Annual Review of Resource Economics

Small Business Disaster Recovery in the United States

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First published as a Review in Advance on April 16, 2025

The *Annual Review of Resource Economics* is online at resource.annualreviews.org

https://doi.org/10.1146/annurev-resource-011724-082853

JEL codes: L20, M20, Q54, Q56, Q59

Keywords

small business, natural disasters, recovery, resilience, mitigation, resource allocation

Abstract

Natural disasters pose significant challenges to small businesses, as they are more vulnerable to shocks. Their recovery is crucial to the resilience of communities. This literature review explores the topic of US small business disaster recovery by examining research in economics, management, and disaster studies. The review highlights a consensus among small business researchers that even within the small business sector, size matters. There is an understanding that space and time play a crucial role not only in the recovery process itself but also in how researchers may need to measure recovery. A common thread is that the recovery process may not have a prescriptive endpoint, and that the endpoint to recovery may be in the eye of the beholder. The review exposes significant gaps in the literature, particularly regarding long-term recovery processes, standardized measurement metrics, and the complicated dynamics between business and household recovery.

1. INTRODUCTION

Small business disaster recovery research in the United States has had a resurgence in the last two decades. Some of the seminal articles that focused on small business disaster recovery were written in the 1990s in the aftermath of the Northridge earthquake in southern California (Dahlhamer & Tierney 1996, 1998; Tierney 1997). The research on recovery from natural disasters had mainly focused on households and communities with aggregate macroeconomic factors that disguised the effect on small businesses. Yet, the recovery of small businesses can be crucial to the recovery and resilience of communities. In fact, Rouhanizadeh et al. (2020) found that the most cited barriers to postdisaster community recovery were low numbers of active small businesses and low rates of employment.

According to the US Small Business Administration (SBA) (SBA 2024), there were 34.8 million small businesses in the United States in 2023, and they employed 45.9% of private sector workers (59 million people). A less-known fact is that 82% of these small businesses have no employees and the average number of employees for those that have them is 11 workers. Even so, small businesses create two-thirds of net new jobs and drive innovation and competitiveness (Kobe & Schwinn 2018). Small businesses also play an outsized role in rural America, providing 54.3% of rural jobs compared to 45.5% in urban areas (Wilmoth 2023). When a natural disaster hits a community, its impact on the small business sector may delay not just the recovery of the business itself, but also the ability of the community to recover. Kilkenny et al. (1999) found that the most significant factor in small business success was community reciprocity. Business owners provide many services to the community, as they are community members, leaders, and donors, and they rely on the community's support of the business (both financial and social) to succeed. The community in turn needs its small businesses that, in many cases, provide essential goods and services to recover.

Small businesses are more vulnerable than larger businesses to natural disasters. Even without an exogenous shock such as a natural disaster, small business survival is tenuous. Less than half survive the five-year mark, but of those that do, 70% are still operating 10 years later (Off. Advocacy 2024). Firm size measured by number of employees can be used as a proxy for the labor and sometimes financial resources available to the business. Thus, the smaller the business, the fewer resources it will have available in times of crisis. Moreover, considering that most small businesses are nonemployers and the majority are home-based, a natural disaster affects the economic well-being of the business and the household (Schrank et al. 2013). For small business owners, a natural disaster can be the critical juncture from which their pre-event financial fragility or lack of resources determines their ability to recover. It is also where their previous short- and long-term decisions impact their current survival and future recovery.

Three recently published reviews of the literature (Harries 2021, Miklian & Hoelscher 2022, Sadeghi 2022) focused on understanding small business recovery and resilience to natural disasters. Harries (2021) concentrated on business adaptation and motivation and advocated for more research on small business adaptation by incorporating factors such as social and cultural capital and their influence of risk mitigation and coping strategies. Sadeghi (2022) provided a comprehensive review of small business recovery from flood risk and proposed four themes for future research that include business continuity procedures, adaptation measures, resilience frameworks, and recovery efforts. Miklian & Hoelscher (2022) offered a comprehensive review on small and medium enterprises (SMEs) and exogenous shocks to include shocks beyond natural disasters such as financial crises, armed conflict, and the COVID-19 pandemic. All three author groups attempted to distinguish between exogenous shocks and crises, where shocks were acute and crises were the longer-term consequences that a business must overcome to recover. They proposed more focused

research on the differences between formal and informal microfirms and SMEs and their opportunities and barriers to recovery based on business size and industry variation. All agree that this is an emerging subject that needs further study to be able to provide evidence-based policy implications and interventions. This review differs from the studies above by underscoring the importance not only of adaptation to natural disasters but also of the frameworks and definitions surrounding recovery outcomes. Moreover, this review is narrower in scope by concentrating solely on natural disasters within the United States.

I limit this review of literature to nonfarm small business disaster recovery. However, farms are businesses too. Many small farms suffer from the same lack of resources and preparedness as nonfarm businesses, and many of the factors associated with recovery are the same for farms and nonfarm small businesses. For example, US farmers have different mechanisms available to them to mitigate weather-related disasters such as the Federal Crop Insurance Program, yet small farms tend to be underinsured (Velandia et al. 2009).

I restrict this review to natural hazards in the United States for several reasons. First, the definition of small business varies across countries. In the United States, small businesses are defined as those with fewer than 500 employees, while in the European Union they are defined as those with fewer than 50 employees (Harries 2021). In other continents such as Africa and Asia, small businesses may be defined as smallholder households. Second, I want to provide consistent framing on policy research, which can be different based on location context. Third, the United States itself suffers from a sufficient variety of natural disasters such as earthquakes, wildfires, tornadoes, floods, and cyclones (hurricanes), which provide the needed perspective.

Table 1 provides examples of the research conducted in the United States focused on small business recovery from natural disasters. Much of the early work on small business disaster recovery, in the late 1990s and early 2000s, focused on the Loma Prieta earthquake in 1989 (Santa Cruz Mountains, California), Hurricane Andrew in 1992 (South Florida), and flooding. After Hurricane Katrina in 2005 (Gulf Coast), most of the research focused on hurricanes and flooding. I could find only one article (Ha et al. 2022) focused on small business recovery from wildfires.

This article continues with a discussion of the inconsistent definitions of small business recovery and resilience in disaster recovery frameworks. I then summarize the impact of natural disasters on small businesses. Next, a discussion of the factors associated with disaster recovery is provided. I conclude by suggesting potential themes for future research.

2. DEFINING SURVIVAL, RECOVERY, AND RESILIENCE

There is no consensus definition of disaster recovery. However, it has become clear that recovery is a nonlinear process and involves businesses, households, and institutions that change over time and circumstances (Alesch et al. 2001, Chang 2010, Jordan & Javernick-Will 2013, Marshall & Schrank 2014, Smith 2016). Businesses do not recover at the same rate or in the same manner; context matters. Small business recovery is not simply an open or shut case. Brown et al. (2008) point out that businesses may be on a recovery continuum from which there may be no end. At any point along this continuum, a business can be characterized to be at a distinct state or stage in the process. Any model for business recovery needs to incorporate the element of time, as business return and survival rates vary across time (Dietch & Corey 2011, Lam et al. 2009, Schrank et al. 2013).

As more researchers focused on small businesses in the last 25 years, the terms survival, recovery, and resilience have been used interchangeably and operationalized and measured with a variety of outcomes. In the last decade, survival and recovery have become recovery and resilience. The inconsistent use of indicators proves problematic in measuring economic resilience (Rose & Krausmann 2013). Thus, it is important to understand how these terms are used and operationalized in research. **Figure 1** demonstrates the states in the recovery process that can be measured at

Table 1 Empirical papers about small business disaster recovery in the United States

Reference	Number of observations	Type of disaster
Tierney & Nigg (1995)	737 (Memphis, Tennessee), 1,079 (Des Moines, Iowa)	Earthquake and flood
Dahlhamer & D'Souza (1997)	738 (Memphis, Tennessee), 1,079 (Des Moines, Iowa)	Earthquake and flood
Tierney (1997)	1,110	Earthquake
Webb et al. (2000)	5,000	Earthquakes, floods, hurricane
Webb et al. (2002)	933 (California), 1,078 (Florida)	Earthquakes and hurricane
Spillan & Hough (2003)	162	Natural disasters (various)
Runyan (2006)	17	Hurricane
Flynn (2007)	127	Flood
Danes et al. (2009a)	311	Natural disasters (various)
Lam et al. (2009)	1,132 (Dec. 2005), 950 (June 2006)	Hurricane
Haynes et al. (2011)	509	Natural disasters (various)
LeSage et al. (2011)	673	Hurricane
Corey & Deitch (2011)	183	Hurricane
Xiao (2011)	361	Flood
Lam et al. (2012)	1,190 (Dec. 2005), 1,029 (June 2006), 1,042 (Oct. 2007)	Hurricane
Xiao & Van Zandt (2012)	831	Hurricane
Stafford et al. (2013)	282	Natural disasters (various)
Schrank et al. (2013)	3,527	Hurricane
Xiao & Peacock (2014)	1,190	Hurricane
Marshall et al. (2015)	447	Hurricane
Scarinci (2016)	26	Hurricane
Josephson et al. (2017)	499	Hurricane
Sydnor et al. (2017)	497	Hurricane
Hiramatsu & Marshall (2018)	287	Hurricane
Torres et al. (2019)	373	Hurricane
Davlasheridze & Geylani (2017)	2,837	Flood
Grube & Storr (2018)	353 (Hurricane Katrina), 30 (Alabama), 36 (Missouri)	Hurricane and tornado
Tyler & Sadiq (2019)	19	Hurricane
Marshall & Schrank (2020)	451	Hurricane
Collier et al. (2020)	949	Hurricane
Watson et al. (2020)	218	Hurricane
Wiatt et al. (2021)	499	Hurricane
Dormady et al. (2022)	249	Hurricane
Xiao et al. (2022)	75	Hurricane
Ha et al. (2022)	11	Wildfire
Collier et al. (2025)	273	Hurricane

different points in time. For this study, we use Marshall & Schrank's (2014) definition of recovery, where the business is operating and has returned to pre-event conditions.

2.1. Survival

The terms survival and recovery have been used interchangeably. In most cases, survival is implied when one considers a business to be recovered. When researchers (Scarinci 2016) operationalize

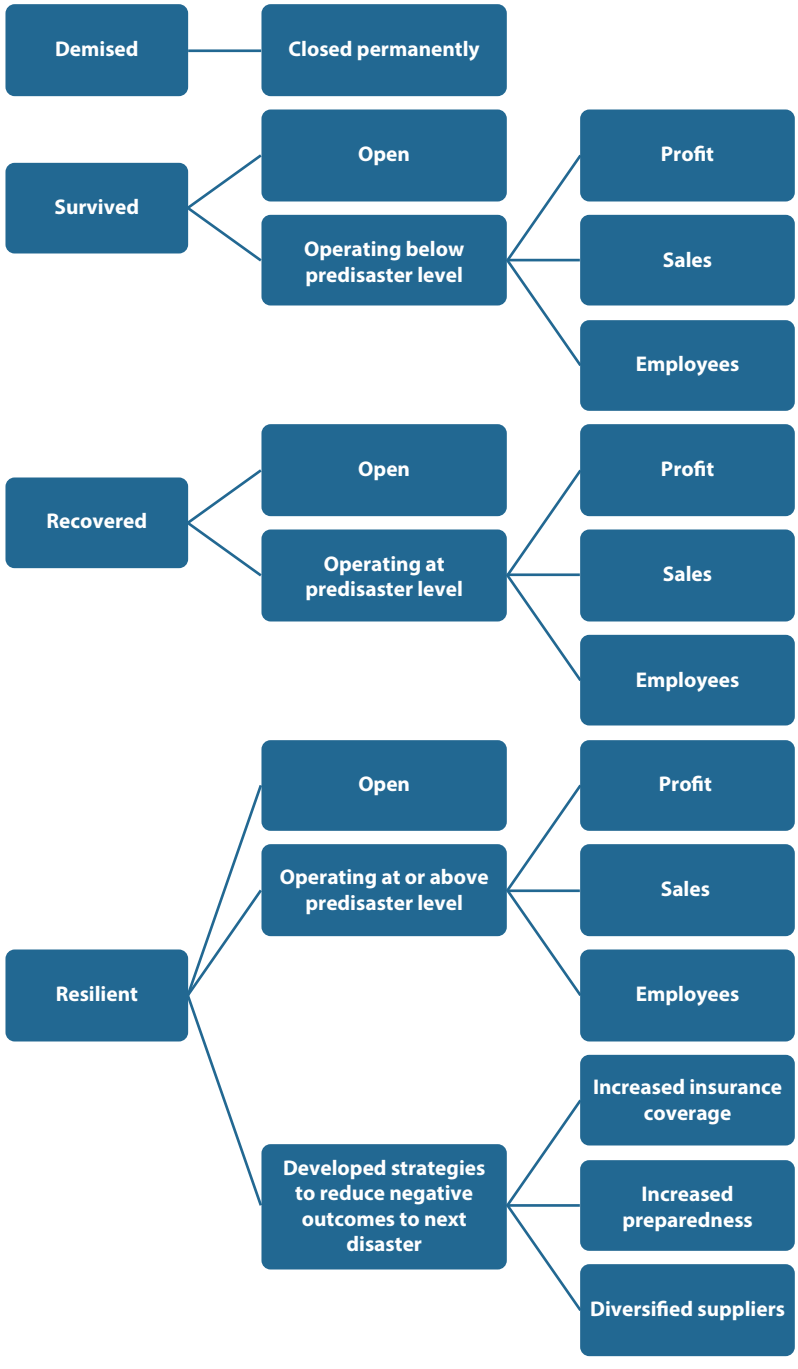

Figure 1

Definitions of states at any point in time during the recovery process with examples of metrics to assess pre- and postdisaster levels. Figure adapted from Marshall & Schrank (2014).

recovered as a business that is still operating regardless of whether the business is doing better or worse than predisaster, they are missing a key element of recovery measurement. Although the business may be operating, it may be worse off than before the disaster or not back to normal in terms of operations, sales, or profits. Thus, this operating business would not meet the definition of a recovered business, as it has not returned to pre-event conditions, as explained in the section below. It would technically have survived the disaster, but it has not recovered. In fact, research that defines open as recovered (i.e., success) and closed as failure is not sufficient to understand the nuances of business recovery (Stevenson et al. 2018). Small business recovery research may need to go beyond secondary data to depict the nuances of survival and recovery, as they are more likely to be accurately reported by business owners.

For example, Schrank et al. (2013) interviewed a random sample of small business owners in Mississippi whose businesses were operating in 2004 and experienced Hurricane Katrina. They interviewed businesses in 2013, 2014, and 2015. What made their sample unique was that owners of businesses that survived (operating) as well as owners whose businesses met demise (closed) were interviewed. The authors were also able to determine whether the businesses were better or worse off after the disaster by measuring profitability, employment, and adaptive capacity. Because they had these measures, they were able to objectively characterize businesses as survived (open but worse off than before the event) versus recovered (open and operating at the same level or better than before the event).

2.2. Recovery

Researchers have used the distinction between operating and not operating as a measure of recovery six months to one year after the disaster. However, businesses that are not operating during that time frame may be rebuilding or may have relocated; thus, business demise may only be able to be confirmed by the business owner. In fact, Brown et al. (2008) and Schrank et al. (2013) warn against assuming success or failure of a business too early in the recovery process, where success and failure are defined as operating and not operating as a measure of recovery.

Just as survival and recovery have been used interchangeably, so have recovery and resilience. Recovery has been defined as the return to predisaster conditions or a new steady state (Blanco et al. 2009, Swanson et al. 2009, Watson et al. 2023). This new steady state has also included changes in economic conditions, business practices, or adjustment strategies. Marshall & Schrank (2014) defined recovery as a business that gets back to its steady state by some measurable criteria benchmarked against a predetermined baseline. For example, Tierney (1997) depicted business recovery after the 1994 Northridge earthquake by asking business owners if they were better off, the same, or worse off than before the event. Webb et al. (2002) added to Tierney's business recovery definition in their comparison of long-term recovery from the Loma Prieta earthquake and Hurricane Andrew by developing a scale of recovery outcomes that also included whether the number of employees, customers, and profits had remained the same, were better off, or were worse off. On the other hand, some researchers (Xiao et al. 2022) do not clearly define or operationalize recovery beyond operating status.

2.3. Resilience

There is no consensus on the definition of resilience, although resilience definitions can and tend to include getting to recovery. Seminal works, by Holling (1973) in ecology and Timmerman (1981) in climate research, have laid the foundation to define resilience as the ability of a business to absorb an event (Burton 2015). Some researchers have defined resilience as the ability to survive and cope with a disaster with minimal losses by preempting vulnerabilities and exploiting available resources (human, financial, social, or physical) (Bruneau et al. 2003, Cutter et al. 2008, Klein et al.

2003, Rose & Liao 2005, Swanson et al. 2009, Tierney & Bruneau 2007). A necessary condition for resilience is a return to pre-event status and the adaptive capacity to withstand the event. Adaptive capacity is a business' ability to adjust to a shock, usually ex post, to reduce undesired outcomes to the next shock.

More recent definitions have defined resilience as the ability to not only withstand the event so that the business recovers but also adapt to the changes brought by the disaster so that the business is better off (Bruneau et al. 2003, Cutter et al. 2008). Rose & Krausmann (2013) defined short-term business resilience as the ability to manage disaster impacts to ensure the delivery of inputs and outputs. This may entail diminishing losses while facilitating a quick recovery of operations. Marshall & Schrank (2014) define and operationalize resilience as the state at which the small business is better off than predisaster conditions and its adaptive capacity to reduce exposure to future events. Post-event conditions include both subjective outcomes such as owner perceptions of business conditions and objective outcomes such as business revenue, employment levels, and profit. The difference between recovery and resilience is the adaptive capacity to reduce losses, not just the ability to be better off.

In some sense, based on the time it takes to get through the recovery process, a small business may be at different states along a recovery continuum. At one end you have survivor businesses and at the other end you have resilient businesses, as shown in **Figure 1**. Survivors are operating but are in worse condition than before the disaster. Recovered businesses are operating and have gotten back to the same condition or trendline. Finally, resilient businesses are operating and not only better off than before the disaster, but they can also withstand future events through changes in business operations.

3. DISASTER RECOVERY FRAMEWORKS

Researchers have developed various frameworks to understand and measure business recovery. The frameworks discussed below seek to standardize research approaches while acknowledging the dynamic and often lengthy nature of the recovery process. Each framework offers unique insights into how businesses navigate the path to recovery and highlights the importance of clear definitions, standardized measurements, and recognition of the temporal aspects of business recovery.

Miles & Chang's (2006, 2011) framework for business recovery is imbedded in their community recovery model reinforcing the link between businesses, households, and communities. The model implies a process of events that takes place over time without suggesting an actual time frame. They proposed that owner and business characteristics, community recovery, and policy effects are important factors that should be considered in the recovery process (Miles & Chang 2006).

Marshall & Schrank (2014) proposed a Small Business Disaster Recovery Framework (SBDRF) based on their work following Hurricane Katrina. They found that businesses could be characterized at various stages in the recovery process. Their framework incorporates time in the process starting by benchmarking businesses before the disaster but with no specific end to the process. Businesses are characterized based on their economic status prior to the event and then compared and tracked over time through the recovery process. Their framework provides researchers with a standardized vocabulary with an understanding that most small business disaster research primarily relies on primary data collection (Marshall & Schrank 2014, Stevenson et al. 2018). **Figure 1** provides examples of how recovery and reliance can be measured based on their framework.

The Business Recovery Assessment Framework (BRAF) attempts to standardize primary research and guide the measurement of business recovery after a disaster (Stevenson et al. 2018). Stevenson et al. reiterate that data focused on small businesses collected by government agencies do not have the level of detail required for valuable insights into the process of business recovery. They propose five steps that will help to objectively compare businesses in the recovery process.

BRAF is a linear process that includes (*a*) establishing the research aim or what will be learned by measuring business recovery, (*b*) determining the analysis approach, (*c*) defining recovery, (*d*) determining the time step, and (*e*) selecting the most appropriate indicators (Stevenson et al. 2018). An important part of this framework is defining recovery, how it will be measured, and at what reference point.

Although Brown et al. (2018) were solely focused on the hotel industry, their capitals-based framework is valuable in understanding how small businesses can build disaster resilience within a broader context. The six capitals they identified as important for disaster resilience included economic, social, human, physical, natural, and cultural. The capitals can be measured by factors that provide more details and nuances of the disaster recovery process. For example, human capital can be measured by skills, knowledge, and capacity to adapt, whereas natural capital can be measured by the business' location and the location's environmental risks (Brown et al. 2018).

A common theme across these frameworks is the need to define recovery. Defining small business recovery and how it will be measured is essential, with an understanding that each definition has its drawbacks. These frameworks also provide an understanding that space and time play a crucial role not only in the recovery process itself but in how researchers may need to measure recovery. Another common thread is that the recovery process may not have an endpoint (Chang 2010), and the endpoint may be more subjective than objective.

4. IMPACT OF NATURAL DISASTERS ON SMALL BUSINESSES

The impact of natural disasters on small businesses can, on the one hand, be devastating and, on the other hand, provide new opportunities (Kachali et al. 2015, Sun et al. 2022). Natural disasters disrupt individual businesses and the macroeconomic environments in which they operate. These impacts may be felt by different industries at different times of the disaster event. Researchers have studied the disaster event as a singular period in time; however, the impacts of a disaster can linger well beyond the initial event. Some small businesses will cease operating immediately following a disaster and never reopen. The majority, however, will reopen, but approximately 20% will cease operation anywhere between two and four years after the event (Alesch et al. 2001; Lam et al. 2009, 2012; Schrank et al. 2013); thus, demise rates fall within normal small business attrition. This signifies that the majority of small businesses will continue to operate years after the natural disaster as the impact of the event lessens (Xiao 2011). Moreover, Webb et al. (2000) and Sun et al. (2022) demonstrated that small businesses in the construction and service sectors may show gains after a natural disaster.

Natural disasters create a climate of uncertainty that affects small businesses both directly and indirectly, and both can be equally devastating (Miklian & Hoelscher 2022, Watson et al. 2023). These direct and indirect economic disruptions require time-sensitive decision-making (Miklian & Hoelscher 2022) by business owners, community members, financial and insurance industries, and local, state, and federal government agencies (Henderson et al. 2020). Damages to buildings, equipment, labor, and availability of lifelines (e.g., roads and utilities) are considered direct impacts. From an economic perspective, they can be viewed as a shock to the production function. Natural disasters can impact land, labor, capital, and other necessary inputs. Because small businesses are not lone economic units and exist within a context, indirect impacts may include disruptions to the business owner's household, downstream supply chains, and the community (ability of customers to access businesses, socioeconomic vulnerability of community) (Goulbourne et al. 2024, Haynes et al. 2019, Watson et al. 2023). Small business recovery is about not only the internal processes of the business but also the individuals, families, businesses, institutions, and communities where they are located (Henderson et al. 2020, Sullivan 2003).

Direct and catastrophic damage to the business has been negatively associated with disaster recovery. Physical damage was correlated with a decreased probability of disaster recovery (Basker & Miranda 2018, Corey & Deitch 2011, Lam et al. 2009, LeSage et al. 2011, Wiatt et al. 2021). Businesses that were forced to remain closed longer and suffered supply chain disruptions were less likely to recover (Marshall & Schrank 2020, Runyan 2006, Webb et al. 2002). Lifeline losses (utility, roads, etc.) were also a major barrier to business recovery (Sydnor et al. 2017, Tierney 1997, Tierney & Nigg 1995, Tyler & Sadiq 2019, Zhang et al. 2009). The ability of a small business to soften the blow caused by these losses would depend on its level of preparation, its mitigation strategies, and its postdisaster management strategies.

5. SMALL BUSINESS FACTORS ASSOCIATED WITH DISASTER RECOVERY

5.1. Disaster Planning and Mitigation

Disaster planning and preparedness are important aspects of disaster recovery. Disaster planning is the process of developing written procedures. Disaster preparedness is the process of ensuring the business is able to execute those procedures. A business may have a disaster plan, but poor preparedness (actual readiness to execute) would make the plan ineffective in a real emergency.

Most small businesses were underprepared for disasters, with low levels of formal disaster planning (Flynn 2007, Runyan 2006, Webb et al. 2000). Josephson et al. (2017) found that 42% of small businesses undertook three or fewer preparation measures. Only a small percentage of businesses typically had disaster recovery plans in place (Flynn 2007, Ha et al. 2022). However, businesses with disaster plans were significantly less likely to suffer physical damage in disasters (Xiao & Peacock 2014). The presence of a disaster plan also enhances the effectiveness of specific hazard mitigation measures (Xiao & Peacock 2014).

Common preparedness measures included having first aid supplies, developing emergency plans, meeting wind standards, and purchasing property and business interruption insurance (Dahlhamer & D'Souza 1995, Josephson et al. 2017). However, more complex measures such as arranging alternative locations, elevating inventory, or conducting emergency drills were rare (Dahlhamer & D'Souza 1995, Josephson et al. 2017, Scarinci 2016). One of the most common natural disasters across the United States is flooding (Sun et al. 2022) due to intense or prolonged rain or storm surge, yet a majority of businesses did not have flood insurance or did not understand their insurance coverage (Collier et al. 2020, Michel-Kerjan & Taglioni 2017, Scarinci 2016). Similarly, even though business interruption losses often exceed property damage significantly (Dormady et al. 2022), a 2017 survey of small business owners indicated that 71% of small businesses did not have business interruption insurance, which is crucial for business recovery (Nationwide 2017). Collier et al. (2020) found that 29% of small businesses during Hurricane Sandy in 2012 did not have any insurance. Those that did have insurance stated that they suffered losses their insurance did not cover. After Hurricane Katrina, most small businesses surveyed by Marshall & Schrank (2014) stated that they had been underinsured. Josephson & Marshall (2016) and Collier et al. (2020) drew a direct line between revenue, insurance, and credit, all of which affected small business recovery. Less-successful businesses were less likely to invest in insurance, which in turn left them more vulnerable to disasters. Businesses without insurance or underinsured ones were more likely to need credit to rebuild. However, less-successful businesses were less likely to qualify for private or government loans.

Business characteristics that have been associated with higher disaster preparedness include firm size, ownership structure, industry sector, prior disaster experience, and location. Research has shown that small businesses tend to be less prepared for disasters than larger businesses (Corey &

Deitch 2011, Dahlhamer & D'Souza 1997, Webb et al. 2000). Flynn (2007) found that prior disaster experience only marginally increased disaster planning, but flood insurance coverage increased substantially. Indeed, prior disaster experience was associated with increased disaster preparedness (Han & Nigg 2011, Josephson et al. 2017). Josephson et al. (2017) suggested that women, property owners, retail businesses, coastal location, and businesses with cash flow problems were associated with higher levels of disaster preparedness. On the other hand, businesses structured as sole proprietors, in good financial position, and in the wholesale and construction sectors were less likely to be prepared (Han & Nigg 2011).

Given the potential impact of more extreme weather events, disaster planning and preparedness should be seen as an important economic investment and business strategy. However, research suggests that disaster preparedness may be too costly and/or a low priority (Egbelakin et al. 2016, McClure et al. 2015, Spillan & Hough 2003). The effect of charity hazard should also be explored (Edobor et al. 2025, Raschky & Weck-Hannemann 2007). In other words, the tendency of business owners not to plan or mitigate against natural disasters because of dependence on expected aid from the government should be more extensively investigated. More research is needed to understand the barriers small businesses face to plan and prepare for natural disasters.

5.2. Business Characteristics

Recovery patterns vary by business characteristics and can differ between short-term and long-term recovery (Corey & Deitch 2011, Zhang et al. 2009). For small business owners, a natural disaster can be the "straw that broke the camel's back," as they could be one crisis or catastrophe away from business demise. The ability to survive and recover from an exogenous shock relies on the preexisting characteristics and conditions of the business. Characteristics such as size, industry, and structure have been associated with business recovery. There is consensus among small business researchers that even within the small business sector, size matters. Businesses with more employees were more likely to recover because they tend to have more resources and are usually better prepared (Dahlhamer & D'Souza 1997, Lam et al. 2012, Xiao & Peacock 2014, Xiao & Van Zandt 2012).

The structure and industry of the business also play a role in disaster recovery. However, there is no consensus on whether that role is positive or negative. Home-based businesses showed higher survival rates and higher probability of recovery (Marshall et al. 2015, Wiatt et al. 2021). Locally owned businesses and those in the retail sector were more likely to recover after Hurricane Katrina (Lam et al. 2009, LeSage et al. 2011). However, others have suggested that small locally owned and locally serving businesses were less likely to recover (Khan & Sayem 2013, Watson et al. 2020, Webb et al. 2000, Zhang et al. 2009). The lack of consensus may be due to how researchers defined recovery and how early in the recovery process the research was conducted. For example, Watson et al. (2020) conducted their study 15 months after Hurricane Andrew and used owner perception of full recovery. In contrast, Lam et al. (2009) and LeSage et al. (2011) followed businesses after Hurricane Katrina for two years and defined recovery as business return, and Wiatt et al. (2021) defined recovery with both subjective and objective measures five years after Hurricane Katrina.

The legal structure of the business may have a role in disaster recovery. Sole proprietorships were less likely to recover compared to businesses that were incorporated (i.e., a limited liability company, S corporation) (Stafford et al. 2013, Webb & Gilbert 2016). Stafford et al. (2013) found that incorporated businesses had better long-term recovery. Others have associated sole proprietorships with a lack of disaster planning and preexisting financial conditions that may inhibit disaster recovery (Tierney & Nigg 1995, Webb & Gilbert 2016).

Choosing an operating location and whether to own or rent is an important predisaster strategy that may have postdisaster consequences (Basker & Miranda 2018; Marshall et al. 2015;

Marshall & Schrank 2020; Webb et al. 2000, 2002). Once a disaster occurs, businesses may be able to relocate, yet a relatively small percentage of small business owners choose to relocate due to either contractual obligations, unaffordable leases, or sense of responsibility toward the community (Alesch et al. 2001). That may be for the best, as business relocation was found to be negatively associated with business survival (Marshall & Schrank 2020). There is relatively little research that addresses postdisaster management strategies. It is important to understand how business owners react to natural disasters because these events may require shifts in management strategies across all functional areas of the business.

5.3. Business Owner Characteristics

Business owner demographics such as gender, age, and education and their association with small business recovery have been the most well-documented. However, other business owner characteristics such as industry experience, experience with disasters, social capital, and community embeddedness have had little attention. There is also little to no literature on owner risk tolerance and charity hazard in regard to small business disaster recovery.

Businesses owned by women, minoritized individuals, and veterans were more likely to close after Hurricane Katrina (Danes et al. 2009a, Haynes et al. 2019, Katare et al. 2021, Marshall et al. 2015). Although education has not been found to play a significant role in small business recovery, owners with more industry experience were more likely to recover (Marshall et al. 2015). Most disaster researchers have employed owner age and education as control variables, but few have used the owner's industry experience.

An owner's past experience with disasters was expected to affect small business disaster recovery (Eiser et al. 2012, Shtob 2019, Webb et al. 2002). Indeed, experience with disasters from earthquakes to flooding to hurricanes was positively associated with business recovery (Dahlhamer & D'Souza 1997, Marshall et al. 2015). One would expect that disaster experience would prompt the business owner to increase preparedness (Flynn 2007, Han & Nigg 2011, Josephson et al. 2017). Moreover, owners with disaster experience would have increased knowledge of successful management strategies and available disaster resources. Shtob (2019) proposes that past experience with disasters may lead individuals to downplay past trauma caused by the events, which may cause business owners to deemphasize future risks. However, there is insufficient research on this topic. A key takeaway is that past disaster experiences influence business owners' risk interpretations and guide their subsequent decision-making.

5.4. Financial Factors

Preexisting business conditions such as cash flow problems and financial intermingling between the business and the family have been shown to impact small business disaster recovery, but the impact is not always negative. A study of the Loma Prieta earthquake and Hurricane Andrew found that businesses with better predisaster financial conditions were surprisingly less likely to recover long-term (Webb et al. 2002). However, Sydnor et al. (2017) found that older businesses with higher pre-Katrina revenue were more likely to be operating eight years after the disaster. Businesses with cash flow problems pre-Katrina were also less likely to close, suggesting that prior adversity may aid in disaster recovery (Marshall et al. 2015). Wiatt et al. (2021) found that predisaster cash flow problems and financial intermingling were not statistically significant for business survival but did have an impact on business recovery and resilience. They define recovery as a business with the same success pre- and postdisaster and resilient as a business with more success postdisaster.

Even under the best of circumstances, financial intermingling puts both the household and the business at financial and legal risk. Yet, financial intermingling is common among small

businesses, particularly sole proprietorships. Financial intermingling is defined as the use of household assets (credit cards, household savings) to support the business or the use of business assets (cars, equipment) for support of the household (Yilmazer & Schrank 2006). Yilmazer & Schrank (2006) suggested that the most common form of intermingling was from household to business. Small business owners were found to not only use household assets as collateral but also to withhold the owner's salary as a form of financial bootstrapping (Haynes et al. 1999, Winborg & Landstrom 2001). Collier et al. (2025) found that 50% of small businesses used loans from family and friends to fund their recovery process after Hurricane Harvey in 2017 (Texas and Louisiana). After a natural disaster, financial intermingling was negatively associated with business resilience (Marshall & Schrank 2020, Wiatt et al. 2021). Wiatt et al. (2021) proposed that using the financial resources of the family to fund the business postdisaster may have helped the business in the short-term (immediately after the disaster) but disadvantaged the business in the long-term.

Brown et al. (2021) argued that small businesses with access to lines of credit used them effectively to manage cash flow volatility after a severe weather shock. They explicitly state that these results may not hold if the cash flow volatility were due to a natural disaster that would affect business fundamentals. However, federal disaster loans provided after natural disasters have been shown to provide greater access to private credit thereby increasing business recovery (Collier et al. 2024). More research on the use and access of available credit after a natural disaster is needed with added emphasis on how the banker-owner relationship can mediate that access (Bednarik & Marshall 2023).

Little is known about how the business owning household and the business adjust during times of crisis. There is scant research regarding how and if the exchange of resources between the business owning household and the business affect disaster recovery. Yet, a natural disaster is a "perfect" natural experiment to study the interdependence of these two systems. Family business researchers have long studied the interdependence of the family and business systems in regard to family business sustainability (Danes et al. 2009b, Stafford et al. 1999). Miller et al. (1999) developed a scale of adjustment strategies during increased business and family demands, and they have been shown to be associated with family business survival (Niehm et al. 2009, Pushkarskaya & Marshall 2010). However, natural disasters were not the focus of these studies. The few researchers that have studied the impact of these adjustment strategies on small business disaster recovery have found them to be positively associated with recovery (Haynes et al. 2019, Marshall & Schrank 2020, Stafford et al. 2013).

5.5. Social Capital and Community Factors

Small business owners play an important role in community recovery. Small business owners were motivated by place attachment to return to their communities and made use of social capital to navigate uncertainty (Grube & Storr 2018, Storr et al. 2015). Businesses often made recovery decisions based on social ties and community attachment, not just profit motives (Grube & Storr 2018, Xiao et al. 2022). Community support and partnerships were crucial for short-term recovery (Ha et al. 2022) and business return (Lam et al. 2009, 2012; LeSage et al. 2011; Tyler & Sadiq 2019). Additionally, if business owners perceived the overall business climate to be positive, they were more likely to recover (Webb et al. 2002). Community economic recovery was also vital for small business recovery (Sun et al. 2022, Xiao & Drucker 2013). Watson et al. (2020) found that customer loss and labor disruptions due to transportation issues and childcare decreased the likelihood of business recovery. There was significant spatial interdependence between household and business returns to a neighborhood (Xiao & Van Zandt 2012). Household dynamics play a pivotal role in determining how businesses bounce back.

The study by Xiao et al. (2022) highlights the importance of treating businesses as both economic and social units in disaster recovery. Researchers have sought to understand how social capital affects disaster recovery (Aldrich 2012). Social capital comprises a small business owner's formal and informal network. According to Aldrich (2012), social capital included bonding, bridging, and linking. Bonding social capital was the support received from family and friends (the business owner's closest network). Bridging social capital was the support from community organizations, and linking social capital was the support received from institutions. It is intuitive that social capital would play some role in small business disaster recovery. Small businesses are interconnected with their communities, and their owners are embedded within the community. Small business owners rely on each other, their neighbors, and customers for business recovery. Indeed, Danes et al. (2009b) and Grube & Storr (2018) found that social capital positively impacted small business resilience. Torres et al. (2019) dove deeper into the types of social capital that supported small business resilience and discovered that bridging and linking social capital enhanced business resilience. Thus, help from community organizations (e.g., religious organizations) and institutions such as the state and federal government increased small business resilience.

5.6. Government Assistance and Small Business Recovery

The two primary US agencies that provide federal disaster assistance are the Federal Emergency Management Agency (FEMA) and the SBA. FEMA aids individuals and families and can (in some instances) provide assistance for uninsured or underinsured home-based business owners. SBA provides disaster loans to individuals and businesses that can be used for losses not covered by insurance, funding not covered by FEMA, and operating expenses (SBA 2024). The SBA provides loans to cover physical damage, mitigation assistance, and economic injury.

The effectiveness of government disaster assistance to small businesses is mixed. Disaster assistance that provided direct cash aid to victims and helped to quickly repair infrastructure was found to lead to not only less out-migration from affected areas but also increased demand for local goods and business survival (Gallagher et al. 2023, Goulbourne et al. 2024). Federal loan assistance programs were often seen as impediments to recovery due to bureaucratic processes and delays (Runyan 2006). On the one hand, small business owners may need a cash flow infusion to survive. On the other hand, disaster loans may increase the debt of small businesses, putting them in a precarious position if demand for their products does not recover. Moreover, for many small business owners, the SBA disaster loan process itself may be a barrier, as it may be the first loan they seek. SBA loans are based on the owner's ability to find credit elsewhere, so if an owner can find loans from another bank, then it is possible that they may not be approved for a loan from the SBA (Josephson & Marshall 2016).

Collier et al. (2025) found that, after Hurricane Harvey, only a quarter of affected businesses applied for a loan. Of those that applied for a private loan, half were denied, and of those that applied for an SBA loan, two-thirds were denied. They found that 50% used informal financing such as friends and family. Their results concur with the study by Josephson & Marshall (2016), where only 42% of those that applied for an SBA loan were approved and businesses with higher income and with insurance were less likely to apply. Those with paid insurance claims were more likely to be approved and received lower amounts, but those with cash flow problems were not approved. Both studies highlight the importance of revenue, credit, and insurance to the SBA loan process.

Several studies have shown no significant impact of federal assistance programs (Webb et al. 2002) or a negative impact (Webb et al. 2000). Danes et al. (2009a) had mixed results based on gender, with federal assistance decreasing resilience for male-owned businesses and increasing resilience for female-owned businesses. Haynes et al. (2011) found that federal assistance did not

impact business survival but did increase business revenue in the long run. Federal assistance at the county level increased business survival (Stafford et al. 2013). More recent research has shown a positive association between receiving SBA disaster loans and business recovery (Davlasheridze & Geylani 2017, Hiramatsu & Marshall 2018, Stafford et al. 2013, Watson et al. 2020, Xiao 2011). There is a clear need for further discussion about the role of government in helping small business adaptation (Ferreira 2024). These studies emphasize the need for panel data to understand the impact of government assistance at various times during the recovery process. They also highlight the need to evaluate the effectiveness of government intervention.

The literature reviewed here highlights the need for more causal studies. Although several studies use empirical identification (Collier et al. 2024, 2025; Xiao 2011; Xiao & Peacock 2014), many are cross-sectional studies that do not control for selection or endogeneity. However, the lack of causal studies may be due to the inherent difficulty of conducting experimental research in a disaster context. The literature also reveals that small businesses face unique challenges during the recovery process. It highlights the complex nature of business recovery after natural disasters and that small businesses are both economic and social units. It also underscores the interplay between business and owner characteristics, community factors, economic conditions, and policy interventions in shaping recovery outcomes.

6. FUTURE RESEARCH

The impacts of climate change, extreme weather events, and other potential natural disasters make the continued study of small business disaster recovery important. Small businesses are run by people embedded in local contexts that may envision future disasters and their associated risks through different lenses (Shtob 2019). I present five key themes for future research.

The first theme is the need for longitudinal recovery processes and metrics. Examination of recovered businesses at a single point in time is insufficient to capture the recovery process or to examine the full nature of the decisions made by business owners. Disaster studies have not been large in scale, comprehensive in scope, longitudinal, or guided by consistent models of recovery. Additionally, there is a need to develop standardized definitions and measurements for small business survival, recovery, and resilience. The decision between predisaster and counterfactual baselines will largely be determined by accessibility to post- and predisaster data.

The second theme is focused on business–household dynamics in disaster recovery. Researchers should investigate the interdependence between household finances, credit, and business recovery. There is limited research examining how home-based and family-owned businesses navigate the recovery process. The resource allocation between household and business during and after recovery should be of particular interest to applied economists.

Social capital, community factors, and spatial relationships constitute the third theme. There is a continued need to explore the role of social networks, the private sector, and community support in recovery. This could include the study of how individual business recovery affects community economic resilience. There is evidence of spatial interdependencies between household and business recovery, but further investigation, particularly with different types of natural disaster, would be useful.

The fourth theme emphasizes a more robust discussion of postdisaster management strategies and adaptive capacity. Primary data collection would allow the examination of specific management decisions and operational changes postdisaster. Not all operational changes in investments may be economically feasible or lead to recovery. Questions that could be considered are (*a*) how small businesses develop adaptive capacity for future disasters and (*b*) what factors contribute to long-term business resilience. From a policy perspective, it is necessary to evaluate the impact of

government assistance programs on small business recovery and to investigate barriers to accessing support along with ways to improve program effectiveness.

The fifth and final theme for continued research focuses on business owner behavior, especially risk perception and preparedness. Current research is limited on the impact of past disaster experiences on risk perceptions and preparedness behaviors. Business owner characteristics have been associated with levels of business preparedness and mitigation; however, more can be done to investigate preparedness disparities and barriers among different business types.

7. CONCLUSION

This literature review provides a comprehensive analysis of small business disaster recovery, drawing insights from various disciplines such as economics, management, and disaster studies. It highlights the multifaceted nature of small business recovery, emphasizing the interplay between business characteristics, owner attributes, community factors, and policy interventions. The literature reveals that small businesses face unique challenges in disaster situations, often exacerbated by their limited resources and vulnerability to external shocks. Key findings underscore the importance of disaster preparedness, the role of financial and social capital, and the potential impact of government assistance programs. However, the review also exposes significant gaps in the literature, particularly regarding long-term recovery processes, standardized measurement metrics, and the complicated dynamics between business and household recovery.

As the frequency and severity of natural disasters increase, it is important to have robust, evidence-based strategies to support small business recovery. Future research should prioritize longitudinal studies, develop standardized frameworks for measuring recovery, and continue to explore the complex interrelationships between businesses, households, and communities in the recovery process. By addressing the proposed research themes, researchers can contribute to more effective policies, ultimately enhancing the resilience of small businesses and the communities they serve. Increasing our understanding of the small business disaster recovery process will enhance our ability to prepare for, mitigate, and endure the impacts of future disasters, ensuring the long-term sustainability of small businesses.

FUTURE ISSUES

1. Examination of recovered businesses at a single point in time is insufficient to capture the recovery process or to examine the full nature of the decisions made by business owners.
2. There is a need to develop standardized definitions and measurements for small business survival, recovery, and resilience.
3. The resource allocation between household and business during and post recovery is a fertile area for future research by applied economists.
4. There is a continued need to explore the role of social networks, the private sector, and community support in small business recovery.
5. From a policy perspective, research evaluating access to government assistance programs and their impact on small business recovery should be a high priority.
6. A better understanding of the impact of past disaster experiences on risk perceptions and preparedness behaviors should also be a priority.

DISCLOSURE STATEMENT

The author is not aware of any affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review.

ACKNOWLEDGMENTS

I gratefully acknowledge Dr. Holly Schrank for her valuable contributions to the Hurricane Katrina Small Business Disaster Recovery Project. I would also like to acknowledge Renee Wiatt for her valuable insights and constructive feedback. This work was supported by the Agriculture and Food Research Initiative-Foundational and Applied Science Program, project award number 2019-67023-29871, from the US Department of Agriculture's National Institute of Food and Agriculture.

LITERATURE CITED

Aldrich DP. 2012. *Building Resilience: Social Capital in Post-Disaster Recovery*. Univ. Chicago Press

Alesch DJ, Holly JN, Mittler E, Nagy R. 2001. Organizations at risk: what happens when small businesses and not-for-profits encounter natural disasters. Public Entity Risk Inst. **http://www.chamberofecocommerce.com/images/Organizations_at_Risk.pdf**

Basker E, Miranda J. 2018. Taken by storm: business financing and survival in the aftermath of Hurricane Katrina. *J. Econ. Geogr.* 18(6):1285–313

Bednarik Z, Marshall MI. 2023. Rural small business loan access and their adaptive capacity in times of crisis. Paper presented at the Agricultural & Applied Economics Association Annual Meeting, July 23–25

Blanco H, Alberti M, Olshansky R, Chang S, Wheeler SM, et al. 2009. Shaken, shrinking, hot, impoverished and informal: emerging research agendas in planning. *Prog. Plan.* 72(4):195–250

Brown D, Saito K, Spence R, Chenvidyakarn T, Adams B, et al. 2008. Indicators for measuring, monitoring and evaluating post-disaster recovery. Presented at the Sixth International Workshop on Remote Sensing for Disaster Applications, University of Pavia, It.

Brown JR, Gustafson MT, Ivanov IT. 2021. Weathering cash flow shocks. *J. Finance* 76(4):1731–72

Brown NA, Orchiston C, Rovins JE, Feldmann-Jensen S, Johnston D. 2018. An integrative framework for investigating disaster resilience within the hotel sector. *J. Hosp. Tour. Manag.* 36:67–75

Bruneau M, Chang SE, Eguchi RT, Lee GC, O'Rourke TD, et al. 2003. A framework to quantitatively assess and enhance the seismic resilience of communities. *Earthq. Spectra* 19(4):733–52

Burton CG. 2015. A validation of metrics for community resilience to natural hazards and disasters using the recovery from Hurricane Katrina as a case study. *Ann. Assoc. Am. Geogr.* 105(1):67–86

Chang SE. 2010. Urban disaster recovery: a measurement framework and its application to the 1995 Kobe earthquake. *Disasters* 34(2):303–27

Collier BL, Haughwout AF, Kunreuther HC, Michel-Kerjan EO. 2020. Firms' management of infrequent shocks. *J. Money Credit Bank.* 52(6):1329–59

Collier BL, Howell ST, Rendell L. 2024. After the storm: how emergency liquidity helps small businesses following natural disasters. NBER Work. Pap. 32326

Collier BL, Powell LS, Ragin MA, You X. 2025. Financing negative shocks: evidence from Hurricane Harvey. *J. Financ. Quant. Anal.* 60(3):1342–72

Corey CM, Deitch EA. 2011. Factors affecting business recovery immediately after Hurricane Katrina. *J. Conting. Crisis Manag.* 19(3):169–81

Cutter SL, Barnes L, Berry M, Burton C, Evans E, et al. 2008. A place-based model for understanding community resilience to natural disasters. *Glob. Environ. Change* 18(4):598–606

Dahlhamer JM, D'Souza MJ. 1995. Determinants of business disaster preparedness in two U.S. metropolitan areas. Prelim. Pap. 224, Univ. Del. Disaster Res. Cent. **https://udspace.udel.edu/items/152ecff3-eeac-4db3-abe5-739a5312704f**

Dahlhamer JM, D'Souza MJ. 1997. Determinants of business-disaster preparedness in two U.S. metropolitan areas. *Int. J. Mass Emerg. Disasters* 15(2):265–81

Dahlhamer JM, Tierney KJ. 1996. Winners and losers: predicting business disaster recovery outcomes following the Northridge earthquake. Prelim. Pap. 243, Univ. Del. Disaster Res. Cent. **http://udspace.udel.edu/handle/19716/651**

Dahlhamer JM, Tierney KJ. 1998. Rebounding from disruptive events: business recovery following the Northridge earthquake. *Sociol. Spectrum* 18(2):121–41

Danes SM, Lee J, Amarapurkar S, Stafford K, Haynes G, Brewton KE. 2009a. Determinants of family business resilience after a natural disaster by gender of business owner. *J. Dev. Entrep.* 14(04):333–54

Danes SM, Stafford K, Haynes G, Amarapurkar SS. 2009b. Family capital of family firms: bridging human, social, and financial capital. *Family Bus. Rev.* 22(3):199–215

Davlasheridze M, Geylani PC. 2017. Small business vulnerability to floods and the effects of disaster loans. *Small Bus. Econ.* 49(4):865–88

Dietch EA, Corey CM. 2011. Predicting long-term business recovery four years after Hurricane Katrina. *Manag. Res. Rev.* 34(3):311–24

Dormady NC, Rose A, Roa-Henriquez A, Morin CB. 2022. The cost-effectiveness of economic resilience. *Int. J. Prod. Econ.* 244:108371

Edobor EW, Marshall MI, Katare B, Valdivia C. 2025. Insuring for cyclone events: What matters to small business owners? *J. Agric. Appl. Econ. Assoc.* 4(1):17–37

Egbelakin T, Rabel P, Wilkinson S, Ingham J, Eziaku R. 2016. How prepared are small businesses for another earthquake disaster in New Zealand? In *Proceedings of the CIB World Building Congress*, pp. 702–14. **https://hdl.handle.net/10179/8430**

Eiser RJ, Bostrom A, Burton I, Johnston DM, McClure J, et al. 2012. Risk interpretation and action: a conceptual framework for responses to natural hazards. *Int. J. Disaster Risk Reduct.* 1:5–16

Ferreira S. 2024. Extreme weather events and climate change: economic impacts and adaptation policies. *Annu. Rev. Resour. Econ.* 16:207–31

Flynn DT. 2007. The impact of disasters on small business disaster planning: a case study. *Disasters* 31(4):508–15

Gallagher J, Hartley D, Rohlin S. 2023. Weathering an unexpected financial shock: the role of federal disaster assistance on household finance and business survival. *J. Assoc. Environ. Resour. Econ.* 10(2):525–67

Goulbourne R, Ferreira Neto AB, Ross A. 2024. Do businesses "vote with their feet" too? Examining firm mobility in response to hurricane risk. *Ann. Reg. Sci.* 73(3):945–78

Grube LE, Storr VH. 2018. Embedded entrepreneurs and post-disaster community recovery. *Entrep. Reg. Dev.* 30(7–8):800–21

Ha S, Childs M, Kim YK, Fairhurst A. 2022. After the fire: an assessment of small business preparedness and recovery in Gatlinburg, Tennessee. *Int. J. Hosp. Tourism Adm.* 23(2):216–41

Han Z, Nigg J. 2011. The influences of business and decision makers' characteristics on disaster preparedness—a study on the 1989 Loma Prieta earthquake. *Int. J. Disaster Risk Sci.* 2(4):22–31

Harries T. 2021. Understanding small business adaptation to natural hazards: a critical review. *Int. J. Disaster Risk Reduct.* 63:102403

Haynes GW, Danes SM, Schrank HL, Lee Y. 2019. Survival and success of family-owned small businesses after hurricane Katrina: impact of disaster assistance and adaptive capacity. *J. Conting. Crisis Manag.* 27(2):130–44

Haynes GW, Danes SM, Stafford K. 2011. Influence of federal disaster assistance on family business survival and success. *J. Conting. Crisis Manag.* 19(2):86–98

Haynes GW, Walker R, Rowe BR, Hong G-S. 1999. The intermingling of business and family finances in family-owned businesses. *Family Bus. Rev.* 12(3):225–39

Henderson F, Steiner A, Farmer J, Whittam G. 2020. Challenges of community engagement in a rural area: the impact of flood protection and policy. *J. Rural Stud.* 73:225–33

Hiramatsu T, Marshall M. 2018. The long-term impact of disaster loans: the case of small businesses after Hurricane Katrina. *Sustainability* 10(7):2364

Holling CS. 1973. Resilience and stability of ecological systems. *Annu. Rev. Ecol. Evol. Syst.* 4:1–23

Jordan E, Javernick-Will A. 2013. Indicators of community recovery: content analysis and Delphi approach. *Nat. Hazards Rev.* 14(1):21–28

Josephson A, Marshall MI. 2016. The demand for post-Katrina disaster aid: SBA disaster loans and small businesses in Mississippi. *J. Conting. Crisis Manag.* 24(4):264–74

Josephson A, Schrank H, Marshall M. 2017. Assessing preparedness of small businesses for hurricane disasters: analysis of pre-disaster owner, business and location characteristics. *Int. J. Disaster Risk Reduct.* 23:25–35

Kachali H, Whitman ZR, Stevenson JR, Vargo J, Seville E, Wilson T. 2015. Industry sector recovery following the Canterbury earthquakes. *Int. J. Disaster Risk Reduct.* 12:42–52

Katare B, Marshall MI, Valdivia CB. 2021. Bend or break? Small business survival and strategies during the COVID-19 shock. *Int. J. Disaster Risk Reduct.* 61:102332

Khan MAU, Sayem MA. 2013. Understanding recovery of small enterprises from natural disaster. *Environ. Hazards* 12(3–4):218–39

Kilkenny M, Nalbarte L, Besser T. 1999. Reciprocated community support and small town—small business success. *Entrep. Reg. Dev.* 11(3):231–46

Klein RJT, Nicholls RJ, Thomalla F. 2003. Resilience to natural hazards: How useful is this concept? *Glob. Environ. Change B Environ. Hazards* 5(1):35–45

Kobe K, Schwinn R. 2018. *Small business GDP, 1998–2014*. Res. Summ. 444, Dec., Off. Advocacy, US Small Bus. Admin. **https://advocacy.sba.gov/wp-content/uploads/2018/12/rs444-Small-Business-GDP-1998-20141.pdf**

Lam NSN, Arenas H, Pace K, LeSage J, Campanella R. 2012. Predictors of business return in New Orleans after Hurricane Katrina. *PLOS ONE* 7(10):e47935

Lam NSN, Pace K, Campanella R, LeSage J, Arenas H. 2009. Business return in New Orleans: decision making amid post-Katrina uncertainty. *PLOS ONE* 4(8):e6765

LeSage JP, Kelley Pace R, Lam N, Campanella R, Liu X. 2011. New Orleans business recovery in the aftermath of Hurricane Katrina. *J. R. Stat. Soc. Ser. A Stat. Soc.* 174(4):1007–27

Marshall MI, Niehm LS, Sydnor SB, Schrank HL. 2015. Predicting small business demise after a natural disaster: an analysis of pre-existing conditions. *Nat. Hazards* 79(1):331–54

Marshall MI, Schrank HL. 2014. Small business disaster recovery: a research framework. *Nat. Hazards* 72(2):597–616

Marshall MI, Schrank HL. 2020. Sink or swim? Impacts of management strategies on small business survival and recovery. *Sustainability* 12(15):6229

McClure J, Spittal MJ, Fischer R, Charleson A. 2015. Why do people take fewer damage mitigation actions than survival actions? Other factors outweigh cost. *Nat. Hazards Rev.* 16(2):04014018

Michel-Kerjan E, Taglioni G. 2017. Insuring hurricanes: Perspectives, gaps, and opportunities after 2017. *McKinsey & Company*, Dec. 20. **https://www.mckinsey.com/industries/financial-services/our-insights/insuring-hurricanes-perspectives-gaps-and-opportunities-after-2017**

Miklian J, Hoelscher K. 2022. SMEs and exogenous shocks: a conceptual literature review and forward research agenda. *Int. Small Bus. J. Res. Entrep.* 40(2):178–204

Miles SB, Chang SE. 2006. Modeling community recovery from earthquakes. *Earthq. Spectra* 22(2):439–58

Miles SB, Chang SE. 2011. ResilUS: a community based disaster resilience model. *Cartogr. Geogr. Inform. Sci.* 38(1):36–51

Miller NJ, Fitzgerald MA, Winter M, Paul J. 1999. Exploring the overlap of family and business demands: household and family business managers' adjustment strategies. *Family Bus. Rev.* 12(3):253–68

Nationwide. 2017. Nationwide warns of widening gap between disaster risks and business preparedness. *Nationwide*, Feb. 28. **https://news.nationwide.com/nationwide-warns-of-widening-gap-between-disaster-risks-and-business-preparedness/**

Niehm LS, Miller NJ, Shelley MC, Fitzgerald MA. 2009. Small family business survival: Strategies for coping with overlapping family and business demands. *J. Dev. Entrep.* 14(3):209–32

Off. Advocacy. 2024. *Frequently asked questions about small business, 2024*. July 23, Off. Advocacy, US Small Bus. Admin.

Pushkarskaya H, Marshall MI. 2010. Family structure, policy shocks, and family business adjustment choices. *J. Family Econ. Issues* 31:414–26

Raschky P, Weck-Hannemann H. 2007. Charity hazard—a real hazard to natural disaster insurance? *Environ. Hazards* 7(4):321–29

Rose A, Krausmann E. 2013. An economic framework for the development of a resilience index for business recovery. *Int. J. Disaster Risk Reduct.* 5:73–83
Rose A, Liao S-Y. 2005. Modeling regional economic resilience to disasters: a computable general equilibrium analysis of water service disruptions. *J. Reg. Sci.* 45(1):75–112
Rouhanizadeh B, Kermanshachi S, Nipa TJ. 2020. Exploratory analysis of barriers to effective post-disaster recovery. *Int. J. Disaster Risk Reduct.* 50:101735
Runyan RC. 2006. Small business in the face of crisis: identifying barriers to recovery from a natural disaster. *J. Conting. Crisis Manag.* 14(1):12–26
Sadeghi N. 2022. Continuity of small businesses when facing increased flood risk due to global climate change impacts: a systematic literature review. *Int. J. Disaster Risk Reduct.* 82:103316
SBA (US Small Bus. Admin.). 2024. *Disaster assistance*. US Small Bus. Admin. **https://www.sba.gov/funding-programs/disaster-assistance**
Scarinci C. 2016. A post-superstorm Sandy study of small business disaster preparedness and perspectives on planning for future incidents. *J. Int. Interdiscip. Bus. Res.* 3:7
Schrank HL, Marshall MI, Hall-Phillips A, Wiatt RF, Jones NE. 2013. Small-business demise and recovery after Katrina: rate of survival and demise. *Nat. Hazards* 65(3):2353–74
Shtob DA. 2019. Remembering the future: natural disaster, place, and symbolic survival. *Rural Sociol.* 84(1):123–47
Smith C. 2016. Environmental jolts: understanding how family firms respond and why. *Family Bus. Rev.* 29(4):401–23
Spillan J, Hough M. 2003. Crisis planning in small businesses: importance, impetus and indifference. *Eur. Manag. J.* 21(3):398–407
Stafford K, Danes SM, Haynes GW. 2013. Long-term family firm survival and growth considering owning family adaptive capacity and federal disaster assistance receipt. *J. Family Bus. Strategy* 4(3):188–200
Stafford K, Duncan KA, Dane S, Winter M. 1999. A research model of sustainable family businesses. *Family Bus. Rev.* 12(3):197–208
Stevenson JR, Brown C, Seville E, Vargo J. 2018. Business recovery: an assessment framework. *Disasters* 42(3):519–40
Storr VH, Haeffele-Balch S, Grube LE. 2015. *Community Revival in the Wake of Disaster: Lessons in Local Entrepreneurship*. Palgrave Macmillan US
Sullivan M. 2003. Integrated recovery management: a new way of looking at a delicate process. *Aust. J. Emerg. Manag.* 18(2):4–27
Sun Q, Mann J, Skidmore M. 2022. The impacts of flooding and business activity and employment: a spatial perspective on small business. *Water Econ. Policy* 8(3):2140003-25
Swanson DA, McKibben J, Wombold L, Forgette RG, Van Boening MV. 2009. The socio-demographic and environmental effects of Katrina: an impact analysis perspective. *Open Demogr. J.* 2:36–46
Sydnor S, Niehm L, Lee Y, Marshall M, Schrank H. 2017. Analysis of post-disaster damage and disruptive impacts on the operating status of small businesses after Hurricane Katrina. *Nat. Hazards* 85(3):1637–63
Tierney K, Bruneau M. 2007. Conceptualizing and measuring resilience. *TR News* 250:14–17
Tierney KJ. 1997. Business impacts of the Northridge earthquake. *J. Conting. Crisis Manag.* 5(2):87–97
Tierney KJ, Nigg JM. 1995. Business vulnerability to disaster related lifeline disruption. Prelim. Pap. 223, Univ. Del. Disaster Res. Cent.
Timmerman P. 1981. *Vulnerability, Resilience and the Collapse of Society*. Inst. Environ. Stud.
Torres AP, Marshall MI, Sydnor S. 2019. Does social capital pay off? The case of small business resilience after Hurricane Katrina. *J. Conting. Crisis Manag.* 27(2):168–81
Tyler J, Sadiq A-A. 2019. Business continuity and disaster recovery in the aftermath of Hurricane Irma: exploring whether community-level mitigation activities make a difference. *Nat. Hazards Rev.* 20(1):04018026
Velandia M, Rejesus RM, Knight TO, Sherrick BJ. 2009. Factors affecting farmers' utilization of agricultural risk management tools: the case of crop insurance, forward contracting, and spreading sales. *J. Agric. Appl. Econ.* 41(1):107–23
Watson M, Brown C, Handmer J, Kroll C, Wein A, et al. 2023. Methods and lessons for business resilience and recovery surveys. *Int. J. Disaster Risk Reduct.* 93:103743

Watson M, Xiao Y, Helgeson J, Dillard M. 2020. Importance of households in business disaster recovery. *Nat. Hazards Rev.* 21(4):05020008

Webb D, Gilbert S. 2016. A literature review of disaster-induced business interruption and an exploratory analysis of the effects of the 2004 Atlantic hurricane season on Florida establishments at the zip code level. NIST Tech. Note 1932, Natl. Inst. Stand. Technol., US Dep. Commer. **https://doi.org/10.6028/NIST.TN.1932**

Webb GR, Tierney KJ, Dahlhamer JM. 2000. Businesses and disasters: empirical patterns and unanswered questions. *Nat. Hazards Rev.* 1(2):83–90

Webb GR, Tierney KJ, Dahlhamer JM. 2002. Predicting long-term business recovery from disaster: a comparison of the Loma Prieta earthquake and Hurricane Andrew. *Glob. Environ. Change B Environ. Hazards* 4(2):45–58

Wiatt RD, Lee YG, Marshall MI, Zuiker VS. 2021. The effect of cash flow problems and resource intermingling on small business recovery and resilience after a natural disaster. *J. Family Econ. Issues* 42(1):203–14

Wilmoth D. 2023. *Small business facts—small businesses in rural areas, August 2023*. Rep., Off. Advocacy, US Small Bus. Admin.

Winborg J, Landstrom H. 2001. Financial bootstrapping in small businesses: examining small business managers' resource acquisition behaviors. *J. Bus. Venturing* 16(3):235–54

Xiao Y. 2011. Local economic impacts of natural disasters. *J. Reg. Sci.* 51(4):804–20

Xiao Y, Drucker J. 2013. Does economic diversity enhance regional disaster resilience? *J. Am. Plan. Assoc.* 79(2):148–60

Xiao Y, Peacock WG. 2014. Do hazard mitigation and preparedness reduce physical damage to businesses in disasters? Critical role of business disaster planning. *Nat. Hazards Rev.* 15(3):04014007

Xiao Y, Van Zandt S. 2012. Building community resiliency: spatial links between household and business post-disaster return. *Urban Stud.* 49(11):2523–42

Xiao Y, Wu K, Finn D, Chandrasekhar D. 2022. Community businesses as social units in post-disaster recovery. *J. Plan. Educ. Res.* 42(1):76–89

Yilmazer T, Schrank H. 2006. Financial intermingling in small family businesses. *J. Bus. Venturing* 21(5):726–51

Zhang Y, Lindell MK, Prater CS. 2009. Vulnerability of community businesses to environmental disasters. *Disasters* 33(1):38–57