

The Financial Recovery of Region From Economic Disruptions and Resiliency of Real Estate — Construction Sector: A Case Study of Southeast Texas Economy and Real Property Values

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This study examines the financial recovery of Southeast Texas post-economic disruptions, particularly focusing on the real estate-construction sector's resilience, a key economic driver in the region. It analyzes macroeconomic indicators, emphasizing the sector's role in the region's recovery. The research highlights risk management as crucial for financial resilience in real estate-construction. Three key innovative aspects include: (1) Southeast Texas historically relies on real estate-construction for economic growth, with financial stability linked to major industries. (2) Utilizing the Participatory Analysis of Risk Management (PARM) methodology, focusing on the region's real estate-construction sector. (3) Enhancing PARM results through financial valuation of residential and industrial/commercial properties in Southeast Texas, enabling longitudinal analysis and a deeper understanding of the region's financial stability and resilience. This study underscores the importance of studying the real estate-construction sector for the region's economic well-being post-disruptions.

Keywords: financial recovery, economic disruption, economic growth, resiliency, best practices of risk management, real estate - construction sector, residential and industrial/commercial real estate

INTRODUCTION AND BACKGROUND

Economic Growth and Employment in Real Estate in Southeast Texas

There is a direct connection between economic growth and the real estate - construction sector in Southeast Texas. The growth of the oil and gas industry has led to massive real estate development and expansion projects, resulting in increased employment in construction and real estate. The importance of the construction and real estate sector in Southeast Texas is confirmed by statistics obtained from the Texas

Workforce Commission, where employment in the construction and real estate sector as a percentage of pre-pandemic total employment in Hardin, Jefferson, and Orange counties was 12.46%, 13.91%, and 12.41%, respectively (Texas Labor Market Highlights, 2019).

According to the US Bureau of Economic Analysis, real GDP pre-pandemic growth was 8.6% from 2014 to 2018 in Beaumont-Port Arthur MSA. The same agency data shows a 9.6% increase in per capita personal income in Beaumont-Port Arthur MSA from 2014 to 2018. Population growth in Southeast Texas from 2014 until, the major economic disruption, Hurricane Harvey, was slow but steady. Since the three major economic disruptions, Hurricane Harvey, Tropical Storm Imelda, and the COVID-19 pandemic, there have been small declines in Hardin, Jefferson, and Orange counties. Table one shows the population changes as a result of Hurricane Harvey, Tropical Storm Imelda, and the COVID-19 pandemic in four counties of Southeast Texas and compares it to Harris County and the state of Texas. The table includes the period of the pandemic lockdown.

TABLE 1
POPULATION IN HARDIN, HARRIS, JEFFERSON, AND ORANGE COUNTIES COVERING THE TIME FRAME OF MAJOR ECONOMIC DISRUPTIONS IN SETX REGION

	Hardin	Harris	Jefferson	Orange	Beaumont-Port Arthur MSA	Texas
2020	58,305	4,738,253	250,127	82,878	391,310	29,360,759
2019	57,796	4,709,243	251,315	83,086	392,197	28,986,794
2018	57,207	4,698,619	255,001	83,572	395,780	28,701,845
2017	57,159	4,664,159	256,591	84,936	398,686	28,322,717
2016	56,260	4,629,189	256,311	84,533	397,104	27,937,492
2015	55,761	4,561,939	255,232	83,946	394,939	27,486,814
2014	55,508	4,458,709	252,915	83,249	391,672	26,977,142

Source: US Census Bureau

Economic Disruptions and their Impact on Real Estate in Southeast Texas

Economic disruptions, such as natural disasters and pandemics, directly and negatively impact the construction and real estate sector, therefore, impacting the economic growth of Southeast Texas. First, hurricanes, floods, storms, and other natural disasters cause structural damage to real properties, resulting in decreases in the value of real properties. The decrease in the value of real estate properties depends on the magnitude of the disaster and the volume of damage. Second, economic disruptions such as natural disasters and pandemics affect the supply and demand of rental and for-sale properties disrupting the equilibrium in real estate markets. During the last decade, there was massive expansion and construction in Southeast Texas, which had a significant impact on price equilibrium. In the SETX region demand for industrial/commercial, residential, and other types of properties grew slowly but steadily. Under the conditions of economic disruptions, a decrease in supply and construction in real estate cause causes sharp increases in property sales prices and rents, especially in high-demand locations of Southeast Texas.

To demonstrate the negative impact caused by disruptive forces we provide a snapshot of multiple events that caused distress in the economy of Southeast Texas in general and in the real estate - construction sector. Research shows that “the intensive construction and current infrastructure were not prepared to handle more than 51 inches of rain during Hurricane Harvey. (Ramchand and Krishnamoorti, 2017) These factors resulted in Harvey destroying \$125 billion worth of property and damaging 148,000 single-family homes and 163,000 apartments. Property growth, damage, and insurance data in Southeast Texas demonstrate the magnitude of real estate growth and the impact of Harvey. COVID-19 created another unprecedented distress for the real estate market of Southeast Texas. At the beginning of the pandemic, supply chain issues caused a shortage of construction materials which increased their prices resulting in unprecedented nationwide inflation in real estate. There is no question that the economy of Southeast Texas

is under the influence of regional and national pressures and this study of resiliency and recovery is necessary and timely. Our study discovered that during the above-mentioned disruptions various local governments of the SETX region were concerned by the fact that specific areas of this region are in shortage of residential real properties due to disproportionate growth in the oil and gas industry and real estate-construction sector.

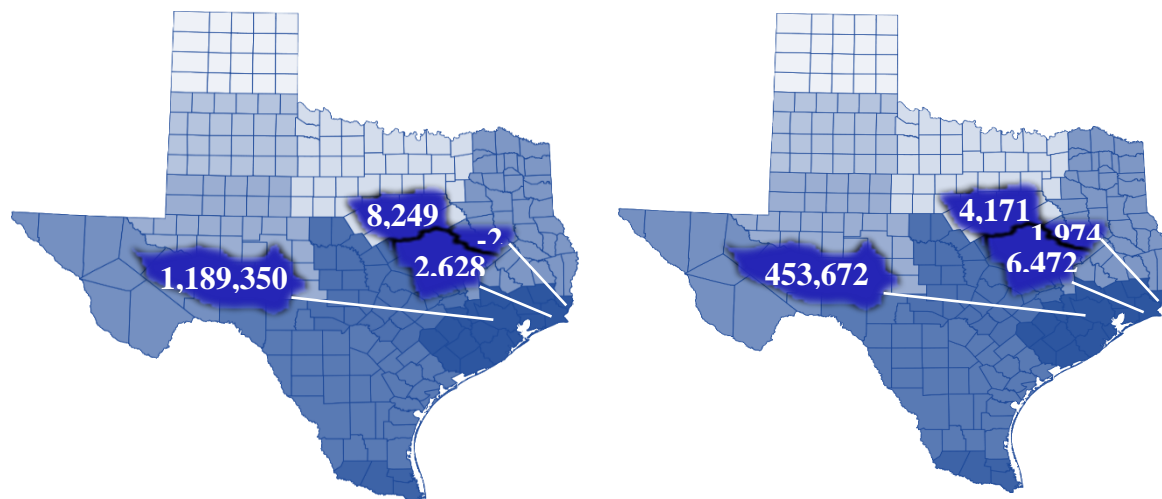
TABLE 2
SNAPSHOT OF PROPERTY GROWTH, DAMAGE, AND INSURANCE IN HARDIN, HARRIS, JEFFERSON, AND ORANGE COUNTIES BEFORE MAJOR ECONOMIC DISRUPTIONS IN THE SETX REGION

	Hardin	Harris	Jefferson	Orange	Southeast Texas region (3 counties)
Population growth, 2000-2016	8,249	1,189,350	2,628	-2	10,875
Housing unit growth, 2000-2016	4,171	453,672	6,472	1,974	12,617
Single-family homes damaged in 2017	2,571	115,286	66,735	5,328	74,634
Multi-family homes damaged in 2017	1	1394	1,461	120	1,582
Mobile homes damaged in 2017	307	269	6,137	28	6,472
National Flood Insurance Program (NFIP) participation	8%	14.0%	18.0%	23.5%	

Sources: US Census Bureau and Aon Benfield

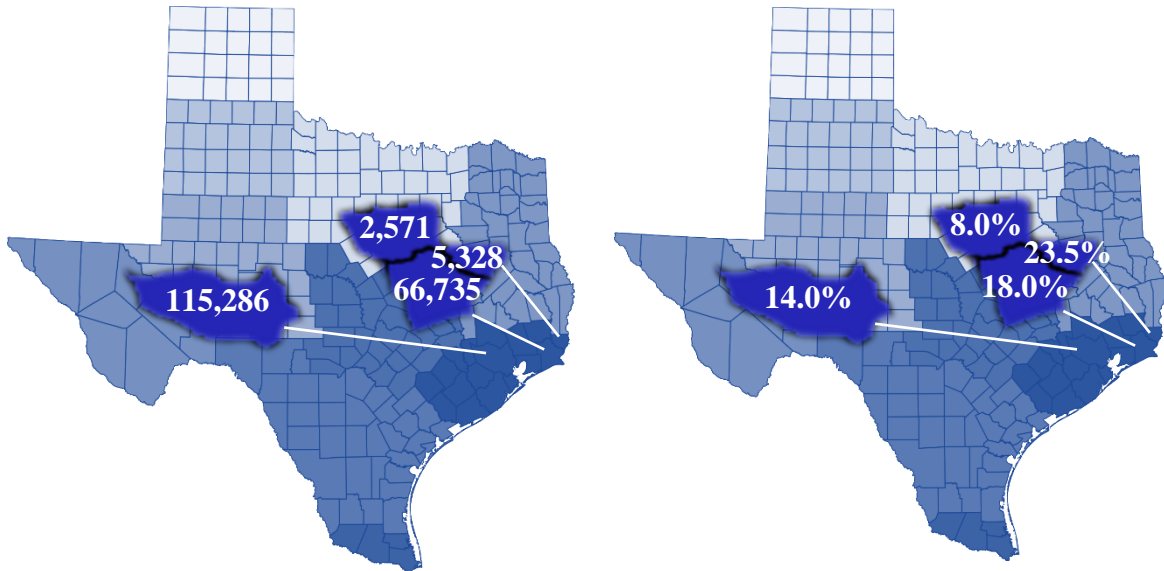
The population and housing units of Southeast Texas have grown significantly since 2000. The following chart highlights the growth in three counties of Southeast Texas compared with Harris County one of the largest metropolitan areas of Texas.

FIGURE 1
POPULATION GROWTH (LEFT FIGURE) AND HOUSING UNIT GROWTH (RIGHT FIGURE) IN HARDIN, HARRIS, JEFFERSON, AND ORANGE COUNTIES BEFORE MAJOR ECONOMIC DISRUPTIONS IN SETX REGION (2000 TO 2016)



It is surprising to observe the low levels of NFIP insurance participation in light of the prevalence of risks in this area.

FIGURE 2
POST HARVEY SINGLE-FAMILY HOMES DAMAGE (LEFT FIGURE) AND NFIP
PARTICIPATION (RIGHT FIGURE) IN HARDIN, HARRIS, JEFFERSON,
AND ORANGE COUNTIES (2017)



This research indicates that Southeast Texas is a resilient region and has recovered from the recent major economic disruptions. However, the speed of recovery varies from community to community. In this study, an analysis of residential property pre- and post-disruption values is conducted for all residential properties in Bevil Oaks, a residential community northwest of Beaumont. Also, researchers analyzed industrial/commercial property pre- and post-disruption values in selected properties in Hardin, Jefferson, and Orange counties. The analysis was undertaken to provide insight into the effect of economic disruption on residential and industrial/commercial property values.

RESEARCH METHODS

Analysis of Macroeconomic Indicators of Southeast Texas Region

The research team obtained macroeconomic data such as GDP by county/metro areas from the US Bureau of Economic Analysis and US Census Bureau County Business Patterns and investigated the correlation of this data to the real estate - construction sector. Researchers also obtained information about per capita personal income and real GDP in chained dollars for Hardin, Harris, Jefferson, and Orange counties. The employment data related to the construction and real estate sector came from the Texas Workforce Commission and Texas Labor Market Review. County population trends and data was obtained from the US Census Bureau. Using this data researchers completed a macroeconomic analysis of Southeast Texas to understand the financial and economic recovery of this region after Hurricane Harvey and Tropical Storm Imelda.

Valuation of Residential and Industrial/Commercial Real Property Samples

Using the methodology designed by Sargsyan et al, (2019) researchers examined representative samples of residential and industrial/commercial properties in Southeast Texas. A regression model was built to study appraised values of residential and industrial/commercial real properties for pre- and post-Harvey also pre- and post-Imelda periods. In this part of the analysis, the objective was to determine the effect of flooding from Hurricane Harvey and Tropical Storm Imelda on residential and industrial/commercial property values in Southeast Texas. The projections about the long-term impact of

the COVID-19 pandemic on the real estate and construction sector are difficult to use when it comes to long-term estimates of the regional trends of SETX under multiple factors including economic disruption, economic growth, and other disruptive forces.

Analysis of residential property values pre- and post-storms is conducted for all flooded homes in Bevil Oaks, a residential community. There was a total of 779 real properties in the Bevil Oaks community. Data obtained for all properties have been divided into three groups: (a) improved properties that flooded and were not demolished (rebuilt), (b) properties that flooded and were demolished, and (c) unimproved properties that only consisted of land. Improved properties that flooded and were not demolished were 176 (22.6% of all properties). Seventeen properties (2.1%) that flooded were demolished. The rest of the unimproved properties consisted of farm/agricultural use land or empty lots. Using the same methodology, the valuation of industrial/commercial properties for pre- and post-storms was conducted in 45 flooded properties in Hardin, Jefferson, and Orange counties.

Participatory Analysis of Risk Management in the Real Estate - Construction Sector of Southeast Texas

To complete a comprehensive risk management analysis of the construction and real estate sector this study used the Participatory Analysis of Risk Management (PARM) methodology designed by Sargsyan et al. (2019). PARM method identified risk management practices of recovery and resiliency from natural disasters in the real estate - construction sector. In addition, this tool was used to identify challenges and experiences that stakeholders of the real estate - construction sector faced during major economic disruptions in this region.

The core elements of the PARM research tool are (a) participation (the involvement of local stakeholders in research), (b) analysis (research of resiliency and recovery efforts), and (c) risk management (identification of best practices of risk management). These three core elements of PARM methodology facilitated a comprehensive analysis of risk management practices and helped to investigate the recovery and resiliency after major economic distress. The PARM methodology workflow has four stages: (1) research team workshop (preparatory phase), (2) focus group workshops and fieldwork, (3) data analysis, and (4) communication with the local constituency. The results generated by the PARM methodology provide valuable information to stakeholders so they can become more resilient and avoid significant losses during future natural disasters. The results will also help businesses in the real estate - construction sector to develop long-term financial plans which ultimately will lead to enhanced financial stability. This study confirmed one more time that the participatory approach can help design realistic strategies for resiliency and recovery. This research also confirmed that the recovery and resiliency of the real estate - construction sector rely on efficient public-private active engagement, so therefore the participatory approach of involving a large range of stakeholders of the real estate – construction sector provides yet another layer of significance for this study.

Specific Applications and Implications of PARM Methodology to the Real Estate - Construction Sector in Southeast Texas

As specified earlier, this study followed the PARM workflow designed by Sargsyan et al. (2019), and the first stage was to establish the research question/goal. The main question/goal of this research was to identify and analyze the risk management practices that the construction and real estate sector businesses implemented during economic disruptions such as natural disasters and the COVID-19 pandemic. Based on the research goal, focus group questions were developed:

Preparation stage:

- What items would you place on a checklist to prepare for upcoming risks of economic disruptions?

During disruption:

- What risks/problems did you experience during economic disruptions?
- What practices did you use to handle situations/manage risks during unforeseen and unpredictable events that cause economic disruption?

- What were the most successful risk management strategies that you/your group used during economic disruptions? Why?
 - Were there risk management strategies that were not as successful that were used during economic disruptions? Why?
- Recovery stage:
- How did you manage the recovery process after economic disruption? What risks or challenges did you encounter during recovery?
 - What helpful hints do you suggest that will allow rapid recovery from upcoming economic disruption?
- Role of technology:
- What role did technology (including communications) play in response to economic disruption? Which were the most critical technologies? Where do you see the role of technology in managing future economic disruptions? What do you see as the role of technology in the future?

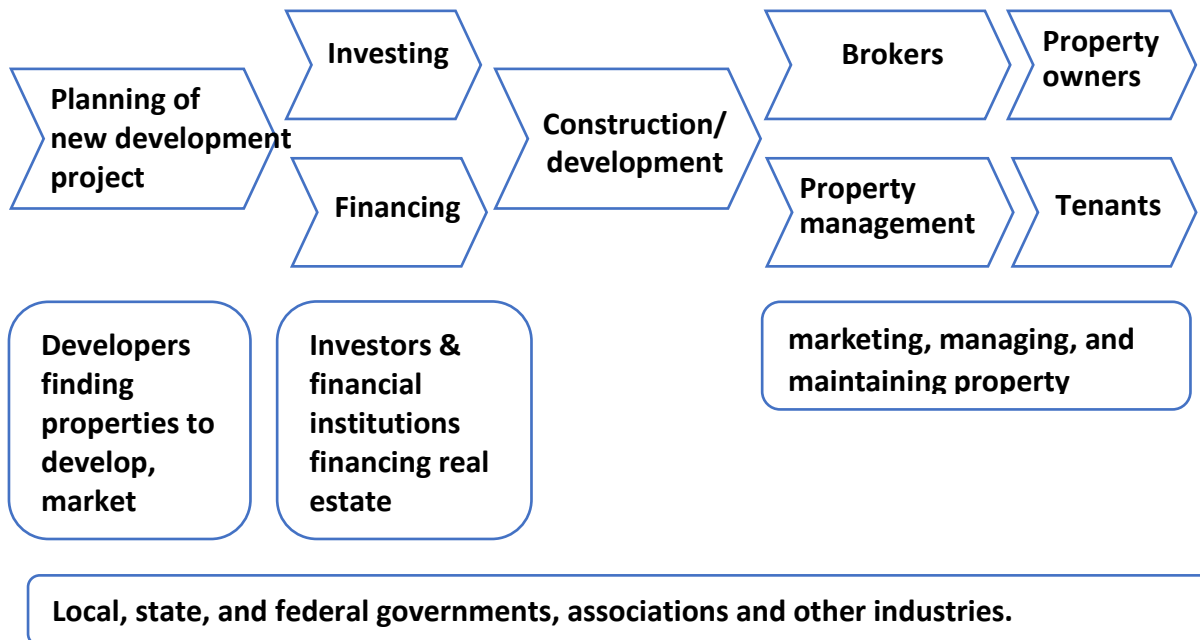
Government action:

- What actions should local, state, and federal governments take to protect your businesses from unforeseen and unpredictable risks such as natural disasters, pandemics, and other events that cause economic disruptions (“your wish list”)?

Figure 3 shows the results of the value chain analysis of Southeast Texas real estate - construction sector. Value chain analysis allowed us to map and identify the major stakeholders of the real estate - construction sector. Among stakeholders are construction firms, residential and industrial/commercial real estate businesses, brokers, financial institutions, local governments, etc. A representative group of the stakeholders of the real estate – construction sector was selected to participate in focus group workshops.

In addition to the main players in this sector, researchers also interviewed significant local stakeholders and broad community organizations, including local government officials, public community organizations, and representatives of the oil and gas industry. The findings shown in this work demonstrate the results of interviews with the real estate - construction sector players. These results are combined with input from the rest of the community organizations that have an indirect influence on the real estate – construction sector.

**FIGURE 3
CONSTRUCTION AND REAL ESTATE SECTOR’S VALUE CHAIN ANALYSIS**



RESULTS OF THE ANALYSIS AND DISCUSSION

The Financial and Economic Recovery of Southeast Texas

As can be observed from table three, there was a constant and significant growth in employment. This can be explained by a sharp increase in the need for employees involved in construction, rebuilding, and recovery efforts, caused by economic disruptions. For informative reasons, employment in 2010 is included in the last row of the table.

TABLE 3
TOTAL EMPLOYMENT IN HARDIN, HARRIS, JEFFERSON, AND ORANGE COUNTIES

	Hardin	Harris	Jefferson	Orange	Beaumont-Port Arthur MSA	Texas
2020	20,531	3,104,522	148,619	30,823	199,973	17,158,640
2019	21,132	3,277,558	159,804	32,624	213,560	17,902,704
2018	21,278	3,218,399	159,694	33,005	168,950	17,598,844
2017	20,644	3,155,419	157,767	32,349	166,873	17,159,034
2016	20,287	3,076,608	157,076	32,354	167,987	16,684,682
2015	20,742	3,104,370	159,048	33,186	169,689	16,413,328
2014	20,587	3,043,600	157,322	32,611	167,677	16,000,512
2010	19,609	2,659,686	152,225	31,396	163,507	14,262,558

Source: US Bureau of Economic Analysis

Despite the negative impact of the economic disruptions on the Southeast Texas region, we can observe in Table four, that since 2016 the Beaumont-Port Arthur MSA saw growth of per capita personal income of 6.88%, compared to 11.81% for Harris County and 10.39% for the state of Texas. Five-year (2014-2018) growth of per capita personal income was 11.58%, 8.65%, and 11.23% in Hardin, Jefferson, and Orange counties, respectively. Personal income growth is an indication of the growth of economic activity and investments in real estate.

TABLE 4
PER CAPITA PERSONAL INCOME IN HARDIN, HARRIS, JEFFERSON, AND ORANGE COUNTIES

	Hardin	Harris	Jefferson	Orange	Beaumont-Port Arthur MSA	Texas
2020	49,159	60,183	46,547	48,173	47,281	55,129
2019	47,363	59,207	44,230	46,227	45,115	53,266
2018	45,982	56,474	44,065	44,938	44,527	50,355
2017	44,273	53,708	42,233	43,217	42,728	47,929
2016	43,228	50,511	41,102	42,304	41,659	45,616
2015	42,854	53,874	41,848	41,777	41,975	46,577
2014	41,209	54,462	40,555	40,402	40,615	46,289

Source: US Bureau of Economic Analysis

The following table highlights the dominance of Jefferson County in the added value of Beaumont-Port Arthur MSA. Therefore, the rapid recovery of Jefferson County is key to overcoming economic hardship and decline after Hurricane Harvey. Although Tropical Storm Imelda was a disaster comparable to Harvey, the Southeast Texas region recovered much more quickly, in part due to what was learned in recovering from Harvey. The COVID-19 pandemic caused fundamentally different economic disruption than natural

disasters due to its rare nature, long distress, and severe economic disruption. Many of the strategies used to deal with economic disruptions during natural disasters added value and have been used during recovery from economic disruption caused by the COVID-19 pandemic.

**TABLE 5
REAL GDP IN CHAINED DOLLARS FOR HARDIN, HARRIS, JEFFERSON, AND ORANGE
COUNTIES**

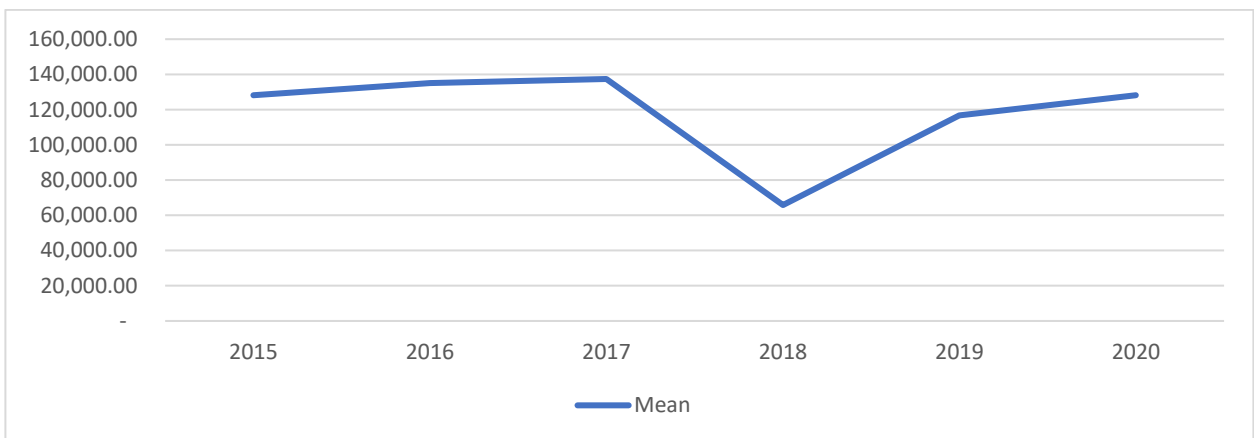
	Hardin	Harris	Jefferson	Orange	Beaumont-Port Arthur MSA
2020	1,265,880,000	359,650,873,000	20,688,536,000	3,207,959,000	25,180,298,000
2019	1,344,905,000	373,087,121,000	22,059,368,000	3,286,754,000	26,691,818,000
2018	1,320,027,000	376,949,835,000	23,729,173,000	3,196,209,000	28,227,410,000
2017	1,258,985,000	367,138,880,000	23,759,625,000	3,072,605,000	28,069,251,000
2016	1,249,286,000	364,787,186,000	23,478,937,000	3,199,109,000	27,917,965,000
2015	1,282,714,000	368,946,321,000	21,956,655,000	3,247,476,000	26,492,325,000
2014	1,347,003,000	349,764,201,000	21,277,402,000	3,355,362,000	25,996,119,000

Source: US Bureau of Economic Analysis

Value Trends of Residential and Industrial/Commercial Real Estate Properties

A regression model for pre- versus post-natural disaster residential real estate properties shows that the value of the properties on average declined after economic disruption as compared to before economic disruption. The losses in value represent a significant decrease in homeowners’ equity. As can be observed from the following figure the decrease of residential real estate properties in comparison to industrial/commercial real estate properties was sharp and rapid. The recovery was not as steep as during the economic disruption and took a long time.

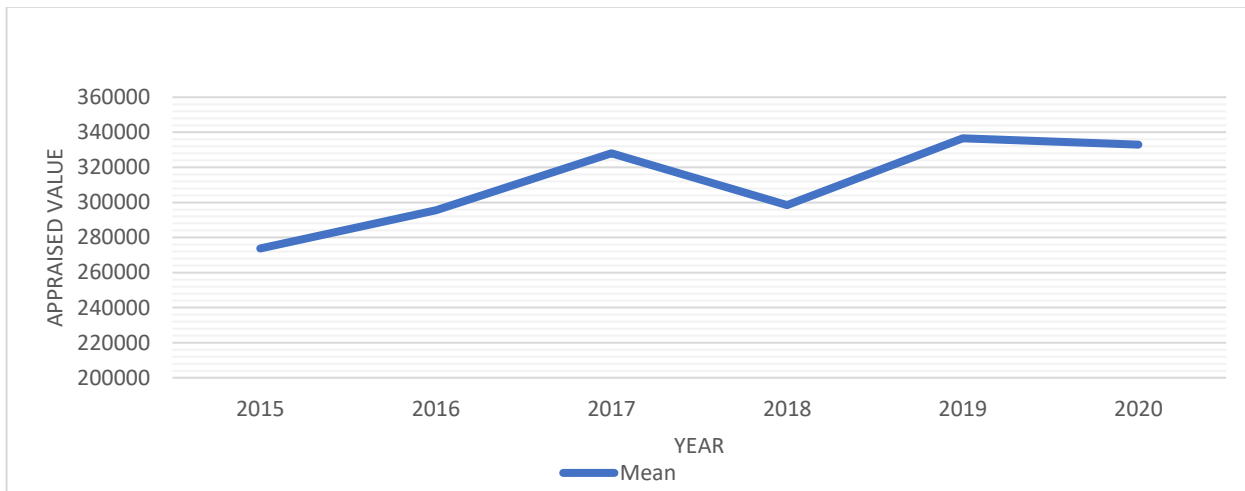
**FIGURE 4
ANALYSIS OF VALUES OF RESIDENTIAL REAL ESTATE PROPERTIES IN SETX**



Source: Jefferson County Appraisal District

In contrast to residential real estate properties, the decline in industrial/commercial real estate properties was not as steep and the recovery was rapid, leading to stable real estate values. Residential values need insurance proceeds and the availability of contractors for recovery. Industrial/commercial properties often use operating funds to ensure immediate recovery and provide business continuity.

FIGURE 5
ANALYSIS OF VALUES OF INDUSTRIAL/COMMERCIAL REAL ESTATE
PROPERTIES IN SETX



Source: Jefferson County Appraisal District

In-Depth Interviews and Focus Group Workshops With Stakeholders of the Real Estate - Construction Sector of Southeast Texas

After the economic distress caused by Hurricane Rita in 2005 (which was mostly a wind event), businesses learned and gained experience in securing existing properties and building new ones to ensure less damage from wind (stronger structure, wind-resilient technology, and materials). Following Hurricane Rita's devastation, the state changed the building and design norms of properties to protect them from wind events. The requirement to protect property from windstorm damage caused the development costs to increase significantly since they had to design and build stronger foundations, framing, and roofs to secure the property from hurricane-level winds.

Economic disruptions caused by Hurricane Harvey and Tropical Storm Imelda are very different events by their nature, in contrast to Hurricane Rita. Both Hurricane Harvey and Tropical Storm Imelda were unprecedented flood events, and both the Southeast Texas infrastructure and properties were not designed to handle that much floodwater. After Hurricane Harvey, the state and local governments worked together to raise the standards again to make sure that if a Harvey or Imelda-type event happened again, the infrastructure and real estate properties would be much more resilient to flooding. The drainage and building elevation requirements have been changed significantly. The changes in construction requirements again impacted the increase in the cost of real estate development. Economic distress caused by COVID-19 was unprecedented and had a long-lasting disruption to the activities of many businesses and households. However, it is important to note that economic disruption caused by the COVID-19 pandemic did not impact the structure of the real estate properties.

During these economic disruptions, different real estate businesses and households had different experiences including:

- loss of tenants,
- significant property damage,
- uninsured losses,
- loss of initial investment resulting in having to start the development projects and, in some cases, re-build properties all over again,
- financing issues,
- delays, and backlogs in compensations of insured losses and FEMA,

- standing flood water stayed in the properties for several days, old properties started settling, and other properties started to have foundation problems.

This study identified the following risk management best practices through the implementation of the PARM methodology:

Risk Management Best Practices (RMBPs) in Response to Government Actions and Economic Disruptions

1. **Enhanced Skills and Technical Knowledge:** Emphasized the importance of skill development and technical education beyond the traditional university degree to adapt to evolving job markets and technological advancements.
2. **Addressed the threats of E-commerce Disruption and “Walmartization” of America:** Implemented strategic plans to mitigate the economic impacts caused by the “Walmartization” of America and the growth of e-commerce, ensuring local businesses in real estate and construction remained competitive.
3. **Upgraded Structural Standards and Safety Measures:** Introduced new regulations for structural design, landscaping, drainage, and site safety to enhance resilience against floods and high winds, including structural fortifications.
4. **Invested in Infrastructure for Economic Stability:** Boosted investments in infrastructure, such as transportation networks and utility systems, in Southeast Texas to prepare the region for economic fluctuations, emphasizing the importance of preparedness and resilience.
5. **Revised Landscape and Drainage Systems:** Modified the existing landscape and drainage systems to manage floodwaters more effectively, a critical strategy for disaster planning in urban areas.
6. **Fostered Resilient Essential Services:** Developed resilient essential services to support a positive recovery environment and foster economic growth following disruptions.
7. **Provided Financial Incentives:** Offered tax relief, credits, and loans, and eased regulatory burdens to alleviate economic stress on businesses and communities.
8. **Strengthened Emergency Management Efforts:** Supported the Texas Division of Emergency Management and Homeland Security in their efforts to prepare, prevent, mitigate, respond, and recover from disasters through unified command and efficient resource use.
9. **Offered Preparedness and Recovery Resources:** Federal, state, and local governments distributed preparedness and recovery resources through FEMA, CDC, TDEM and other organizations to inform the public and businesses about best practices for disaster readiness.

RMBPs Addressing Financing, Insurance, and Investment Strategies

10. **Optimized Financial Loss Mitigation:** Advocated for comprehensive insurance coverage as a key strategy for financial loss mitigation, encouraging property owners to invest in adequate protection against economic shocks.
11. **Planned for Business Continuity:** Stressed the importance of having risk management plans that considered the possibility of extended shutdowns, as highlighted by the COVID-19 pandemic’s impact on businesses.
12. **Maintained Financial Liquidity:** Emphasized the critical need for sufficient cash reserves and accessible credit lines to ensure financial stability during uncertain times.
13. **SMEs are Encouraged to Adopted Risk Management Practices of Large Firms:** Encouraged small and medium-sized enterprises to adopt risk management strategies of larger firms for efficient contingency fund allocation that ensures business continuity.
14. **Diversified Real Estate Investments:** Recommended diversification by industry and geography in real estate investments to minimize the risk of significant losses.
15. **Improved Communication with Insurance Adjusters:** Highlighted the necessity of effective communication with insurance adjusters following widespread economic disruptions to facilitate recovery.
16. **Advocated for Preemptive Spending:** Encouraged preemptive investments in property, infrastructure, and drainage systems to mitigate future financial losses.

17. Developed Flexible Rent Collection Strategies: Suggested alternative methods for rent collection and property management during recovery periods to support tenants and property owners.
18. Adapted to Rising Development Costs: Encouraged agility in reassessing new development projects in response to increased costs, ensuring sustainable growth.
19. Monitored Construction Material Prices: Recommended strategic planning for construction material procurement to manage costs effectively.
20. Prepared for Energy Sector Fluctuations: Advised on the creation of risk management plans to address the cyclical nature of the real estate market in Southeast Texas, particularly about the oil and gas industry.

RMBPs Related to Economic Disruption Preparedness, Management, and Recovery

21. Built a Resilient Team: Stressed the importance of assembling a skilled team, providing adequate training, and developing contingency plans to enhance business resilience.
22. Implemented Comprehensive Planning: Advocated for the development of short-term, mid-term, and long-term strategies to ensure continuity beyond daily operations.
23. Promoted Collaboration: Encouraged collaboration among public and private entities, including competitors, to strengthen preparation, mitigation, response, and recovery efforts.
24. Learned from Past Disruptions: Urged businesses to analyze previous economic shocks to better understand risks and develop effective response strategies.
25. Leveraged Lessons from Past Disruptions: Encouraged businesses to compile procedures, policies, and contingency plans based on previous disruptions to ensure uninterrupted operations.
26. Monitored and Controlled Financial Losses: Implemented controls and monitoring systems to minimize financial losses and damages during disruptions.
27. Leveraged Economic Disruptions for Improvement: Recognized that disruptions could provide opportunities for residential real estate improvements, spurred by increased online shopping for renovations.
28. Acted Promptly Post-Disruption: Stressed the importance of immediate action following flooding to protect and dry out properties, preventing long-term damage.
29. Assessed Financial Impact Promptly: Emphasized the need for quick evaluation of financial losses and damages following disruptions to plan for recovery.
30. Planned for Continued Recovery Efforts Despite Supply Chain Challenges: Developed plans to continue recovery efforts amid supply chain disruptions, ensuring the availability of construction materials, energy, and equipment.
31. Incorporated Backup Power Solutions: Advocated for the inclusion of power generators as a backup option to address energy shortages during disruptions.
32. Addressed Labor Shortages Creatively: Emphasized the importance of maintaining connections with construction professionals across regions to quickly mobilize additional crews for rebuilding efforts after major disruptions.
33. Promoted Entrepreneurial Resilience: Highlighted the American entrepreneurial spirit of overcoming challenges and the courage to restart from scratch as a model for resilience.

RMBPs Related to New Technologies and Communication

34. Adopted Digitalization and Cloud Storage: Stressed the importance of digitalization and the use of cloud storage to enhance remote work capabilities and data recovery.
35. Utilized social media for Communication: Recognized the role of social media as an effective communication tool during economic disruptions.
36. Leveraged Information Technologies: Promoted the use of information technologies by public officials to inform communities about recovery strategies and actions.
37. Enhanced Stakeholder Collaboration: Advocated for improved communication with stakeholders to foster collaboration and speedy recovery efforts.

38. Addressed E-commerce Threats: Developed strategies to navigate the challenges posed by online transactions and the rise of e-commerce.
39. Expanded New Technology Applications: Emphasized the importance of adopting new technologies to develop sustainable and resilient real estate properties.
40. Ensured Security and Safety: Highlighted new technologies as means to enhance security measures, including cybersecurity, during economic disruptions.
41. Innovated with AI and Chatbots: Pointed out the evolving role of AI and chatbots in improving the technical efficiency of risk management systems and providing guidance.
42. Facilitated Virtual Meetings for Efficiency: Advocated for virtual meetings to reduce costs and improve the efficiency of business activities.

The real estate market always tends to follow a cyclical and interconnected trend between the industrial/commercial, and residential segments. In Southeast Texas, where the energy sector is a major contributor to this region's economy and job market, construction and expansion of oil and gas production has a higher effect on the real estate market. Frequent economic disruptions in Southeast Texas cause long-lasting distress to business activity and negatively impact real estate values in this region. This study found that it takes a significant amount of resources and time to "recover and rebuild" from economic disruptions. This study also found that industrial/commercial properties have been repaired and recovered quicker as the businesses in those properties couldn't stay shut down for a long time. For residential properties, the repairs and recovery process took longer time in comparison to industrial/commercial properties.

It is worth noting that, catastrophes also result in opportunities for developers. Multiple real estate developers and investors benefited from these events and situations. There are cases where entire neighborhoods of damaged buildings have been successfully re-developed.

The risk management best practices during previous economic disruptions show the positive impact of collaboration, communication, and interaction between public and private parties involved in the real estate sector. Sharing knowledge, new technologies, and best practices is a key to resiliency. Real estate businesses need to innovate and should have an entrepreneurial spirit to be resilient and recover from economic disruptions. Further application of new technologies (including information technologies) is key to developing sustainable and resilient neighborhoods.

CONCLUSION

Recovery efforts and investments in resiliency can offset the financial losses and declines caused by economic disruptions. Rebuilding and construction can lead to an economic boom, positively influencing the regional economy's GDP, personal income, employment, and population growth. Due to frequent economic disruptions, Southeast Texas developed resilient communities and businesses. Those businesses that operate in industrial/commercial real estate properties developed "immunity" to frequent economic disruptions that occurred in the past. They re-use the best practices of risk management learned from previous disruptions to overcome challenges of the next economic distress. This study also highlights the need for more efficient use of available risk management tools such as public and private insurance. Sustainable and resilient management of the real estate construction sector is necessary to minimize losses from events that cause economic disruptions.

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