

WHITE PAPER

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Abstract

The previous major pandemic affecting the world's economy occurred just over a century ago. Advanced economies at the time were structured very differently (agro-industrial versus today's service economies) and technology for tracking, testing, and treating was less advanced. Consequently, there is little value from lessons learned during that time period. The authors of this paper argue that more recent natural and man-made disasters may hold valuable insights relevant to the COVID-19 pandemic in terms of economic impacts on individuals, communities, and affected regions. In addition, years of data on the relative efficacy of various relief and recovery programs should also guide decisionmakers who now wrestle with developing and implementing pro-active policies to mitigate against anticipated economic harms and to help speed economic and social recovery efforts. **Section 1** frames the current context, discussing key similarities and differences between recent natural and manmade disasters in the US and the COVID-19 pandemic. Context is critical for determining which lessons learned from past events may be useful for addressing the current pandemic. **Section 2** presents findings from five years of field research in the US Gulf Coast region during the immediate aftermath of the 2005 hurricanes (Katrina, Rita, and Wilma), with a focus on impacts on small businesses, communities, and individuals. **Section 3** examines the use of data to track and monitor the social and economic impacts of natural and man-made disasters, yielding insights into how different approaches may result in dramatically different outcomes, which in turn could greatly impact decisions about subsequent relief and recovery policies. **Section 4** applies key findings from PERC's previous research on the economic and financial impacts from natural and man-made disasters to the current COVID-19 pandemic, offering policy prescriptions based upon evidence from recent exogenous shocks affecting supply and demand.

Introduction

PERC has conducted years of research on disaster recovery (following major hurricanes, such as Katrina, Rita, and Wilma in 2005), credit access for lower income Americans, and credit reporting in general. Some of the findings produced over the past nearly two decades of PERC's existence may be useful in the economic recovery phase of the COVID-19 crisis.

Funders for the disaster recovery research included Foundation for the Mid South, Ewing Marion Kauffman Foundation, The Brookings Institution Metropolitan Policy Program, the Bill & Melinda Gates Foundation, Louisiana Disaster Recovery Foundation (LDRF), and The World Bank.

The first section of this report discusses comparisons between COVID-19 and Hurricane Katrina, as well as the 2008 Financial Crisis and other events. The most pertinent key findings from PERC's disaster recovery research follow in the second and third sections, with links to the underlying reports so the reader may access the reports' much fuller findings. The fourth and final section contains some context on how these key findings may relate and act as lessons for the economic aspects of the COVID-19 crisis.



1. COVID-19 Economic Crisis

While the COVID-19 pandemic is first and foremost a health crisis, the necessary responses needed to halt the explosive growth in the rate of infections is producing an economic crisis that will need to be addressed. As is typical of major crises, the particulars of the COVID-19 crisis are unique. The Spanish flu pandemic of 1918-1920 has been estimated to have resulted in declines of GDP of between 6% and 8%, controlling for the impacts of WWI.1 However, this pandemic occurred when economies were structured very differently, with a far greater share of workers employed in industrial, mining, construction, manufacturing, and farming, compared to the present, in which the service sector, including restaurants, leisure and hospitality, education and medical services, dominate.

Some very early educated guesses suggest that the economic impact of COVID-19 could be much larger than the Spanish flu experience. Federal Reserve Bank of St. Louis President James Bullard predicted an increase in the unemployment rate of up to 30% in the second quarter due to coronavirus shutdown measures, as well as a 50% reduction in GDP, which would be unprecedented. A Morgan Stanley economist expects a 30% decline in GDP in the second quarter of 2020.3 Secretary Mnuchin warned the crisis could result in a 20% unemployment rate without government aid.4

This would be a much larger crisis than the 2008 Financial Crisis, where unemployment topped out at 10% in the US, more on the scale of the Great Depression, where unemployment reached 25%. However, the Financial Crisis and the Great Depression were economic and financial crises, and the 2008-10 Great Recession was much milder in large part owing to lessons learned from the Great Depression.5 In both cases, panic and economic imbalances were the cause, rather than means of production, supply, and workers. Automatic stabilizers (unemployment insurance, food stamps, and the like) combined with a massive government rescue and deficit spending following the 2008 Financial Crisis helped prop up aggregate demand until the economy was able to stabilize.6

- 1 Robert Barro, Jose Ursua, & Joanna Weng, "Coronavirus Meets the Great Influenza Pandemic." *Vox EU.* 20 March 2020. Accessed at: https://voxeu.org/article/coronavirus-meets-great-influenza-pandemic 2 Simon Kennedy, "30% GDP Drop: Morgan Stanley Joins Goldman Sachs in Upping Estimates of Coronavirus
- Economic Pain." Fortune. 23 March 2020. Accessed at: https://fortune.com/2020/03/23/morgan-stanley-goldman-sachs-estimate-coronavirus-economic-pain/
- ³ Ibid; see also Reade Pickert, "Economists See US Facing Worst-Ever Quarterly Contraction." *Bloomberg.* 23 March 2020. Accessed at: https://www.bloomberg.com/news/articles/2020-03-23/economists-see-u-s-facing-worst-ever-quarterly-contraction
- 4 "Mnuchin Warns Senators of 20% US Unemployment Without Coronavirus Rescue, Source Says." *CNBC.* 18 March 2020. Accessed at: https://www.cnbc.com/2020/03/18/mnuchin-warns-senators-of-20percent-us-unemployment-without-coronavirus-rescue-source-says.html
- ⁵ Then Chairman of the Federal Reserve Ben Bernanke was an expert on the Great Depression and wrote his doctoral thesis on the economics of the Great Depression while at Princeton University. He has subsequently written extensively on the same topic. See https://www.bis.org/review/r040305e.pdf
- ⁶ Some have argued that the size of the government rescue was too small to make up for the actual gap in GDP, and that a more aggressive rescue could have resulted in a milder Financial Crisis/Great Recession. See Paul Krugman, "How Did We Know the Stimulus was Too Small?" *The New York Times.* 28 July 2010. Accessed at: https://krugman.blogs.nytimes.com/2010/07/28/how-did-we-know-the-stimulus-was-too-small/



These basic tools and monetary policy (both conventional and unconventional) are being deployed again (or are being proposed) in hopes of preventing the COVID-19 health crisis from becoming a COVID-19 Economic Crisis that rivals the Great Depression.

These general responses are being deployed and proposed in *relatively* large amounts, with bipartisan support due to general policymaker consensus that the economic impact of COVID-19 will be massive and requires a pro-active government response. Initial economic data from the week of March 15th suggests that a large and sudden negative economic impact had already begun to unfold. The size and suddenness of the economic shock is unprecedented in the data. This is unlike past financial and economic crises, which may seem very sudden or are related to key short-term events like the late October 1929 stock market crash or the September 15th, 2008 Lehman Brothers collapse, but typically unfold over many months or years. In those crises, although financial contagion can be rapid, the employment destroying downward vicious cycles (such as the debt-deflation cycle) took time to unfold. In other words, there was a measurable lag in employment affects after the initial financial shock (e.g. stock market crash, insolvency among investment banks).

The size and suddenness of the shock (an activity slowdown/shutdown that is a necessary response to the health crisis) in some ways most resembles a large-scale natural disaster such as Hurricane Katrina, which also morphed into an economic disaster by destroying both supply and demand. A key difference, of course, is that Hurricane Katrina physically destroyed homes, businesses and infrastructure. Initially, COVID-19 is destroying supply with businesses closings (workers needing to isolate themselves and prevent customer exposure) and supply chain disruptions (e.g. cargo containers from China with goods for US manufacturers and retailers). At the same time it is destroying demand with consumers isolating themselves and not flying, using hotels, etc. Over a short period of time, without government support, this will feed on itself. A downward spiral means that demand will rapidly decline from the resulting *economic* impact, not just the initial isolation needed for the health crisis. Stating the obvious, in order to prevent a massive downward economic spiral, government intervention is needed.

What follows are key findings from PERC's past work exploring small business, individual, and community recovery efforts following major hurricanes, as well as other credit research that we think may be useful to policymakers addressing the COVID-19 economic fallout. It is our sincere hope that policymakers on all levels of government who are seeking proactively for solutions may find value in this report.

⁷ See Matthew Yglesias, "The Upcoming Employment Catastrophe, in One Chart." *Vox.* 23 March 2020. Accessed at: https://www.vox.com/2020/3/21/21188529/initial-unemployment-claims-goldman-sachs; M. Corey Goldman, "Jobless Claims Seen Soaring as Trump Asks States to Hold Back Numbers." *TheStreet.* 20 March 2020. Accessed at: https://www.thestreet.com/markets/jobless-claims-to-soar-trump-asks-states-to-hold-back-numbers; Myles Udland, "We Just Got Our First Look at How Much Coronavirus Will Damage the US Economy." *Yahoo! Finance.* 16 March 2020. Accessed at: https://finance.yahoo.com/news/ny-fed-empire-manufacturing-dismal-coronavirus-damage-to-us-economy-130606782.html



2. Small Business Recovery after Hurricanes Katrina, Rita, & Wilma

2.1 Two Years after Disaster

In 2007, following the 2005 hurricanes of Katrina, Rita, and Wilma, PERC surveyed 1,032 small business owners and operators in Gulf Coast FEMA-declared disaster areas. Key findings included:

Small Business Administration: High Loan Approval Rates but Low Approval Rating

Small businesses in the regions we surveyed had a higher Small Business Administration loan approval rate than the general pool of applicants for disaster loans in the wake of Hurricanes Katrina and Rita: 56.7% vs. 28%.

Applicants nonetheless had a largely negative opinion of the SBA, with 46.6% holding some unfavorable opinion of the agency vs. 30% holding a favorable opinion.

Access to Credit a Challenge as Small Business Owners Turn to Private Credit:

Overall, access to credit remains a significant problem for many small businesses. Access to affordable credit was seen as a major challenge by more than 1 in 4 (27%) respondents.

Most respondents (66%) used business credit cards for business credit, but nearly half (48%) used personal credit cards for business reasons. Nearly 1 in 4 had become more reliant on the personal credit cards to cover business expenses. 27% of respondents had business loans, though a smaller share of minority respondents had business loans.

Opinion of Public Institutions Less Positive than of Private Charities:

In general, government institutions received little confidence in a positive impact. This outlook covered not only the SBA, but also the military, and state and local agencies. Charities, especially local charities and faith groups, by contrast, did elicit a substantially more favorable opinion.

[Recovery] is not Being Enjoyed Equally by All Groups:

Black-owned businesses recovered by far the worst in terms of sales, with 78% reporting lower revenue than before the hurricane. By contrast, just 60% of Caucasian-owned small businesses reported lower revenues today than pre-Katrina.

African Americans also reported a much harder time getting affordable credit than Caucasians or Hispanics, with 40% reporting they had trouble, compared to 28% for Hispanics and 25% for Caucasians.

Recovery, Renewal, and Resiliency: Gulf Coast Small Businesses Two Years Later (August 2007)



2.2 Three Years after Disaster

In 2008, PERC surveyed 1,170 small business owners and operators in a follow-up of the 2007 survey. The 1,170 small business owners and operators included 299 who completed the 2007 survey. Key findings included:

The perceived magnitude of some challenges associated with small business recovery has declined significantly.

Satisfaction with the Small Business Administration has increased since 2007. On every point of comparison, the overall satisfaction with SBA loans increased or stayed the same. Ratings of "favorable" increased, while ratings of "unfavorable" decreased.

Nonprofits and charities continue to be viewed as the organizations that have had the most positive impact in recovery.

When asked to identify an agency or institution that had a positive impact on respondents' businesses, the majority of small business owners answered "none." 13% said that a non-profit or charity had a positive impact. 8% identified FEMA, and fewer identified other government entities.

Disparities in business recovery by the race/ethnicity of owner or operator remain.

In access to affordable credit, Black business owners reported more challenges. On a scale of 1 to 10, Black business owners ranked access to affordable credit as a 5.0, Hispanic business owners gave it a rank of 4.4, and Caucasian business owners ranked it a 3.9. There is a large disparity between the ease of obtaining affordable credit for Caucasian business owners and the ease of affordable credit for Black business owners. Additionally, 39% of Black business owners said that affordable credit was a challenge to their business, as compared to 29% of Asian business owners, 25% of Caucasian business owners and 24% of Hispanic business owners.

Black business closure appears to have been higher overall. Black business owners and operators had the highest rate of disconnection (a phone number that is disconnected or no longer associated with the business) among the ethnicities surveyed. The rates of disconnection since 2005 are virtually equal in 2007 and 2008, with nearly 1 in 4 Black-owned businesses having disconnected phone numbers. This is 30% higher than the disconnection rate for Hispanic-owned businesses, 35% higher than Asian-owned businesses, and 52% higher than the disconnection rate for Caucasian-owned businesses.

Recovering But Not Recovered: Gulf Coast Businesses Three Years Later (August 2008)



2.3 Five Years after Disaster

In 2009 and 2010 PERC examined the continuing impact of Hurricane Katrina and other disasters on small businesses and the self-employed in Louisiana. The main research looked at the impacts of aid received from the Community Development Organizations (CDOs) and was funded in part by the Louisiana Disaster Recovery Foundation (LDRF), as well as aid received from other sources. PERC conducted five case study interviews of small business operators and the self-employed who received aid from LDRF-funded CDOs, surveyed over 1,600 small business operators, and analyzed tens of thousands of Experian small business credit files. Key findings included:

Minority-owned and -operated Businesses More Severely and Persistently Impacted. Minority-owned and -operated businesses were more likely to have been negatively and very negatively impacted by the 2005 hurricanes.

Access to Credit Still Major Hurdle for Many. Over a third (38%) of small business owners/operators believed accessing loans at competitive and fair interest rates is a major challenge. Black business owners/operators were more likely than average to consider access to credit as a major challenge, with 50% indicating their credit had been reduced since the beginning of the credit crisis in 2008.

LDRF-funded Aid Distributed Over Two Months Faster Compared to Other Aid. LDRF-funded organizations disbursed aid months faster than other organizations such as the SBA.

Aid was Critical and It Works. The vast majority of recipients saw aid distributed by the LDRF-funded organizations as "very useful" or "critical." Specifically, 91% of financial aid (loans or grants) and 78% of technical assistance was considered very useful or critical. Of the businesses that applied for but did not receive aid, 52% indicated that if they had received aid their business would have been much better off or would have survived. Those that received aid from the LDRF-funded CDOs (1) showed a much higher degree of sales recovery, (2) had a much more optimistic assessment of near- and long-term business prospects, and (3) more frequently expected to hire over the next year than did those very negatively impacted business that did not receive LDRF-funded assistance.

Benefits from Modest Grants and Assistance in Sourcing Funds. Small grants and initial seed funding by the aid organizations had big impacts for some businesses. Modest grants may enable the entrepreneur to invest in ways that make a big difference (have a high return on investment). Aid organizations acting as a central resource for loans, grants, insurance claims information, and assistance with applications reduces confusion and allows the small business owner to make better decisions. The small business owners that were interviewed tended to dislike using debt for financing business needs. Relatively small grants aimed at repairing and purchasing essentials for reestablishing businesses appeared to be well-targeted and effective.

Community-based Aid is Key. Loans and aid from an aid organization that maintains close contact with the borrower, understands the borrower's situation, and where the funds and resources will be used may have a greater likelihood of being used wisely. Non-profit non-governmental aid organizations may be able to lend and aid more quickly and tide a business over (bridge financing) until other assistance is received or revenue is restored.



Importantly, non-profit non-governmental aid organizations can often act more quickly than large government bureaucracies can in distributing aid. As such, the grants from these organizations may be timelier and may enable a business to survive or rebuild while waiting for other aid or insurance claims.

Every Dollar of Aid Distributed Likely Produces Over a Dollar of New Wages from New Jobs. It is estimated that for every \$100 worth of aid distributed, \$103 a year of wages from net new jobs would be produced. Much of these new wages, in turn, are spent locally, creating additional employment and wages. Using a reasonable economic multiplier of 1.5, \$100 worth of aid distributed might produce \$155 a year in new wages. In addition to increased net hiring, aid increases the survivability of the assisted small businesses, with all the associated tangible and intangible benefits.

Community Rebuilding Efforts. Small business success in some measure (and depending of the type of business) is a function of the success of the surrounding community. Small business aid organizations advocating for a community of small businesses can help focus efforts and enable coordination in ways individual businesses cannot.

Long-term Interaction. Since recovery for many businesses is gradual and their needs constantly vary, longer-term interaction results in a better understanding of capabilities and recovery strategies. Aid directed by a steady source can lend stability to the turbulence of an inevitably difficult recovery. Relationships built between caseworkers and business owners were clearly important to the individuals interviewed and cannot be underestimated in the development of aid approaches.

Focus of Aid Should Also be on Young Businesses and Entrepreneurs. In addition to aid needed for those businesses directly impacted by the 2005 hurricanes, the renewal and recovery of New Orleans and other hard-hit areas of Louisiana requires vibrant young businesses and a hospitable environment for entrepreneurs to start new businesses. Aid should also be directed to these areas. Of the small businesses surveyed, owners of newer or younger businesses were twice as likely (32%) to report extreme difficulty in accessing credit than were more established businesses (16%).

Assistance in applying for loans, grants, and insurance claims. In the case studies, assistance in applying for loans, grants and insurance claims was cited as a valuable resource, but small business owners may not be fully aware of aid availability, terms, and necessary qualifications. This is particularly the case following a disaster when a number of newly developed aid opportunities are opening up. The aid organization acting as a central resource for this information reduces confusion and allows the small business owner to make better decisions. Once aid is pursued, additional assistance may be needed due to language barriers or difficulty completing the necessary paperwork.

- Louisiana Small Businesses Five Years Post-Katrina: Assessing LDRF Program Impacts and Measuring Existing Needs (March 2011)
- Assessment of Small Business Aid and Needs in Louisiana Five Years After Hurricane Katrina: Overview of Case Studies (March 2011)



3. Using Data to Monitor Disaster Impacts & Recovery

In 2008 PERC published a report examining what could be gleaned from using business and consumer credit files data to assess disaster impacts and recovery. These results use credit file data from Gulf Coast FEMA-declared disaster areas. Key findings included:

3.1 Findings on Small Businesses

Business financial stress, measured by the average amount of reported business collections, rose significantly two years after [Hurricane] Katrina.

Average credit collections for the New Orleans MSA increased by nearly 500% between August 2005 and July 2007, while those for Orleans Parish increased by nearly 900% during the same period.

Average credit collections for the Biloxi-Gulfport MSA increased by nearly 400% between August 2005 and July 2007, with Jackson experiencing a dramatic increase of nearly 1,300% during the two years after Katrina.

Data found in private data sets, such as consumer and business credit files, have the potential to quickly inform policymakers and stakeholders (both following disasters and in general) of the underlying financial conditions of populations, communities, and small businesses.

Information, such as credit scores, should be monitored by those interested in economic development and recovery, since these real outcome measures are used by the private sector to guide and price flows of capital to consumers and, increasingly to small businesses.

Data found in credit files may be useful in creating leading indicators of recovery and economic development, as such data are routinely used for similar purposes in the private sector, like estimating the likelihood of future default for consumers and small businesses.

Appending credit file data with other private and public data can enable segmentation analysis and monitoring of recovery and development program efficacy.



3.2 Findings on Communities & Individuals

Changes in indebtedness and credit performance vary dramatically across groups of individuals following the disaster.

Lower income groups experienced the greatest increase in the average level of indebtedness.

African Americans showed the highest increase in level of indebtedness, while Caucasians showed the lowest. On the other hand, African Americans achieved the highest improvement in credit performance while Hispanics showed no improvement at all.

Young adults (under 25 year of age) showed the highest increase in the average level of indebtedness. Indebtedness levels actually increased the least for the oldest age groups, with the very elderly (over 86 years) experiencing no increase at all.

While those in the middle age groups enjoyed improvement in average credit performance, there has been only a slight improvement for younger adults and even some decline for the oldest age groups.

Homeowners and married couples experienced a relatively smaller increase in average level of indebtedness and showed better improvement in credit performance compared to other groups.

Differences in the levels of credit performance and indebtedness across groups appear much larger than differences within groups in those measures from pre- to post-disaster. These cross-group differences underscore the importance of accounting for changing population composition when comparing average community-wide financial indicators pre-to post-disaster.

Different geographic areas showed very different impact and recovery rates (using credit file data).

Credit and Financial Impacts of Disaster: What Can We Learn from Credit File Data (August 2008)



4 Key Potential Lessons for COVID-19 Economic Recovery Efforts

The following potential lessons for the current COVID-19 crisis are drawn from PERC's disaster recovery research in the Gulf Coast and nearly two decades of research in credit reporting and credit access.

Speed matters. When trying to keep a small business afloat, including maintaining payrolls, speed matters in receiving aid if it is needed to make up for lost revenue. Given the suddenness and scale of the COVID-19 economic shock, this is likely to be especially true. To the extent businesses fail and time passes, the recovery may be long lasting, requiring a more organic business recovery. Both initial federal and state stop-gap small business aid and longer-term, more sustainable aid is reasonable.

CDOs, Nonprofits, Local Governments Can Aid State and Federal Efforts. Nonprofits, Community Development Organizations (CDOs), Community Development Financial Institutions (CDFIs), and local governments and organizations are closer to small businesses and may be able to act more quickly than large centralized governments when it comes to disbursing aid. In fact, CDFIs are already receiving funds from larger financial intuitions for COVID-19 programs. In the Gulf Coast, crucially, these smaller institutions often provided faster 'bridge' aid to small businesses until larger federal and state aid was accessed. Also, the SBA could be overwhelmed, but luckily the US has an army of nonprofits across the country that can help.

Second, these smaller institutions provide counseling to small business owners on what federal and state aid is available to particular small businesses, how to apply for it, and assistance with the application process. This is crucial as small business owners may be experts in their own industry but are typically not in navigating government aid programs. This 'last mile' of aid should not be overlooked. While federal and state aid should be made as simple as possible, there are limits to this, and so federal and state governments should partner with smaller, on-the-ground institutions.

Grants are Preferable to Loans. While credit access is important to small business owners, if the aid is not meant for productive investment but to fill a large sales disruption, debt may act to harm the longer-term viability of the small business. Loans that can be forgiven, however, can be, essentially, viewed as grants.

Long-Term Efforts May be Needed. The recovery from Hurricanes Katrina, Rita and Wilma took several years. Our report five years after the fact showed recovery was still occurring, which was then 'interrupted' by other major events such as the BP oil spill and the Financial Crisis. While we can hope the recovery from the current crisis will be swift (and unlike the natural disaster of Hurricane Katrina, physical infrastructure is not being damaged and people are not moving to other areas), the economic recovery from the Financial Crisis or more ordinary recessions takes years. If long-term efforts are needed, then assistance to new businesses, startups, and entrepreneurs may be appropriate.



Pre-existing Economic Health of Small Business Owners Will Matter. Small business owners often tap their own personal assets and credit to survive disruptions. Those with low family wealth, or otherwise reduced access to credit may find it more difficult to survive more than a very short-term business disruption if government aid does not sufficiently fill the gap (which may be difficult in many cases).

Disparate Impacts are Likely. Given that minority business owners tend on average to have lower family wealth and income, they would have on average fewer available assets and less credit access that can be deployed to withstand major business disruptions. Without *perfect* government aid, this should lead to disparate impacts in terms of business closings. However, this will also depend on the distribution of minority businesses in terms of types and locations of businesses, which will be impacted differently by the COVID-19 crisis and economic fallout.

Impacts Will Vary by Geography. While impacts will no doubt vary by type of business, they will also vary by geography. Some locations have been much harder hit by COVID-19 and need a different degree of response. Apart from differences between cities, there may be differences between city centers, urban, suburban, and rural areas in general.

Communities are Ecosystems. If workers are let go (which is already happening), and businesses close, then the task of recovery becomes harder, as in order for small businesses to recover, the community as a whole will need to recover (their customers and suppliers).

Utilize Data and Surveys to Monitor, Provide Feedback of Impacts and Recovery Efforts. The private sector has datasets that can be utilized to monitor sales and economic impacts of COVID-19 in near real-time. Credit bureaus can monitor individual financial well-being. These data should be utilized to monitor both COVID-19 economic impacts and the efficacy of recovery efforts. Government agencies should have ongoing surveys of small business owners to gauge need and identify any deficiencies of government programs and allow them to be continually improved. Real time feedback is important.

Maintaining Integrity of Credit Reporting is Key. While short-term changes to credit reporting might be needed during the COVID-19 crisis, credit reporting is simply information about true financial conditions (which should be addressed by aid efforts and programs). As such it is a very useful source of information. Credit reporting increases access to credit, and if its integrity is diminished, this will begin to harm credit availability. As PERC and other research have shown, lower-income households and those on the credit margins will be harmed disproportionately. This will similarly harm small businesses as they also utilize personal credit (particularly the smallest of businesses). Longer-term disruptions to credit reporting that reduce its integrity will begin to harm recovery efforts.







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