for two reasons. First, this study uses data on both business closures and continuing businesses in analyzing business survival. Second, attrition is less a concern because of prior respondent cooperation in the 1997 NFBS. When the business owners were recontacted for the 2000 interviews, the attrition rate was 21.8%. If that rate were to continue, there would still be sufficient observations to conduct analyses necessary to meet the proposed objectives.

SHELDUS data will be used for county disaster assistance estimates paid. Ideally, this study would like to have the federal disaster assistance payments paid to public and private entities in each county; however, that information is not available. Damage estimates provided by the SHELDUS database are proxies for the amount of federal disaster assistance paid.