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BUSINESS VULNERABILITY TO EARTHQUAKES
AND OTHER DISASTERS

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Introduction

This chapter focuses on research concerning businesses and disasters—what is currently known, what hazard researchers assumed they knew before empirical research showed otherwise, and what new insights recent research offers. How businesses fare in disaster situations is a new topic in the disaster field. Until relatively recently, there had been virtually no research devoted specifically to private sector disaster vulnerability, impacts, and recovery. Since the field of disaster research began, the overwhelming bulk of the studies carried out have focused on units other than businesses, such as households, public sector organizations with public safety and emergency management responsibilities, and communities. A considerable amount of research has been done on the economic impacts of disasters, but those studies focused primarily on measuring or modeling the regional and macroeconomic impacts following disaster events, rather than on the ways in which hazards and disasters affect business firms (see, for example, Dacy and Kunreuther, 1969; Cochrane, 1975; Wright et al., 1979; Friesema et al., 1979; Cohen, 1993; Gordon et al., 1995; Jones and Chang, 1995; Rose et al., 1997). Essentially, prior to the early 1990s, there had been very few studies assessing disaster impacts at the firm level or analyzing how disasters affect these basic building blocks of the economy. Even after researchers began looking more closely at

private-sector organizations, that work typically involved small samples and particular types of firms, such as small businesses (Alesch et al., 1993; Kroll et al., 1991) or firms representing specific economic sectors, such as Drabek's work on disaster preparedness and response among tourism-oriented businesses (1994), Lindell's research on local emergency planning committees whose activities center on chemical emergency preparedness (1994),¹ and Lindell and Perry's studies on preparedness measures undertaken by hazardous materials facilities (1998). While yielding important insights, findings from these kinds of studies cannot be generalized more broadly to businesses of all types.

Although business firms remain seriously understudied in the disaster field, the 1990s did see an increase in research on how private sector organizations prepare for, cope with, and recover from disasters. This chapter, which discusses findings from several key studies, draws primarily upon research conducted by the University of Delaware Disaster Research Center (DRC) and by other scholars who have focused on relatively large samples of businesses and on multiple disaster events. As indicated in the sections that follow, these systematic investigations have revealed a great deal about how businesses anticipate disasters, the significant problems those events create for private-sector organizations, and business recovery processes.

The Disaster Research Center Surveys

Beginning in 1993, DRC initiated a series of studies on disasters and businesses. In all, DRC conducted five surveys with large samples (or in two cases, populations) of businesses.

¹ These networks typically include both public-sector organizations and private businesses.

Those studies focused on pre-earthquake preparedness in Memphis, business impacts and short-term recovery following the 1993 Midwest Floods and the 1994 Northridge earthquake, and longer-term recovery following the 1989 Loma Prieta earthquake and Hurricane Andrew. All the studies employed mail surveys and followed standard procedures for those kinds of surveys (see Dillman, 1978). In most cases, stratified random sampling was used to ensure an adequate number of businesses of different types and sizes. However, in two studies—the long-term followups of businesses affected by the Loma Prieta earthquake and Hurricane Andrew—the entire population of businesses in each affected area was included, rather than a sample. Table 1 contains more information on the five studies, when they were conducted, and what general topics they addressed.

A substantial amount of qualitative data were also collected in some of the studies listed in Table 1. One year after the mail survey was carried out with the Northridge earthquake sample, DRC conducted follow-up face-to-face interviews with 103 businesses that had responded to the survey and that had experienced extensive earthquake damage. Interviews were also conducted with key community and business leaders for the long-term recovery studies in Santa Cruz and South Dade Counties.

From a theoretical point of view, this set of surveys focused on fundamental questions related to both the sociology of organizations and the sociology of disasters. From the perspective of organizational sociology, the studies were concerned with identifying factors that contribute to the ability of business firms to weather turbulent environments. There is a small literature on how organizations cope with what sociologists term “environmental jolts”—that is, external events that disrupt and threaten organizational viability (Meyer, 1982). Although studies

on businesses in jolted environments have not actually focused on disasters, it can be argued that a large disaster can constitute a genuine environmental jolt both for individual businesses and for interdependent groups of businesses in disaster-stricken areas (Dahlhamer, 1998).

From the perspective of disaster research, the surveys sought to develop basic knowledge on businesses and their experiences with hazards and disasters that is comparable to research on households and other social units. For example, through earlier research, social scientists have developed a basic understanding on such issues as the extent to which households prepare for disasters and which ones are most likely to prepare; how households are affected by disasters; and what factors are associated with successfully moving through the recovery process. Paralleling this work, the business surveys sought to identify factors associated with business preparedness, as well as factors that structure both short- and longer-term outcomes for businesses affected by disasters. Relatedly, this research attempted to better understand the risk factors associated with failure to recover.

From a practical point of view, these studies also aimed at identifying lessons learned and developing guidance for businesses and for policymakers concerned with reducing the negative consequences of disasters for businesses, and in general helping those who have a stake in the well-being of the business sector understand how to enhance the resilience of businesses in the face of major disasters. The need for this kind of practical knowledge has recently come to the forefront in the aftermath of the World Trade Center attack in New York City, as concerns grow about recovery-related challenges for numerous individual businesses and for New York's economy.

The sections that follow discuss common patterns that have emerged from this series of

studies, beginning with findings on organizational anticipation of disasters—that is, disaster preparedness—and then moving on to post-disaster outcomes and the factors that affect the fates of businesses following disasters. Later sections also include discussions on a large study on businesses and disasters whose conclusions are consistent with DRC's work in some ways and different in others.

Business Preparedness for Disasters

Based on the data DRC collected from approximately 5,000 businesses in the five communities, as well as on other studies on business preparedness, it can be said with considerable confidence that the overwhelming majority of businesses place a very low priority on anticipating and planning for disasters. Asked repeatedly in surveys about the extent to which they have adopted preparedness measures of various kinds, businesses score quite low on preparedness scales. For example, based on DRC survey data collected on Santa Cruz and South Dade County businesses in 1997 and 1998, respectively, Cavanaugh (2000) found that of sixteen possible preparedness measures, the median number of measures adopted in South Dade County was six, and the median for Santa Cruz County was four. In Santa Cruz County, which had experienced a severely damaging earthquake in 1989, fourteen percent of businesses had not engaged in even one activity designed increase workplace preparedness. Using DRC data, Dahlhamer and D'Souza (1997) documented similar low levels of preparedness for businesses in Memphis/Shelby County and Des Moines/Polk County. Indeed, nearly half of the businesses in Des Moines had not carried out any of the thirteen preparedness activities included in the questionnaire checklist. Preparedness levels were more or less comparable for the Memphis sample, with approximately half of all businesses undertaking three or fewer measures, out of a

possible seventeen.

Evidence also suggests that when they do prepare, businesses tend to favor preparedness measures that are relatively easy to do and that require little investment. For example, while a substantial number of businesses may keep first aid supplies on hand or make some effort to ensure that their workers know what to do in the event of a disaster, it is rare for businesses to develop disaster recovery plans or make arrangements to move to alternate locations in the event of major damage at the workplace—measures that if adopted might actually reduce business interruption and have a positive impact on recovery outcomes.

Low levels of preparedness persist even when business owner risk perceptions are high and even in the aftermath of disasters. After the 1994 Northridge earthquake, for example, Los Angeles and Santa Monica businesses did step up their adoption of preparedness measures, but only very slightly, and overall preparedness still remained at a very low level—comparable, in fact, to that observed in Santa Cruz County a few years later. Improvements were greatest among larger businesses and firms that had already been relatively well-prepared, as well as those that had experienced business interruption as a result of the earthquake (Dahlhamer and Reshaur, 1996). Evidently even direct disaster experience is insufficient to induce many businesses to plan; indeed, surviving a disaster with relatively few negative consequences may even lead business owners to conclude that planning is unnecessary.

The one consistent finding with respect to the adoption of pre-event measures to contain disaster impacts is that larger firms are more likely to prepare. In every community DRC has studied, larger organizations have shown a greater willingness to undertake preparedness activities than smaller ones. Other research on organizational disaster preparedness also supports

this finding (Alesch et al., 1993; Drabek, 1994). The lack of preparedness among smaller firms appears to be both a time and a resource issue (Mileti et al., 1993; Dahlhamer and Reshaur, 1996; Dahlhamer and D'Souza, 1997). Small business owners must balance numerous conflicting priorities and demands on their time and often can ill afford even small preparedness investments. Larger businesses typically have more resources, have larger staffs to assume crisis-related responsibilities, and are more likely to have created positions that focus directly on readiness for disasters. Since the vast majority of businesses are small ones, well-prepared businesses are clearly in the minority.

There is also some evidence of sectoral effects with respect to business preparedness. For example, DRC data suggest that businesses in the finance, insurance, and real estate sector have a greater propensity to prepare, perhaps because such preparedness is a requirement for many businesses in that sector (Dahlhamer and Reshaur, 1996; Dahlhamer and D'Souza, 1997). In contrast, businesses in the retail and service sectors—by far the most common types of businesses in the U. S. economy—are significantly less likely to engage in preparedness activities.

Disaster Recovery

Turning next to the issue of what happens when businesses are subject to sudden environmental jolts and what outcomes they experience, research has yielded both significant insights and counterintuitive findings. Not surprisingly, findings and conclusions differ to some degree across studies. While this may be a function of study designs, methodologies, or differences among the disaster events that have been studied, it may also be indicative of the complexity of the processes and relationships involved—and of the need for additional research.

With respect to general patterns, results from the four DRC post-disaster studies indicate

that most businesses do recover following disasters, and do so within a relatively short period—with recovery being defined in those studies in terms of owner/manager self-reports that the business was doing about the same or better financially at the time of the survey than it had been prior to the disaster event. In other words, private-sector organizations exhibit a good deal of resilience in the face of environmental jolts. Table 2 contains data on percentages of businesses reporting being worse off, better off, or about the same as they had been prior to experiencing a disasters in the four post-disaster surveys DRC conducted on four major disaster events: the Loma Prieta and Northridge earthquakes, the Midwest floods, and Hurricane Andrew. As indicated in the table, relatively small proportions of businesses reported being worse off than they were prior to those disasters, and large numbers reported returning to prior levels of financial well-being, or even improving. It is interesting to note that while Hurricane Andrew is an outlier in terms of negative outcomes in that disaster, even in that very severe event approximately two-thirds of the businesses surveyed indicated they were no worse off than before the event—or perhaps even better off.²

Even though general business recovery trajectories seem to be more positive than might be

² It should be noted, however, that both the South Dade County and the Santa Cruz County surveys focused on what might be termed “business survivors”—that is, firms that had been in business prior to those disasters and that were still operating at the time the surveys were conducted. Missing from these samples were businesses that were no longer in existence—for whatever reason—when those surveys were conducted. However, businesses that had subsequently moved to other locations outside the two disaster impact areas were included.

expected, some businesses do fare worse than others in the aftermath of disasters. Using data from the surveys and analyses on post-disaster “winner and loser” patterns, it is possible to identify what appear to be risk factors for negative recovery outcomes. While not all studies point consistently in the same direction, they do suggest that independent of other influences, the following factors appear to influence short- and longer-term outcomes for disaster-stricken businesses: size; pre-disaster financial condition; the extent to which the disaster disrupted ongoing business operations; damage in the area surrounding the business location; economic sector and sectoral trends; the nature of business markets; and more general economic trends. Additionally, as we discuss toward the end of this chapter, the fates of individual businesses are closely tied to community-level recovery decision making.

Organizational Size. First, with respect to size, smaller businesses are generally less likely to experience positive recovery outcomes than larger ones. Dahlhamer (1998) suggests that the vulnerability of smaller businesses to disasters is part of a more general pattern that has been documented in the organizational literature, the “liability of smallness” (Baum and Oliver, 1991; Lehrman, 1994). On an everyday, non-disaster basis, smaller firms have more difficulty than their larger counterparts in raising money, competing for labor, and coping with tax burdens and other expenses associated with business operations. As a consequence of these and other factors, they are more likely to fail and less likely to be profitable than larger businesses. It appears that larger firms are better able to weather disasters for essentially the same reasons they tend to be better off during non-disaster times: because they generally have more resources on hand that can be redirected to facilitate recovery, and also because they enjoy various operational and financial advantages that are not available to smaller firms.

Pre-Disaster Financial Condition. Recovery outcomes are influenced to some degree by how well businesses had been doing financially prior to experiencing a disaster, but those relationships are not simple or straightforward. Following the Northridge earthquake, for example, businesses that reported having been in good or excellent financial condition before the earthquake were significantly less likely to report being worse off one year later. Having done well in the period just before the earthquake seems to have cushioned the negative impacts of that event. At the same time, however, pre-disaster financial difficulties did not inevitably lead to even greater problems following the earthquake, because a substantial proportion of firms that had not been doing well prior to the earthquake actually saw their business improve. This was mainly due to the fact that the businesses that had been having a very difficult time before the earthquake tended to be in the manufacturing and construction sector, which received a significant boost following the earthquake.

There is also some evidence that pre-disaster financial condition is a more significant factor in recovery in the short term, as opposed to years after a disaster. In fact, in the long-term recovery studies carried out in Santa Cruz and South Dade Counties, self-reported pre-disaster financial condition was actually inversely related to recovery outcomes. That is, businesses that reported being in better financial condition before experiencing those disasters were actually less likely to report having recovered several years later. Based on studies of shorter-term recovery, it was expected that having been in good financial condition before the disaster would have helped businesses in the longer term. But that was not the case, at least for businesses in these two communities. There could be various reasons for this pattern. First, it may be that the advantages of pre-disaster financial well-being carry over only into the short-term post-disaster period, after

which they dissipate, perhaps because businesses continue to experience recovery-related problems. Relatedly, it seems reasonable to assume that over time broader post-disaster economic trends exert more of an influence on longer-term recovery outcomes than does the pre-disaster well-being of a business. In other words, the influence of pre-disaster financial condition may mean very little compared with what happens to economies and businesses in the years following disasters. We return to this theme later in the paper when we discuss how general economic forces and decisions that are made concerning community recovery affect individual businesses.

Disruption of Business Operations. Another consistent finding is that disasters appear to bring about negative effects for businesses not only (or even primarily) through the direct damage and losses they produce, but more important through the manner in which they can complicate business operations during the post-disaster period. Poor recovery outcomes tend to be associated with the disruptiveness of disaster events—that is, the extent to which disasters create subsequent problems for businesses, such as difficulties with receiving and shipping supplies and products, employee absenteeism, and inconveniences for customers wishing to gain access to the business. Stresses also mount when business owners themselves have to contend with both business-related problems and damage to their own homes.

Indeed, as indicated in post-disaster surveys, the extent to which a disaster creates ongoing operational problems for businesses can be thought of as one measure of disaster severity. Illustrating this point, Table 3 contains data on the problems that business owners in South Dade and Santa Cruz County reported experiencing after Hurricane Andrew and the Loma Prieta earthquake. As the table shows, these two disasters created very extensive problems for a

high proportion of businesses in these high-impact areas. Operational difficulties were more widespread following Andrew than after Loma Prieta, which is again an indicator of the severity of Andrew's impact on South Dade businesses. In this event, more than three-quarters of all survey respondents indicated that they had also experienced hurricane damage at their homes—damage that likely caused additional financial problems and placed competing demands on their time. More than sixty percent reported that employees had been forced to miss work because they needed to take care of their own disaster-related problems. Over one-third reported that the demand for their goods and services had declined or that they had difficulty obtaining needed supplies. Businesses that reported more of these operational problems following the hurricane were significantly less likely to recover in the long term. Similarly, in both South Dade and Santa Cruz, firms that were forced to close for longer periods of time because of disaster damage were less likely to recover. (For lengthier discussions on these findings, see Webb, Tierney, and Dahlhamer, 1999).

Adjacent Commercial and Residential Damage. There is also evidence that businesses located in areas that were severely damaged by a disaster tend to be worse off than those in less-damaged areas. Following the Northridge earthquake, for example, businesses that reported doing poorly the year after the disaster tended to be located in areas where there was a higher degree of business and residential damage in the surrounding area—and this effect was independent of whether the business itself had sustained damage. This pattern likely stems from the fact that certain types of businesses depend on other enterprises and general customer traffic in the immediate area to draw in their customers. For example, clients may patronize a particular dry cleaner or convenience store because it is close to the bank they typically use. If the bank closes,

that closure will have negative ramifications for those other businesses. Thus, because in many cases individual businesses benefit directly from the mix of services offered by adjacent firms, those businesses can be expected to suffer due to disaster damage to neighboring or nearby enterprises.

Interestingly, in the Northridge earthquake, experiencing high levels of damage and even business interruption as a consequence of the earthquake appear not to have been as important as these ecological influences and as the negative effects the earthquake had on overall business operations. Indeed, damage and business interruption appear to have their most important influence on recovery outcomes through the influence they subsequently have on business operations, relationships with customers, and resource flows. In addition to their damage potential, then, disasters exert their negative influence on businesses by disrupting local commercial ecologies and by sapping productivity and profitability, often for prolonged periods of time.

Sectoral Effects. There is also some support in this group of studies for the idea that recovery outcomes differ for businesses in different economic sectors and that the nature of business markets play a role in the recovery process. Businesses in the wholesale and retail trade sectors appear to be more vulnerable to experiencing poor economic outcomes, perhaps due to normal niche crowding and competitiveness in this sector or to the fact that, like the service sector, the wholesale and retail sector tends to experience a lot of turbulence and turnover during normal times (Dahlhamer, 1998). Not surprisingly, the manufacturing and construction sector often gets a boost following disaster events—with most of that stimulus coming from construction. It should be noted, however, that these kinds of gains are generally temporary. By destroying

roofs and breaking windows, for example, a hurricane may create a very large demand for glass, roofing materials, and labor. However, once damage has been ameliorated and absent other trends, the demand for those same goods and services will drop.

Market Effects. In the DRC studies on long-term recovery following the 1992 Loma Prieta earthquake and Hurricane Andrew, survey respondents were asked about the nature of their markets at the time they experienced those disasters—that is, whether their markets were primarily local, regional, national, or even international in scope. In South Dade County, which was hit far more severely than any of the other areas DRC studied, market scope did appear to be associated with differential recovery outcomes. Years after Hurricane Andrew, businesses that had depended primarily on non-local markets were more likely to report being as well-off or better-off than their counterparts whose markets were primarily local. This finding again suggests that business fates can be highly sensitive to disaster-related changes in local customer preferences, fluctuations in demand for particular kinds of goods and services, and local business climates. Dependence on markets outside the immediate impact area may make businesses more resilient in the face of disasters—provided, of course, those businesses are able to surmount other disaster-related problems—while businesses drawing on a local customer base may be more subject to the vicissitudes of changing local consumption patterns.

Overall Economic Climate. Finally and not unexpectedly, these studies suggest that business recovery processes are sensitive to the economic climate in particular business sectors as well as to more general economic trends. In his study of recovery following the Northridge earthquake, for example, Dahlhamer (1998) found that firms in industries that had been experiencing growth in the two-year period just before the earthquake struck were significantly

less likely than firms in declining industries to report being worse off eighteen months later. His analyses also suggested that the changes in business climate that exert the most influence on recovery outcomes are those occurring within a relatively short time period before disasters strike. Findings like these suggest that while they may be damaging and disruptive, it is likely that most disasters, in and of themselves, do little to alter fundamental trends that are already exerting an influence on local and regional economies.

At the same time, as illustrated by the Northridge earthquake case, a disaster can provide at least a temporary economic stimulus to affected economies. At the time the earthquake occurred, in January of 1994, Southern California had yet to rebound from a significant economic recession. The transition out of that recession would have taken place eventually. However, by bringing financial resources into the impact region in the form of recovery aid—including home and business loans, funds to assist with major public infrastructure repair and reconstruction projects, and insurance payments—the earthquake helped Southern California recover from the recession more rapidly than it would have otherwise. Along these same lines, Dacy and Kunreuther (1969: 168) have even argued that “a disaster may actually turn out to be a blessing in disguise,” because disasters create reconstruction booms and allow community improvements to be made rapidly, rather than gradually.

In the long run, the fates of individual businesses affected by disasters are also closely linked to fluctuations in local, regional, and national economies. In the studies on the long-term impacts of Hurricane Andrew and the Loma Prieta earthquake, for example, business owners who considered the general economic climate to be positive for their firms were significantly more likely to also report positive recovery outcomes.

Counterintuitive Findings: Preparedness, Post-Disaster Aid, and Disaster Experience

Some of DRC's research findings on disasters and businesses are counterintuitive. One such finding concerns the relationship between pre-disaster preparedness measures and post-disaster recovery outcomes. One basic assumption in the hazards literature is that planning—whether at the household, organizational, or community level—enhances the ability to cope when disasters occur. In analyzing survey data, it was hypothesized that businesses that had engaged in more extensive pre-event planning would experience better recovery outcomes following disasters. However, DRC's surveys consistently found that preparedness levels essentially had no impact on the likelihood of recovery.

In trying to explain this rather puzzling outcome, we offer several hypotheses. First, since as indicated earlier most businesses that were studied had actually done relatively little to prepare for disasters, what planning had been done may have made little difference for business recovery. According to this argument, if businesses had been doing more to plan before they experienced disasters, those higher levels of planning may have translated into better recovery outcomes.

The more plausible explanation, however, is that while some businesses clearly were trying to prepare for possible disaster events, the preparedness measures they relied on most frequently were not the kinds of activities that have an impact on recovery, either in the short term or in the long term. Instead, the measures businesses were most likely to adopt, such as keeping first aid supplies on hand and training employees in how to respond should a disaster occur, were designed to protect employee safety. While life safety is of course the most important objective any organization can pursue, such measures do not necessarily address business continuity needs or provide recovery-related resources. The workplace measures most businesses have adopted

may well make their businesses better prepared from a life-safety perspective, but they do not shield businesses from the kinds of disaster impacts that affect recovery.

Relatedly, as we discuss in more detail elsewhere in the paper, since many aspects of the post-disaster recovery process are outside the control of individual business, workplace-focused plans, in and of themselves, are almost certainly insufficient to address recovery-related needs. For example, some businesses may be able to weather disruptions in lifeline services, but most will find themselves forced to close if critical services such as water and electricity are disrupted, particularly if those disruptions are of long duration. What happens to individual businesses is determined in large measure by outside forces, such as communitywide decisions regarding mitigation of lifeline system damage and disruption. Workplace-based planning is unlikely to have much of an impact if a business is unfortunate enough to lose utilities for a long period of time, or to be located in a high damage area, or to suddenly become unreachable due to transportation system damage. The standard, recommended planning measures most businesses have adopted do little to help businesses facing these kinds of problems.

Another finding that seems to contradict the research literature involves the relationship between post-disaster aid and recovery outcomes. In studies of both short- and longer-term disaster recovery, the use of various forms of outside disaster assistance, such as Small Business Administration loans, as well as private loans and other sources of outside assistance, was either unrelated to the ability to recover or actually negatively related. That is, businesses that reported using more outside aid tended to be worse off than their counterparts who had not relied so extensively on aid. While exactly what explains this pattern has yet to be explored in depth, there could be several reasons why aid evidently fails to help disaster-stricken businesses. First, much

of the aid that is currently provided to businesses following disasters comes in the form of loans, which bring additional debt. While it is possible for households to receive grant funds following disasters, few outright grants are given to businesses. Second, businesses that find themselves utilizing multiple sources of aid after disasters tend to be those that experienced higher levels of loss and disruption. Put another way, high aid utilizers already have more problems than those who use less aid. Equally important, when aid is obtained, it may well be insufficient to cover actual business losses. For example, DRC's Northridge earthquake survey asked respondents about their use of Small Business Administration loans. Only a small minority of the business in the survey—about 11%—had applied for SBA loans following the earthquake. Of this number, about half had received all or part of their loans at the time the survey was conducted, approximately eighteen months after the earthquake. On average, businesses that had received loan assistance reported that about half their overall losses were covered. In other words, aid tended to arrive slowly, and when it did arrive, it only helped businesses recoup a portion of their losses. (For a more detailed discussion, see Tierney, 1997).

Additionally, aid in getting a business back on its feet may do little for long-term recovery outcomes if a business loses its customer base or if other community changes negatively affect its ability to operate. As we discuss at more length below, a business may succeed in mobilizing significant recovery resources, only to find that it is operating in a new and less hospitable business environment after the occurrence of a disaster.

Another interesting finding revealed by this set of business surveys concerns the relationship between prior disaster experience and recovery outcomes. Although findings regarding the influence of disaster experience on subsequent behavior are not entirely consistent,

the disaster literature tends to view experience in a positive light, as something that enhances individual, group, and organizational capacity to cope with future disasters (Drabek, 1986; Lindell and Perry, 2000). Experience is seen as having the potential for making hazards more salient, encouraging preparedness, promoting learning, and in general improving capacity to anticipate what can be expected in future events. In light of these findings, it seemed reasonable to assume that businesses that had experienced one or more disasters in the past would be more likely to report positive recovery outcomes, since those earlier experiences would presumably have given businesses some idea of what to expect and what would need to be done during the recovery period. However, in three of four disaster-stricken communities DRC studied—Los Angeles, South Dade County, and Santa Cruz County—prior experience was either associated with poorer recovery outcomes or had no relationship to recovery.

Further research is needed to explore the relationship between prior disaster experience and the business recovery process. Here again, there may be a number of different kinds of influences at work. For example, some studies have suggested that prior experience may actually lead to less concern with hazards and to greater complacency, particularly in cases where earlier disaster impacts were less severe (Tierney, Lindell, and Perry, 2001). It could be that businesses concluded from their earlier experiences that they didn't need to do anything additional to prepare to recover from future disasters—or that there was nothing they could do. Alternatively, it may be that, rather than enhancing coping capacity, prior experience—and particularly recent experience—may weaken and burden businesses so that they are even less resilient when another event occurs. In Los Angeles, for example, many of the businesses surveyed after the Northridge earthquake reported having been negatively affected by the 1992 riots. Since the earthquake

occurred less than two years after the unrest, many of those businesses may not yet have been back on their feet and may already have already been saddled with riot-related recovery costs when the earthquake struck.

Qualitative Research on Business Impacts and Recovery

In order to put these findings into context, several points concerning DRC's research on businesses and disasters warrant emphasis. First, the surveys discussed above consisted of large samples of businesses of all sizes and types, which makes their findings more generalizable than those based on more limited samples. Because they were designed to represent entire communities, the samples included businesses that had experienced a very wide range of disaster impacts, from those that were totally destroyed and forced to relocate and those that experienced extensive business interruption, to those whose operations were affected only slightly or not at all by the events in question. The objective of the surveys was to obtain generalizable findings, rather than to gain in-depth knowledge concerning the experiences of very hard-hit firms. While the quantitative approaches used in the surveys do have obvious strengths in terms of their representativeness and generalizability, they do not do a good job of capturing the nuances of business owners' experiences and the complexity of the recovery process as seen through their eyes.

Other work carried out by Alesch and his colleagues (Alesch et al., 2001) using primarily qualitative approaches fills this gap. This research presents a somewhat different view of the recovery process while complementing the DRC survey findings in other respects. That research sought to better understand the post-disaster recovery process for a specific subset of businesses: small businesses and non-profit organizations located mainly in areas that experienced particularly

intense disaster damage.

Many of the findings from these qualitative studies closely parallel findings from the DRC surveys. For example, the Alesch group found that the business owners they interviewed were generally unprepared for disasters. Some simply did not feel at risk; others did not fully understand the hazards to which their businesses were subject, or they trusted in infrastructural mitigation measures such as river levees to keep their businesses safe in the event of a disaster. Like DRC's research, this study also found that businesses that had adopted standard recommended mitigation and preparedness measures fared no better than their less prepared counterparts during the recovery process. Consistent with DRC's findings, Alesch et al. also saw little evidence that the forms of aid that are generally available, such as Small Business Administration loans, actually help businesses weather the recovery process.

Also consistent with the results of the surveys discussed above, these researchers found that ecological factors and business interdependencies play a strong role in recovery outcomes for individual businesses. As this example from their study illustrates, businesses that struggle to reopen following disasters may still flounder if nearby businesses recover more slowly:

After the Northridge earthquake, an established florist was back in business a day or so after the earthquake. But she was the only shop open in the strip mall. She sat for a year, without customers and without other open shops in the little shopping center, watching other shops in the strip mall prepare to reopen after their structural damage was repaired. By the time the mall was up and running, she had run out of both patience and money. She closed her business. She should not have reopened in that location. She depended primarily on traffic generated by the larger "magnet" stores in the mall; her shop was not a destination. By not thinking through the source of her sales and by not thinking about her alternatives, she wasted a year's time, lost a year's income, and lost her assets (Alesch et al., 2001: 73).

Alesch et al. observe that negative post-disaster outcomes sometimes result from owners'

inability to recognize that a disaster has permanently altered the business operating environment, for example by causing shifts in markets for goods and services. Once disaster damage forces customers to shop elsewhere, they may not return when businesses reopen. Disasters can alter both customer purchasing patterns and purchasing power, reducing the demand for particular kinds of goods. Very severe events may cause demographic shifts significant enough to have a serious impact on business profitability. Disasters may also help push business districts that are already not doing well into further decline. Under these kinds of conditions, Alesch and his collaborators argue, individual businesses will not recover no matter how hard their owners work—or how much they borrow—to stay in business.

In contrast with the DRC surveys, which indicate that most businesses do return to pre-disaster levels of financial viability, Alesch and his colleagues found that many of the small enterprises they studied experienced very difficult challenges during the recovery process and that some continued to struggle for years without turning a profit before finally giving up for good. At the extreme, they found evidence for a phenomenon they term “dead business walking,” a situation in which “business owners continually put money into a failing business by draining their personal assets after the business assets are gone. The business shrinks in a slow death until nothing is left but a hollow shell” (Alesch et al., 2001: 92). From the perspective of these researchers, for many business owners an outright decision to close would have been preferable to this gradual decline into commercial and personal ruin.

The many kinds of recovery-related problems businesses can experience were highlighted in this study, in part because the research intentionally focused only on small businesses that sustained significant damage and that were located in particularly hard-hit communities.

However, even if the samples used were not entirely representative of typical businesses affected by disasters, the Alesch et al. findings make a number of important points. For example, they call into question simplistic ideas about the meaning of business failure, survival, and recovery following disasters. They suggest, on the one hand, that closing a business and retiring or starting a different type of business after a disaster may in fact be a prudent response to altered circumstances for some business owners. On the other hand, they show that continued business survival and superficial “recovery” may ultimately result in declining fortunes for business owners. Owners may actually stand to lose significantly more in the long run by putting profits back into a struggling business, using savings to stay afloat, or going into additional debt than they would by simply closing the business. Rather than being seen as indicative of failure, this kind of choice should rightly be viewed as a reasonable business strategy for some firms affected by disasters. Findings like these suggest that bankruptcies and business closures may constitute strategic business decisions and that for some owners maintaining the business in the face of a changed operating environment may be a poorer choice over the long run.

The Alesch et al. research also highlights the need for what these researchers term “management mitigation” measures, which they define as “changes in how a firm conducts its business that result in a reduction of the initial shock of the natural disaster and that increase the probability of surviving following it” (Alesch et al., 2001: 12). Management mitigation measures include a range of strategies designed to reduce exposure and vulnerability (e.g., doing business in multiple locations, using just-in-time delivery to reduce inventory exposure to hazards, diversifying the customer base, and having good data backup procedures in place) and ensure rapid recovery when an event does occur (e.g., ensuring that leases require owners to make

repairs in a timely manner, having adequate insurance coverage). The value of management mitigation strategies is that they enable owners to avoid initial damage and loss and then to be flexible in the face of changes in post-disaster operating environments.

General Observations: The Significance of Business-Community Interdependencies

Several general conclusions can be drawn from studies on businesses and disasters. First and not surprisingly, some of the same factors and business characteristics that keep businesses afloat during non-turbulent or non-disaster times also make businesses more resilient when disasters occur. Size is one such insulating factor. Second, disasters can exacerbate the difficulties that some businesses experience on a daily basis. For example, a disaster can provide a negative jolt for businesses in highly competitive niches and for those that are undercapitalized or already on the margins of being profitable. In other words, disasters can add to the woes of businesses that are already struggling. At the same time, to the extent that disasters bring resources into affected communities, they also have the potential for providing a stimulus to some types of business activities.

Firm-level characteristics are only part of the story. The fates of individual businesses are linked to ongoing economic trends—some of which are affected by disasters and some of which may be completely unrelated. Focusing, for example, on South Dade County following Hurricane Andrew, plans had already been under way to close the Homestead Air Force Base prior to the 1992 hurricane. Besides being a major employer, the base helped sustain numerous other businesses in the impact area. Severe hurricane damage hastened the base closure, and subsequent attempts to keep the base in operation and to reopen it for other uses failed. That part of Dade County permanently lost a major economic engine, and much sooner and more

suddenly than expected. The closure led to an exodus of higher income residents, and the median income in the community dropped. At around the same time, the North American Free Trade Agreement (NAFTA) was instituted. NAFTA dealt a severe blow to businesses in the South Dade agricultural sector, many of which had also suffered losses as a result of Andrew, causing another major economic driving force in South Dade to falter.

Recovery processes and outcomes for individual businesses are also linked to broader recovery-related decisions that are made at the community level. For example, to better understand the range of factors that influence recovery outcomes following disasters, DRC conducted qualitative research to learn more about what communities did to try to assist their businesses, particularly in very hard-hit areas like Santa Cruz County and South Dade County, and what effect those strategies had over time. That research revealed significant differences in community-level approaches that had important consequences for businesses. After the 1989 earthquake, for example, the City of Santa Cruz did much more to support and assist businesses than the other city in the county, Watsonville. As a community, Santa Cruz made better choices regarding its own recovery, improving the overall economic climate and taking active steps to help businesses get reestablished. Santa Cruz took the 1989 earthquake as an opportunity to reinvent itself and to take strategic steps to revitalize a business district that had fallen short of realizing its potential prior to the disaster. Because the community invested time and resources in long-term planning and chose what proved to be an appropriate vision to facilitate business recovery, Santa Cruz now has a central business district that has more businesses and a better mix of businesses, generates more profits, and serves more patrons than before the earthquake. In a retrospective study on recovery in Santa Cruz entitled Earthquake as Opportunity, Christopher

Arnold described the earthquake's impact on Santa Cruz as providing a chance for "renewal on a scale that seemed inconceivable, and [that] enforced decision-making that would otherwise have taken years or even decades to accomplish" (1998: 5). In contrast, Watsonville, the neighboring community, was less successful in forging and realizing a new vision and overcoming recovery-related obstacles and is still struggling economically years after the earthquake.

The same can be said for the South Dade County communities that were affected by Hurricane Andrew. Some proportion of the aid that was provided to that area did target business recovery, and a variety of recovery-related programs were launched, such as the creation of enterprise zones in the impact area. Organizations such as We Will Rebuild and local redevelopment agencies were active in efforts to spur business recovery. However, hard-hit businesses continue in their efforts to cope with both hurricane- and non-hurricane-related economic downturns. They also continue to experience difficulties as a consequence of changes in community demographics that resulted both from the base closure and from community redevelopment and housing reconstruction decisions—demographic shifts that significantly altered the composition of their markets and thus the demand for their goods and services. As one interviewee in DRC's Dade County community study put it

I keep going back to the loss of the number of people. It's just demographics...people with disposable income are not here anymore. And until we're able to recreate or at least try to replace some of those who have left, the businesses are going to be affected by that. I mean, all the money in the world we can dump into businesses, but if there aren't people here to buy the goods....

Perhaps the most general lesson that can be drawn from research on businesses affected by earthquakes and other disasters is that while much of what businesses experience

during and after disasters is the result of firm-level characteristics and of decisions made by individual business owners, those experiences are also shaped in very important ways by other forces that are largely beyond the control of individual owners—such as broader economic trends—and equally important, by what communities do to mitigate, prepare for, respond to, and recover from disasters. When communities adopt effective land use plans and measures to reduce building damage and lifeline service interruption, business losses and disruption are also reduced. Businesses benefit when communities plan well and respond effectively when disasters strike—for example, by rapidly clearing debris and restoring lifeline and transportation networks. And, as discussed earlier, business recovery outcomes are clearly tied to broader communitywide recovery strategies following disasters, including both those aimed at business retention and business district revitalization and those that focus on housing and residential recovery. Effective community decision making before, during, and after disasters can both avoid losses and disruption and do a great deal to ameliorate the post-disaster operational problems that are major contributors to poor recovery outcomes for businesses.

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