RECOVERY FROM THE 2017 STORMS

Economic Recovery & Resilience Project
January 2019 Update
January 2019

South Texas Economic Development Center
College of Business
Texas A&M University-Corpus Christi
6300 Ocean Drive, Corpus Christi, Texas 78412
Telephone: 361-825-5831

http://stedc.tamucc.edu
For data and other publications, contact Jim Lee at jim.lee@tamucc.edu.
SUMMARY

This report is the third update on the economic aftermath of Hurricane Harvey, along with a new update on Florida after Hurricane Irma. The two storms, which were only two weeks apart in 2017, devastated much of the Gulf Coast region and its infrastructure. More than one year later, the Texas disaster region as a whole appears to have returned to pre-Harvey normalcy. Florida seems to be even more resilient to tropical storms than Texas. Still the area spared by Irma, the Florida Panhandle, was later hit by another more powerful storm, Hurricane Michael, in October 2018. This report also details the impact of federal disaster aid on the recovery progress across the affected communities in Texas and Florida.

This study is part of the Economic Recovery and Resilience project funded by the U.S. Economic Development Administration (EDA). As a complement to our June and September updates, this data-driven report describes the 2017 storms’ economic consequences and how the affected areas navigated in the past year and a half. The objective is to provide public officials, policymakers and constituents with an unparalleled inside look at community recovery from economic shocks inflicted by the historic events.

Read the online version of this report at stedc.atavist.com.

HIGHLIGHTS

- Physical damage patterns and the overall footprint of the affected areas were similar between Hurricanes Harvey and Irma, but the overall size of the economic cost was substantially larger for the earlier storm.

- The big economic pictures suggest that most affected communities are “ahead of the game” in the recovery journey, especially in comparison with the experiences from recent hurricanes.

- Massive federal relief funds have proved to be the key drivers of the aggressive community rebuilding efforts that have spurred local employment and the overall business activity.

- Other than damage to home and commercial properties, shifts in the economic landscape of the local communities in the wake of the storms will generate long-lasting economic consequences.
EDITORIAL TEAM

Jim Lee, Director, South Texas Economic Development Center
Email: jim.lee@tamucc.edu

Back Cover Graphic: Sonny Martinez, Graphic Designer, Coastal Bend Business Innovation Center

ECONOMIC RECOVERY & RESILIENCE PROJECT TEAM

- College of Business
- Coastal Bend Business Innovation Center
- South Texas Economic Development Center

ACKNOWLEDGEMENTS

This project benefits from collaboration with various government agencies and other organizations. For this report, the author is grateful to first-hand data provided by the following organizations and individuals:

- Aransas County Appraisal District: Michael Soto
- FEMA Community Planning and Capacity Building: Rick Martin
- Rockport-Fulton Chamber of Commerce: Diane Probst, Glenn Gomez
- Santos McBain Management & Planning: Maryann Carl, Ray De Los Santos
- Small Business Administration: David Elizondo, Richard Jenkins, Mark Randle
A TALE OF TWO STORMS

The year of 2017 set records for natural disaster damages in the United States. For the first time, the U.S. experienced not one, but three hurricanes in the same year. Two hit the U.S. mainland. Hurricanes Harvey and Irma were only two weeks apart.

Harvey was the first hurricane to hit the Texas coast since Ike in 2008. The Category 4 storm made its first landfall on San Jose Island near Rockport on August 25, 2017, with wind gusts over 130 miles per hour and storm surge as high as 12 feet. Harvey then stalled over the southeastern part of Texas for another week, setting a record for rainfall. Some areas in Houston received record amounts of rainfall over 60 inches.

According to the National Weather Service, Irma was the strongest hurricane ever observed in the Atlantic Ocean with sustained winds of at least 185 miles per hour. The storm passed just north of the U.S. Virgin Island and Puerto Rico with Category 5 strength. On September 10, Irma made landfall on the Florida Keys. Although the storm was downgraded to Category 1 after hitting Naples with over 130 mile-per-hour winds, it headed north along Florida’s west coast with strong winds, storm surge and heavy rains over the entire peninsula. Soon
after Harvey and Irma, another Category 5 tropical storm, Maria, inflicted massive damage to Puerto Rico on September 20.[1]

In response to Harvey, 41 counties in southern and southeastern parts of Texas were designated as a disaster region (DR-4332) for Individual Assistance. The disaster region for Irma (DR-4337) consists of 49 counties of Florida, which encompass nearly the entire state except the Panhandle. Together, these 90 counties in Texas and Florida are the focus of this report.
PROPERTY DAMAGE

According to the National Oceanic and Atmospheric Administration (NOAA), Harvey caused at least $125 billion in economic damage, the second costliest natural disaster in U.S. history, trailing only Hurricane Katrina of 2005. While the economic costs of Katrina came mostly from storm surge in New Orleans, Harvey’s impacts were largely from flooding near the Houston area. Harvey also caused nearly 100 direct and indirect deaths, according to the Centers for Disease Control and Prevention (CDC).
NOAA’s estimate for Irma’s economic toll is $50 billion, but this would have soared to $300 billion if it hit Miami directly the way Harvey hit Houston. The death toll was 129 people, according to the CDC.

According to the Federal Emergency Management Agency (FEMA), Harvey caused $2.4 billion in damage to homes in Texas. The Texas Department of Public Safety estimates that Harvey damaged more than 290,000 homes, with nearly 17,000 destroyed. At least 160,000 structures were flooded in Harris and Galveston counties alone. Flooding also destroyed more than 300,000 vehicles in the Houston area.[2]
While the majority of damaged properties were in neighborhoods around Houston, the “ground-zero” communities near Corpus Christi faced disproportionately more losses, particularly from wind damage. About three-quarters of homes in the counties of Aransas and Refugio were damaged. The extent of property damage was similar in its adjacent cities of Port Aransas and Aransas Pass. Two counties on the eastern end of Texas, Jefferson and Orange, also had over 50% damaged homes. Homes in those areas near Houston sustained primarily flood damage. According to the National Flood Insurance Program, the average flood claim was slightly above $60,000 in those areas, compared to about $15,000 in the Coastal Bend region.

In the case of Irma, half of homes (50%) in Monroe County were damaged, according to FEMA. In the Florida Keys, about one in four homes were totally destroyed. The neighboring Hendry (40%) and Collier (22%) Counties in Irma’s path also had relatively more damaged homes.

Source: FEMA, August 2018.
Irma could have caused damage comparable to Harvey. But Florida learned from Hurricane Andrew in 1992 and later Hurricane Charley in 2004. The state revamped building codes to make houses more resilient to wind damage. Today, 80 percent of the homes in Irma’s path were built to better withstand hurricane-force storms.

The Institute of Business and Home Safety (IBHS) has evaluated each U.S. coastal state’s residential building code programs. Florida has maintained the top ranking, with the most recent score of 95 in 2018. By contrast, Texas has been among the bottom states with a resilient home building code, slightly above such states as Alabama and Mississippi.[3]

Much of the IBHS building code evaluation focuses on resilience to windstorms. But the majority of property damage from Harvey and Irma was due to flooding. According to CoreLogic, Harvey caused at least $25 billion in insured and uninsured flood losses of residential properties in Texas; flooding due to Irma caused at least $29 billion in both residential and commercial property losses in Florida.
MITIGATION

In response to the disaster events in 2017, Congress approved two supplemental funding bills in September and October to appropriate a total of $34.5 billion in disaster relief funds (DRF), along with $16 billion in debt forgiveness for the National Flood Insurance Program (NFIP). In early 2018, Congress passed a two-year budget that included another $90 billion for disaster recovery. The total federal spending in response to the 2017 disasters at over $130 billion is a U.S. record. Despite this record amount of disaster funding within 6 months of the events, it would typically take months or years for the funds to work their way from the federal agencies to the local governments, residents and businesses.

FEMA is the primary federal agency for funding assistance following a disaster. By August 2018—about one year after the hurricanes—the agency had doled out $13.8 billion to Texas and $3.7 billion to Florida. The funds were in the form of Individual Assistance to residents and homeowners, Small Business Administration (SBA) low-interest loans, and NFIP claim payments to flood policyholders. For local governments, FEMA had obligated $1.2 billion to Texas and $365 million to Florida in Public Assistance programs to rebuild infrastructure.

So far, Texans have received over $14.7 billion in Harvey-related federal and state grants. The state has channeled nearly $10 billion from the federal government in the form of the Community Development Block Grant — Disaster Recovery (CBDG-DR) program specifically for housing and infrastructure repairs. The CBDG-DR program is designed to address housing, infrastructure and economic development needs that remain after other disaster relief has been exhausted, including federal assistance and private insurance. This disaster mitigation program has approved $616 million so far to Florida.

According to a CNN survey, the federal government has, on average, contributed funds to cover about 62% of property damage from hurricane events. So far, private philanthropies have raised more than $1 billion in the name of Hurricane Harvey relief.[11] In addition to relief aid, disaster survivors have rebuilt their homes and businesses with insurance claims. In Texas, the Texas Windstorm Insurance Association (TWIA) provides most windstorm insurance policies to the coastal areas. In the wake of Harvey, the Association has received more than 76,000 TWIA claims, the second highest number of claims in its history after its inception in 1971. Since then, TWIA has made $1.6 billion in insurance payouts for Harvey damages, 90% of which were from policyholders in the three counties of the Corpus Christi metro area (Aransas, Nueces, and San Patricio).
The Texas state created TWIA after Hurricane Celia swept across the Coastal Bend region in 1970. Hurricane Ike hit the Galveston area in September 2008, resulting in a record amount of 93,000 TWIA claims and nearly $10 billion in claim payments. It took more than 250 days on average for policyholders to receive claim payments. For Harvey, the average amount of time to close TWIA claims reduced to 40 days.[4]

Because of the massive flooding in the Houston area, the NFIP paid out nearly $9 billion to Texans, more than 10 times the amount to Floridians. On the contrary, proportionally more residents in Florida had private insurance than in Texas, resulting in about twice the total amount of claim payouts from private insurers ($10.9 billion vs. $5.8 billion).

### Disaster Payments as of August 2018

<table>
<thead>
<tr>
<th>Category</th>
<th>Texas</th>
<th>Florida</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Federal Disaster Assistance</td>
<td>$13,838</td>
<td>$3,656</td>
</tr>
<tr>
<td>FEMA Individual &amp; Housing Programs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individuals</td>
<td>373,470</td>
<td>777,218</td>
</tr>
<tr>
<td>Amount ($ millions)</td>
<td>$1,635</td>
<td>$1,021</td>
</tr>
<tr>
<td>SBA Disaster Loans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individuals</td>
<td>42,881</td>
<td>34,800</td>
</tr>
<tr>
<td>Amount ($ millions)</td>
<td>$3,396</td>
<td>$1,700</td>
</tr>
<tr>
<td>National Flood Insurance Program</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individuals</td>
<td>91,353</td>
<td>28,500</td>
</tr>
<tr>
<td>Amount ($ millions)</td>
<td>$8,807</td>
<td>$964</td>
</tr>
<tr>
<td>Private Insurance (incl. TWIA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Claims</td>
<td>392,685</td>
<td>988,232</td>
</tr>
<tr>
<td>Amount ($ millions)</td>
<td>$5,796</td>
<td>$10,951</td>
</tr>
<tr>
<td>Public Assistance (obligated)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Projects</td>
<td>2,125</td>
<td>920</td>
</tr>
<tr>
<td>Amount ($ millions)</td>
<td>$1,226</td>
<td>$365</td>
</tr>
</tbody>
</table>

IMMEDIATE IMPACTS

In addition to property damage, Harvey and Irma wreaked havoc on the local economies of the hard-hit areas in Texas and Florida. Most local businesses were closed for weeks and regional infrastructure, including utilities and ship channels, was shut down for at least one week.

To illustrate the *indirect* economic costs as opposed to direct or property losses, the following scatter plot shows the relationship between the extent of damaged homes in each county (horizontal axis) and the change in the local unemployment rate between July and September of 2017 (vertical axis). The change in unemployment captures the overall economic impact immediately following Harvey’s landfall. Although a positive relationship seems clear, the unemployment rate does not rise much until a county sustained more than 30% of damaged homes. Aransas County led the way in both damaged homes and the impact on its labor market.

*Storm Impact on Texas County Economies*

Similar observations apply to Florida. The following chart plots the corresponding relationship between property damage and changing labor market conditions of 49 counties in Florida. The change in each county’s unemployment rate is the difference between the rates of August and October 2017. Only Monroe County saw an immediate rise in unemployment as about half (50%) of its homes were damaged. Again, unemployment did not rise until the extent of property damage reached 30%.

**Storm Impact on Florida County Economies**

ECONOMIC RECOVERY

Local unemployment patterns reflect the overall economic toll of Harvey and Irma. In Texas, Harvey’s impact is most evident for Aransas County, where Harvey made first landfall. Its unemployment rate more than doubled to 10.8% in the month immediately following Harvey’s landfall. But by the end of 2018, the county’s unemployment had inched down steadily to below the pre-Harvey levels (dotted line).

Another timely economic indicator is the monthly sales tax collection as a key measure of the overall business condition. The following chart shows that businesses in Aransas County generated more, not fewer, sales tax dollars until the end of Harvey’s first year anniversary.

The following charts plot the corresponding patterns of unemployment for other counties in Texas and Florida. In Texas, only Refugio County shows a pattern similar to Aransas County. On the eastern end of the Texas coast, the hard-hit counties of Orange and Jefferson also experienced relatively high unemployment rates through the middle of the year.

In Florida, Monroe County also shows the typical pattern of immediate impact and subsequent recovery from a major disaster. Other than Collier and Monroe Counties—which bore the brunt of Irma’s damage—local labor markets across the rest of the state seem to have performed better, not worse, than their pre-storm conditions (dotted lines). Falling unemployment rates among most disaster counties simply followed the national trend.
Unemployment in Texas Counties (%)

Unemployment in Texas Counties (%), Cont’d.

Unemployment in Texas Counties (%), Cont’d.

Unemployment in Texas Counties (%), Cont’d.

Unemployment in Florida Counties (%)

Unemployment in Florida Counties (%), Cont’d.

Unemployment in Florida Counties (%), Cont’d.

Unemployment in Florida Counties (%), Cont’d.

RECOVERY FROM THE 2017 STORMS

Unemployment in Florida Counties (%), Cont’d.

BUSINESS RECOVERY

Business continuity is a critical step to restore the local workforce and the economy as a whole. During Harvey’s landfall in the Coastal Bend, over 85% of businesses in Rockport and Port Aransas were closed. About half a year later, nearly half of those local businesses had returned. By the end of 2018, the businesses reopening rates in those communities were over 80%.

This fast business recovery pace was phenomenal, especially in comparison with the business reopening rate of 65% in New Orleans two years after Hurricane Katrina of 2005 hit the area. According to a recent study, local chamber members were more likely to survive the storms and to reopen earlier than their non-member counterparts. This finding highlights the role of social networks in business survival as well as recovery for the entire community immediately after a major disaster.

Much as this Coastal Bend area relies on tourism as its main economic driver, Harvey has ravaged a large portion of its hotel and motel establishments. About half of those businesses are still under repair today due to their vulnerability to structural damage.

![Reopened Businesses (% of Total)](chart.png)

Source: South Texas Economic Development Center.
In addition to reopened businesses, sales and thus sales tax revenues convey timely information about how fast the disaster communities have recovered. The following chart plots monthly sales tax revenues collected in the Rockport-Fulton area and Port Aransas relative to the revenues during the same month before Harvey. To compare with the pre-Harvey conditions, the figure for August 2018 is divided by the figure of August 2016 (instead of August 2017), and so on.

Despite being closer to the eye of the storm and relatively more physical damage, Rockport-Fulton’s overall business condition seems to have recovered sooner than Port Aransas. Port Aransas suffered sales tax revenue losses through the end of the first year. For Rockport, the losses occurred only within the first two months. The rapid pace of recovery in Rockport was not typical. To illustrate this, the same chart also delineates the corresponding pattern of sales tax revenue changes for Galveston following Hurricane Ike hit the area in September 2008 (gray line).

**Sales Tax Revenues**

(Y-o-Y % Change by Collection Month)

-35%  -25%  -15%  -5%  5%  15%  25%  35%


**Sources:** Texas Comptroller of Public Accounts and South Texas Economic Development Center.
Like Report-Fulton, Galveston experienced increases in sales tax revenues immediately after Ike. This reflected the impact of additional spending in efforts to restore lifeline services, such as electricity and other utilities, along with spending by federal and state officials who flocked to the disaster areas as an emergence response.

But as the initial response and recovery from the historic catastrophe ended, so was the boom in retail sales and hotel occupancy. The downturn in Galveston’s sales tax collections continued for at least two more years. But for the two Coastal Bend communities, sales tax volumes continued to expand beyond the first year.

The following charts show patterns of sales tax revenues for other disaster counties in Texas and Florida.[7] Again, most counties did not suffer losses in sales tax revenues following the storms. In fact, the majority of them saw steady gains throughout 2018. In Texas, the rare exception is the county of Newton on the eastern end of the disaster region.

In Florida, except Monroe and Polk Counties in the direct path of Irma, most counties have also collected more sales tax revenues since then. Even in Monroe County, the overall business activity seems to have returned to the pre-storm level after the first year.
Sales Tax Revenues in Texas Counties (Y-o-Y % Change)

Source: Texas Comptroller of Public Accounts.
Sales Tax Revenues in Texas Counties (Y-o-Y % Change), Cont’d.

Source: Texas Comptroller of Public Accounts.
RECOVERY FROM THE 2017 STORMS

Sales Tax Revenues in Texas Counties (Y-o-Y % Change), Cont’d.

Source: Texas Comptroller of Public Accounts.
Sales Tax Revenues in Texas Counties (Y-o-Y % Change), Cont’d.

Source: Texas Comptroller of Public Accounts.
Sales Tax Revenues in Florida Counties (Y-o-Y % Change)

Source: Florida Department of Revenue.
Sales Tax Revenues in Florida Counties (Y-o-Y % Change), Cont’d.

Source: Florida Department of Revenue.
Sales Tax Revenues in Florida Counties (Y-o-Y % Change), Cont’d.

Source: Florida Department of Revenue.
Sales Tax Revenues in Florida Counties (Y-o-Y % Change), Cont’d.

Source: Florida Department of Revenue.
RECOVERY FROM THE 2017 STORMS

Sales Tax Revenues in Florida Counties (Y-o-Y % Change), Cont’d.

Source: Florida Department of Revenue.
GREAT ECONOMIC SHIFT

The observed increases in sales tax dollars represent only the big picture of local business conditions. Despite the overall increase in sales tax collections, the number of business establishments in the 41-county Texas disaster region reduced by about 12,000, or 6%, through the first quarter of 2018. The following bar chart shows quarterly changes in the number of sales tax outlets across industries in Aransas County since Harvey. Most industries lost some establishments during the quarter immediately following the storm (2017Q4).

Change in Establishments in Aransas County

Source: Texas Comptroller of Public Accounts.
While some businesses have opened their doors since early 2018, the accommodation, food services, and retail trade industries have been slow to recover. The number of retail outlets has continued to drop perhaps due to a bleak business prospect before the community fully recovers. On the other hand, rebuilding activities have become a boon to construction and real estate businesses.

Prompt responses from the federal government as well as insurance payments from the TWIA and NFIP insurance programs might have contributed to the relatively fast economic recovery from the 2017 storms. To illustrate the impact of federal aid on the local economies, the following is a scatter plot showing the amounts of federal grants allocated to the 41 individual Texas disaster counties through August 2018 (horizontal axis) and the counties’ average monthly employment changes over that period (vertical axis). It is clear that the financial support for rebuilding activities has stimulated the local economies through job creation. A county with more federal funds tended to add more jobs.

**Federal Aid and Employment in Texas**

For the disaster areas in Florida, the corresponding scatter plot shows a less clear picture about the economic impacts of federal funds. The straight line that best fits the data of the Florida counties captures 41% of the variation in data observations, instead of 91% in the above diagram for Texas. Obviously, numerous factors other than government relief programs could have affected the performance of a post-disaster economy and thus obscured the expected relationship as observed for Texas. A better understanding of these factors, or whatever separates the different experiences between the two states, may better prepare us for the next hurricane.

**Federal Aid and Employment in Florida**

CONCLUDING REMARKS

We have tracked the local economies of the Gulf Coast region hit by the 2017 storms. Hard data reveal an overall encouraging picture about how most of the 90 counties in Texas and Florida have succeeded in coping with the aftermath of the storms in 2017.

In a nutshell, the local economies seemed to be thriving within one year of the incidents. This finding aligns with the projections of the Texas Comptroller of Public Account using regional models.[8] The federal government’s aggressive disaster relief efforts in response to the hurricanes appear to the key driver behind this success story.

But aggregate measures of the local economies at best offer an incomplete view of the communities still coping with the destruction wrought by the catastrophic events. Evidence about short-term successes should not distract policymakers’ attention to continue to promote recovery in a sustainable manner.

At worst, our county-level observations may lead to a distorted picture about the well-being of individual survivors. According to a recent survey study by the Kaiser Family Foundation, about 3 in 10 people affected by Harvey indicated their lives were not back to normal by the end of 2018.[9] Also, a study finds that scores of New Orleans businesses that reopened their doors soon after Hurricane Katrina eventually failed years later.[10] From these perspectives, it remains too early to tell how the affected community will bound back, let alone bouncing forward.
ENDNOTES


[7] For counties that do not impose a sales tax, such as Newton, we used the data of its largest city.


[9] Liz Hamel, Bryan Wu, Mollyann Brodie, Shao-Chee Sim, and Elena Marks, One Year After the Storm: Texas Gulf Coast Residents’ Views and Experiences with Hurricane Harvey Recovery, Kaiser Family Foundation/Episcopal Health Foundation Harvey Anniversary Survey, August 2018.


RELATED PUBLICATIONS

For Harvey related data and updates, visit us online at http://stedc.tamuccd.edu/harvey

- *The Economic Aftermath of Harvey*, 2018 Q3 Update.
- *Hurricane Harvey: Facts & Stats*