

Florida Case Study: Economic Impacts of Business Closures in Hurricane Prone Counties

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Introduction

The purpose of this paper is to analyze the potential economic impacts resulting from damage or destruction of businesses following a major hurricane strike in Florida. The focus is on non-property losses suffered by businesses. Specifically, we examine losses in terms of the impact on the number of business establishments forced to close under various loss scenarios and the direct impacts on job and payroll loss, revenue loss and fiscal impact to the state in terms of decreased sales tax receipts. Various mitigation strategies adopted in Florida in the post-Hurricane Andrew era are also surveyed.

Before describing the results of this analysis, it is worth recalling the impact that Hurricane Andrew had on the people, businesses and economy of Florida.

Background: Andrew's Place in History

Hurricane Andrew, until September 11, 2001, was the global insurance industry's event of record. For nearly a decade it was the disaster against which all other disasters worldwide were compared. In the dozen years beginning with Hurricane Hugo in 1989, a period pockmarked by catastrophes and cataclysms of unprecedented frequency and ferocity, Hurricane Andrew stood alone.

Andrew struck south Florida in August 1992 with 140 mile-per-hour winds and produced insured losses of \$15.5 billion—about \$20 billion in current (2001) dollars. Economic losses were estimated at \$26 billion (\$34 billion in current dollars). Andrew's reign as the most expensive insurance disaster in history ended, of course, with the terrorist attack of September 11, 2001. Insured losses from that event are currently estimated at \$40.2

billion with economic losses exceeding \$80 billion.¹ The September 11 attack was far more lethal than Andrew as well. Approximately 3,000 people died in the attack while only 23 deaths were directly attributed to Andrew.

Although Andrew has now been eclipsed as the largest insurance event in world history, it remains unchallenged in many respects. It remains the largest natural disaster on record in terms of insured losses not only in the United States but worldwide (see Figure 1). It is still, by far, the most expensive windstorm in U.S. history, with 1989's Hurricane Hugo coming a distant second at \$6 billion in current dollars. Andrew also remains the greatest claims handling challenge the industry has ever faced, producing 700,000 claims in a path of destruction stretching over thousands of square miles. The September 11 terrorist attack, in comparison, generated just over 31,000 claims—mostly in an area measuring just a few square miles around the 16-acre World Trade Center site.² For these reasons, Andrew remains a unique event and still reigns supreme as the insurance event against which all others will continue to be compared.

More than time and severity of loss separates Andrew and September 11, however. While the insurance community, insurance regulators, lawmakers, businesses and homeowners have had a decade to absorb the lessons learned from Andrew and to implement a wide variety of risk mitigation and avoidance strategies, our understanding of the nature of terrorism risk is still in its infancy. Psychologically, the business community (buyers of commercial insurance), insurance regulators and lawmakers in the United States have not yet fully grasped the potential impact that future terrorist attacks could have on the insurance industry, the business community and the economy generally.

¹ For a more detailed analysis of the September 11 terror attack and its impacts on the insurance industry, see the Insurance Information Institute presentation “The Long Shadow of September 11” available at: <http://www.iii.org/media/hottopics/insurance/sept11>.

² Disaster Insurance Information Office web site as of May 8, 2002: <http://www.disasterinformation.org>.

Andrew: Overview of the Impact

Hurricane Andrew delivered a shocking financial blow to the insurance industry but also to the economy of south Florida. A report commissioned by the office of Florida Governor Lawton Chiles summed up the damage as follows:³

- 28,066 homes destroyed
- 107,380 homes damaged
- 82,000 business destroyed or damaged
- 7,800 businesses closed as of September 1992
- 86,000 people out of work as of September 1992

The immediate financial and market consequences of Andrew for insurers were swift, severe and long lasting. Numerous smaller insurers became insolvent and the market for residential and commercial property coverage in coastal areas of the state dried up. Catastrophe reinsurance prices soared and available limits of coverage tumbled. Some Florida subsidiaries of large national insurers required infusions of capital to stay afloat.

Catastrophe modeling firms have estimated that a worst-case scenario event—a Category 5 hurricane striking downtown Miami—could produce insured losses well in excess of \$50 billion—one of the largest catastrophe risks anywhere in the United States (see Figure 2). While a \$50 billion insured loss would produce a staggering blow to insurers, the total economic loss would likely exceed \$80 billion.⁴ The difference is attributable to the fact that many exposures are underinsured, uninsured, altogether uninsurable or that the losses are indirect in nature.

Loss Scenarios: Business Closures and Economic Consequences

Non-property losses resulting from business closures would account for a significant share of uninsured losses in a future Andrew-like event. Table 1 through Table 5 show

³ “Governor’s Commission on Hurricane Andrew, Executive Order 92-291,” Governor’s Disaster Planning and Response Review Committee, 1992.

⁴ According to Insurance Information Institute calculations based on Munich Re data, 62% of economic losses resulting from catastrophes in the industrialized world during the 1990s were insured.

the potential losses arising from scenarios involving the closure of 1%, 3%, 5%, 10%, and 15% in six Florida counties susceptible to a major hurricane strike. The 10% scenario corresponds (approximately) to the experience of businesses in Dade, Broward and Monroe counties in the months following Hurricane Andrew. Each table estimates loss of sales (establishment revenue), sales tax revenue, payroll and job losses for a single year following an event.

According to the most recent Economic Census, these six counties had a combined total of 134,213 establishments employing 1.82 million people and generating an annual payroll of \$43 billion. Florida has 77 counties, but these six hurricane counties alone are home to approximately one-third of the state's businesses and workers and a similar percentage of its payroll dollars.⁵

Significant economic disruption can occur following even relatively "minor" events. For example, under the 1% establishment closure scenario for Dade County in Table 1, nearly 500 businesses in Dade County would close, 6,000 jobs would be lost and combined sales, tax and payroll losses would approach \$1 billion.

Figures 3A – 3F illustrate the impacts on each of the six counties under the 5% establishment closure scenario. Such an event could be considered "modest" because the closure rate is approximately one-half the actual closure rate following Andrew. Such an event striking Dade county implies the closure of nearly 2,500 businesses, lost sales of \$3.8 billion, \$81.8 million in lost sales tax receipts, \$797.8 million in payroll losses and the loss of more than 30,000 jobs.

The same event impacting the contiguous counties of Dade, Broward and Monroe could force the closure of more than 4,100 businesses, produce sales, tax and payroll losses

⁵ The number of establishments closed in each scenario is based on data from the 1997 Economic Census (most recent available). In order to maintain consistency, the corresponding employment and payroll data are used to calculate employment and payroll impacts. The Economic Census data were matched to revenue and sales data from the Florida Department of Revenue. All pecuniary figures have been adjusted to 2001 price levels.

totaling \$8.2 billion dollars and leave some 53,000 people out of work. In the Tampa area (Hillsborough county), this same scenario implies 921 business closures, payroll, revenue and tax losses of \$2.4 billion and the loss of nearly 17,000 jobs. Even the Ft. Myers area (Lee County) could see more than 400 businesses close, the loss of more than one-half billion dollars in sales, tax and payroll losses and job losses in excess of 5,100.

A repeat of an Andrew-like event (10% closure scenario) impacting Dade, Broward and Monroe counties is summarized in Table 4 and illustrated in Figures 4A-4F. While insured property losses from such an event could exceed \$20 billion, direct non-property losses arising from the closure of more than 8,200 businesses could top \$16.3 billion and cost 106,500 south Florida residents their jobs.

An event more severe than Andrew, statistically unlikely but certainly not out of the realm of possibility, could produce insured property losses of \$50 billion. A Category 4 or 5 hurricane striking the downtown Miami area could easily force the close of 15% of business in the affected areas. In Dade County alone, this implies the closure of 7,376 establishments, lost revenues of \$11.5 billion, and a drop in sales tax receipts of \$245 million. An estimated 90,000 jobs and \$2.4 billion in payroll losses would accompany the closures. Total non-property losses in a Dade/Broward/Monroe event could approach \$25 billion, much of it uninsured.

Won't Business Interruption Coverage Help?

It is worth noting that some businesses may have business interruption coverage sufficient to compensate them for lost profits (i.e., net income—not revenues) and extra expenses they incur for some limited period following a disaster. However, because such coverage generally responds only when the business itself sustains direct physical loss or damage (or because authorities have closed off the area), the coverage may not be triggered in many circumstances. Hotels and restaurants, for example, that escape damage but have no guests or patrons because tourism declines, are just two such examples. Moreover, business interruption coverage restores lost profits and extra expense to the affected business only. Lost wages of employees are not covered.

Mitigation Efforts in Florida Following Andrew

The legacy of Hurricane Andrew is one of survival through mitigation. Loss mitigation, a practice long considered essential by insurers and risk managers, was embraced by lawmakers, businesses and homeowners through coastal Florida in the months and years following Hurricane Andrew.

Perhaps not surprisingly, the most obvious of all mitigation efforts, withdrawal from coastal or other hurricane prone areas, was never really considered. Property values and interest in South Florida were, and still are, too great to abandon. Other so-called structural efforts (dams, levees and retaining walls) took a backseat to non-structural efforts to strengthen building codes and local enforcement of zoning and building requirements as well as publicly funded efforts to promote preparedness and loss mitigation.

In the wake of the devastation, Florida began to adopt many new standards in its building code to help mitigate losses given the certainty of future storms. Poor standards for manufactured homes and windows, for example, gave way to the 116 mile per hour national wind standard. Recent code changes include provisions to make windows and doors less vulnerable to wind-blown debris by requiring special hurricane style shutters and technologically advanced, impact-resistant glass. In addition to those building code changes, Florida now requires a review of plans by a structural engineer. Miami-Dade has nearly tripled the number of building inspectors in its force and has added 25 or more roofing inspectors. These increases in supervision and personnel should allow South Florida to enforce and maintain the new storm standards specifically designed to protect property.

Localities have also become very involved with loss mitigation efforts through financial incentives and the dissemination of information. Dade County, for example, was called on to author a hazard mitigation plan in return for federal disaster aid. Dade also instituted a sales tax with the funds earmarked for future recovery and mitigation tasks. This money is to serve the county in providing public information, building shelters and other projects. This local effort and others like it are supported by a number of state-wide

funds developed for the same mitigation and recovery purposes, as well as the Florida Hurricane Catastrophe Fund, established to provide reinsurance to casualty companies with exposure in the Hurricane prone areas.

Important to note as well are the efforts of property insurers and other economic stakeholders in the homeowners market (mortgage lenders, title insurers) in creating incentives for citizens to mitigate losses. The Florida Windstorm Underwriting Authority offers discounts (from 3%-18%) for specific features or repairs in a home designed to protect from storm damage. These first-of-their-kind hurricane preparedness discounts could tally 60% off the homeowner's premium cost, all for preventing loss to the property. Mandatory windstorm deductibles, typically 2% of any loss, were implemented statewide.

Insurers have also promoted mitigation through the dissemination of information to policyholders and the general public. This takes many forms, including regular communications to policyholders, paid advertisements in the print and electronic media, and information on company web sites. Information is also distributed through insurance trade associations such as the Insurance Information Institute and the Institute for Building and Home Safety. The latter also helps develop and test designs expected to reduce insured losses in future catastrophes. Insurers also support the efforts of FEMA, the Red Cross and other disaster assistance organizations.

Hurricanes, tropical storms and severe weather are unavoidable risks in coastal areas. No storms since 1992 have reached the devastating power of Andrew, but a number of smaller hurricanes and storms have made landfall. The Insurance Services Offices and the NOAA survey of these storms show far less property damage in the decade since Andrew, despite above-average tropical activity in recent years. This decline in property damage can be attributed in large part to fortuity, but also to advances in technology – both in advanced weather prediction systems and stronger building materials – as well as advances in engineering, leading to safer homes and office and retail structures. Homes constructed today are demonstrably sturdier, businesses operate with fewer interruptions, and most communities are better prepared to weather storms than they were a decade ago.

Sampling of Loss Mitigation Efforts Adopted in Florida Since Hurricane Andrew

Type of Mitigation	Examples in Florida
Financial	<ul style="list-style-type: none"> ▪ Discounts available through special windstorm underwriters. E.g., Florida Windstorm Underwriting Association (FWUA) offers discounts to policyholders based on specific mitigation efforts designed to protect their homes. Discounts range between 3% & 18%, with a possibility of a 61% discount. ▪ Mandatory windstorm deductibles, typically 2%, of any loss (as opposed to traditional, fixed dollar deductible).
Informational	<ul style="list-style-type: none"> ▪ Continuous direct education of policyholders ▪ Countless educational efforts aimed at teaching homeowners how to protect their property against windstorm damage by retrofitting existing or building new properties. ▪ Funding of educational initiatives through third parties ▪ Use of industry trade associations to promote awareness and mitigation (e.g., IBHS, III) ▪ Federal initiatives (e.g., FEMA's Project Impact)
Building Codes	<ul style="list-style-type: none"> ▪ Florida's building code adopted new, higher standards for homes including the 116 mph wind standard. ▪ Codes strengthened increasing wind resistance for roofs. ▪ More building and roofing inspectors were hired to increase compliance with building standards in some counties (e.g., Dade) ▪ New regulations require review of building plans by a structural engineer. ▪ Supporting/funding research into wind-resistant designs ▪ Federal initiatives (e.g., FEMA's Project Impact)
Public/Fiscal Efforts	<ul style="list-style-type: none"> ▪ Florida legislature established and funded a trust to provide support for recovery and mitigation efforts not covered by federal grants. ▪ Dade County passed a special sales tax to generate revenue for local recovery and mitigation efforts. ▪ Dade County created a hazard mitigation plan in order to receive federal disaster assistance under FEMA's 404 Hazard Mitigation Grant Program.
Partnerships	<ul style="list-style-type: none"> ▪ Insurers assist government and relief organizations with mitigation programs. ▪ Activate network of communication with many organizations in the event a hurricane appears imminent (e.g., relief and weather organizations add web link to insurer organization web sites with mitigation information).

What the Future Holds

Private insurers have slowly come back in to the Florida market for non-wind risks. The number of policyholder serviced the by state's property/casualty joint underwriting association stood at 116,027 in February 2002, down from 849,271 in December 1995. The number of policies in the Florida Windstorm Underwriting Association, however, which underwrites windstorm risks, remains stubbornly high at approximately 500,000. The implication is that not nearly enough has been done to reduce the risk of catastrophic windstorm risk. While mitigation efforts have been effective where applied, their use has been spotty and in some cases their benefit diminished (if not offset entirely) by unwise land use policies.

Efforts to reduce future losses through zoning restrictions or changes in building codes are often opposed by Florida's politically powerful developers and homebuilders as well as real estate interests and proponents of growth. Some in Florida's Congressional delegation believe that the federal government should effectively subsidize the cost of insurance in coastal areas of Florida. This, of course, would be contrary to the objectives of mitigation.

While Hurricane Andrew spawned a great deal of research into the science of windstorm risk mitigation, the state remains very far away from insulating itself from the type of physical and financial devastation discussed in this paper. A repeat of Hurricane Andrew in 2002 would still produce very significant property and non-property losses. Unless more substantive risk-reduction strategies are adopted—such as building moratoria in those areas that are the most vulnerable to hurricane damage—the benefits from mitigation will remain elusive.

Table 1.

**Estimated Sales, Sales Tax, Payroll and Job Losses:
Destruction/Closure of 1% of Business Establishments
(Single-Year, Post Event Losses)**

1% Loss Assumed						
	Establishment Loss*	Sales Loss**	Tax Loss**	Payroll Loss**	Job Loss*	Total Dollar Losses**
Broward County	306	\$527,334,002	\$13,495,684	\$115,748,830	4,408	\$656,578,517
Dade County	492	\$765,660,614	\$16,365,718	159,568,877	6,007	\$941,595,208
Hillsborough County	184	\$392,470,552	\$9,590,072	85,323,757	3,351	\$487,384,381
Lee County	80	\$90,555,864	\$3,726,162	22,616,983	1,030	\$116,899,008
Monroe County	25	\$27,367,060	\$1,193,743	4,502,930	237	\$33,063,734
Palm Beach County	254	\$304,546,165	\$9,987,053	86,340,278	3,128	\$400,873,495
Dade/Broward/Monroe Sub-Total	823	\$1,320,361,677	\$31,055,145	\$279,820,637	10,652	\$1,631,237,459

*Based on unadjusted 1997 economic census data (most recent available)

**Based on 1997 Florida Department of Revenue data adjusted to 2001 price levels.

Table 2.

**Estimated Sales, Sales Tax, Payroll and Job Losses:
Destruction/Closure of 3% of Business Establishments
(Single-Year, Post Event Losses)**

3% Loss Assumed						
	Establishment Loss	Sales Loss	Tax Loss	Payroll Loss	Job Loss	Total Dollar Losses
Broward County	919	\$1,582,002,007	\$40,487,053	\$347,246,491	13,224	\$1,969,735,552
Dade County	1,475	\$2,296,981,842	\$49,097,153	\$478,706,630	18,022	\$2,824,785,624
Hillsborough County	552	\$1,177,411,655	\$28,770,217	\$255,971,270	10,054	\$1,462,153,142
Lee County	241	\$299,765,299	\$11,178,485	\$67,850,949	3,091	\$378,794,733
Monroe County	76	\$82,101,181	\$3,581,230	\$13,508,791	711	\$99,191,202
Palm Beach County	763	\$913,638,494	\$29,961,158	\$259,020,833	9,384	\$1,202,620,485
Dade/Broward/Monroe Sub-Total	2,470	\$3,961,085,031	\$93,165,436	\$839,461,912	31,956	\$4,893,712,378

*Based on unadjusted 1997 economic census data (most recent available)

**Based on 1997 Florida Department of Revenue data adjusted to 2001 price levels.

Table 3.

**Estimated Sales, Sales Tax, Payroll and Job Losses:
Destruction/Closure of 5% of Business Establishments
(Single-Year, Post Event Losses)**

5% Loss Assumed						
	Establishment Loss	Sales Loss	Tax Loss	Payroll Loss	Job Loss	Total Dollar Losses
Broward County	1,532	\$2,636,670,012	\$67,478,422	\$578,744,152	22,039	\$3,282,892,586
Dade County	2,459	\$3,828,303,070	\$81,828,588	\$797,844,383	30,036	\$4,707,976,041
Hillsborough County	921	\$1,962,352,759	\$47,950,362	\$426,618,783	16,756	\$2,436,921,903
Lee County	401	\$499,608,831	\$18,630,808	\$113,084,915	5,151	\$631,324,554
Monroe County	127	\$136,835,302	\$5,968,716	\$22,514,651	1,184	\$165,318,670
Palm Beach County	1,272	\$1,522,730,823	\$49,935,264	\$431,701,388	15,640	\$2,004,367,474
Dade/Broward/Monroe Sub-Total	4,117	\$6,601,808,384	\$155,275,726	\$1,399,103,186	53,260	\$8,156,187,297

*Based on unadjusted 1997 economic census data (most recent available)

**Based on 1997 Florida Department of Revenue data adjusted to 2001 price levels.

Table 4.

**Estimated Sales, Sales Tax, Payroll and Job Losses:
Destruction/Closure of 10.1% of Business Establishments
(Single-Year, Post Event Losses)**

10% Loss Assumed - HURRICANE ANDREW						
	Establishment Loss	Sales Loss	Tax Loss	Payroll Loss	Job Loss	Total Dollar Losses
Broward County	3,063	\$5,273,340,023	\$134,956,845	\$1,157,488,304	44,079	\$6,565,785,173
Dade County	4,918	\$7,656,606,141	\$163,657,176	\$1,595,688,765	60,072	\$9,415,952,082
Hillsborough County	1,842	\$3,924,705,517	\$95,900,723	\$853,237,566	33,512	\$4,873,843,806
Lee County	802	\$999,217,662	\$37,261,616	\$226,169,831	10,303	\$1,262,649,109
Monroe County	254	\$273,670,605	\$11,937,432	\$45,029,303	2,369	\$330,637,339
Palm Beach County	2,543	\$3,045,461,646	\$99,870,527	\$863,402,775	31,280	\$4,008,734,948
Dade/Broward/Monroe Sub-Total	8,234	\$13,203,616,769	\$310,551,453	\$2,798,206,372	106,520	\$16,312,374,593

*Based on unadjusted 1997 economic census data (most recent available)

**Based on 1997 Florida Department of Revenue data adjusted to 2001 price levels.

Table 5.

**Estimated Sales, Sales Tax, Payroll and Job Losses:
Destruction/Closure of 15% of Business Establishments
(Single-Year, Post Event Losses)**

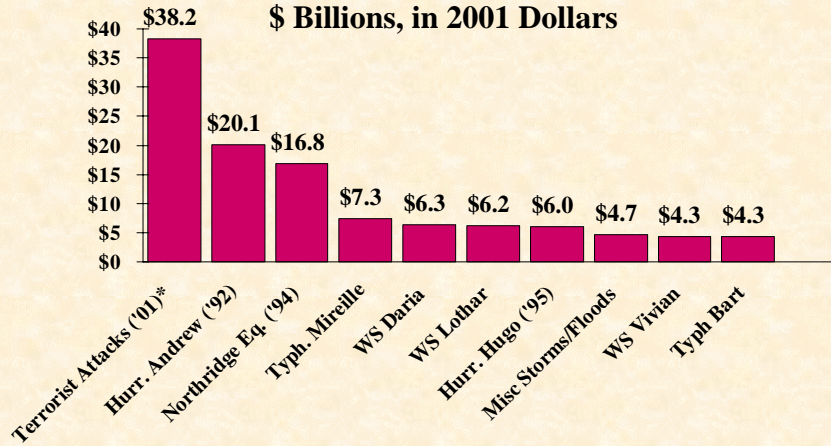
15% Loss Assumed						
	Establishment Loss	Sales Loss	Tax Loss	Payroll Loss	Job Loss	Total Dollar Losses
Broward County	4,595	\$7,910,010,035	\$202,435,267	\$1,736,232,456	66,118	\$9,848,677,759
Dade County	7,376	\$11,484,909,211	\$245,485,764	\$2,393,533,148	90,108	\$14,123,928,122
Hillsborough County	2,762	\$5,887,058,276	\$143,851,085	\$1,279,856,349	50,268	\$7,310,765,709
Lee County	1,204	\$1,498,826,493	\$55,892,424	\$339,254,746	15,454	\$1,893,973,663
Monroe County	380	\$410,505,907	\$17,906,148	\$67,543,954	3,553	\$495,956,009
Palm Beach County	3,815	\$4,568,192,469	\$149,805,791	\$1,295,104,163	46,921	\$6,013,102,423
Dade/Broward/Monroe Sub-Total	12,351	\$19,805,425,153	\$465,827,179	\$4,197,309,558	159,779	\$24,468,561,890

*Based on unadjusted 1997 economic census data (most recent available)

**Based on 1997 Florida Department of Revenue data adjusted to 2001 price levels.



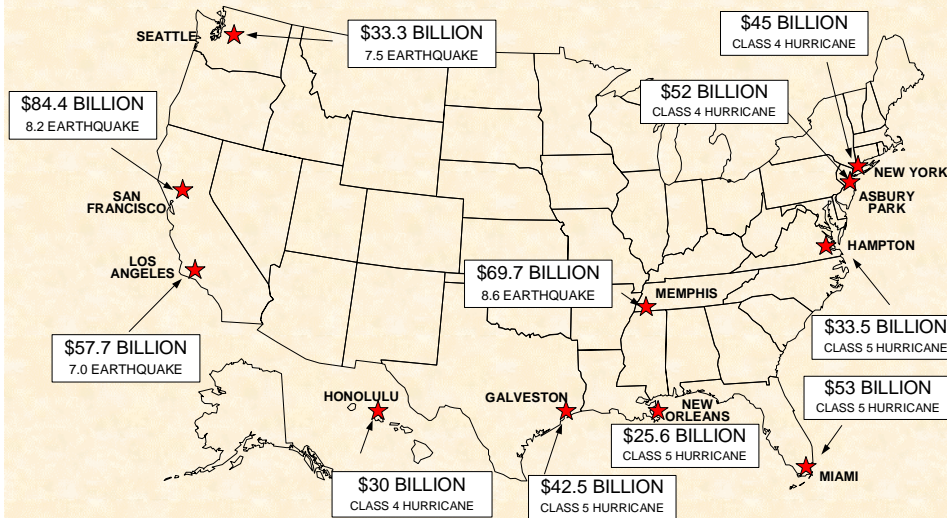
*Figure 1:
World's Largest Catastrophes
(by insured loss)*



*III Estimate; Includes life, liability, aviation and workers compensation losses.
Source: Insurance Information Institute, Swiss Re;
Note: WS = Winter Storm



*Figure 2: Probable Costs of
Future U.S. Natural Disasters*

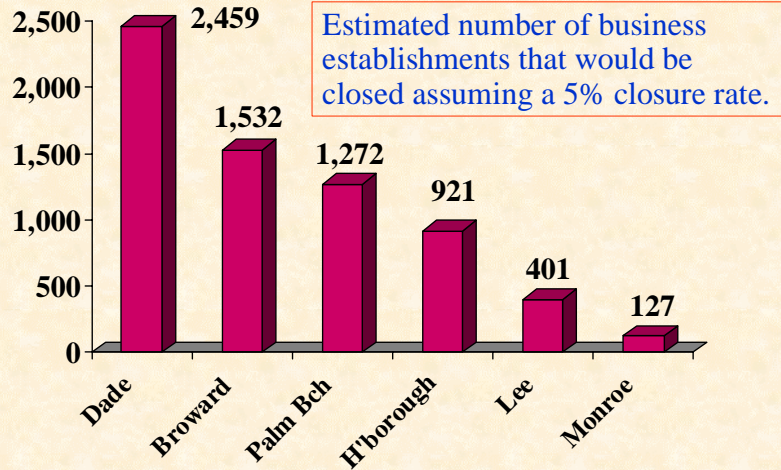


Source: AIR Risk Engineering, ARPC Earthquake Engineering, University of Southern California

5% Business Closure Scenario



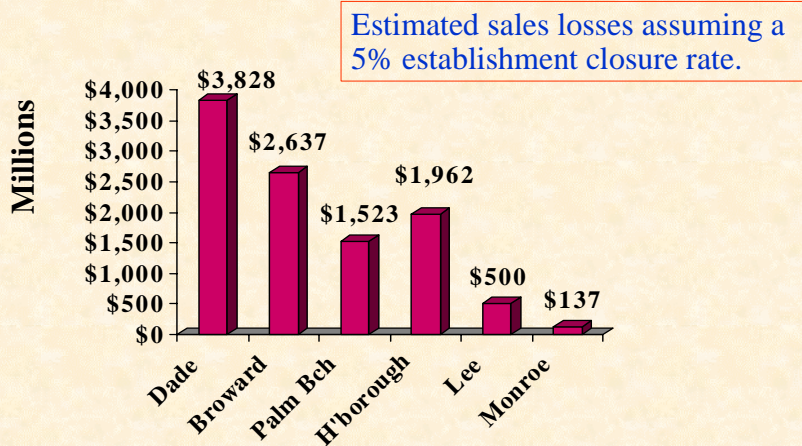
Figure 3A: 5% Hurricane Closure Scenario
Number of Business Closures



Source: Insurance Information Institute from US Census of Manufactures data.



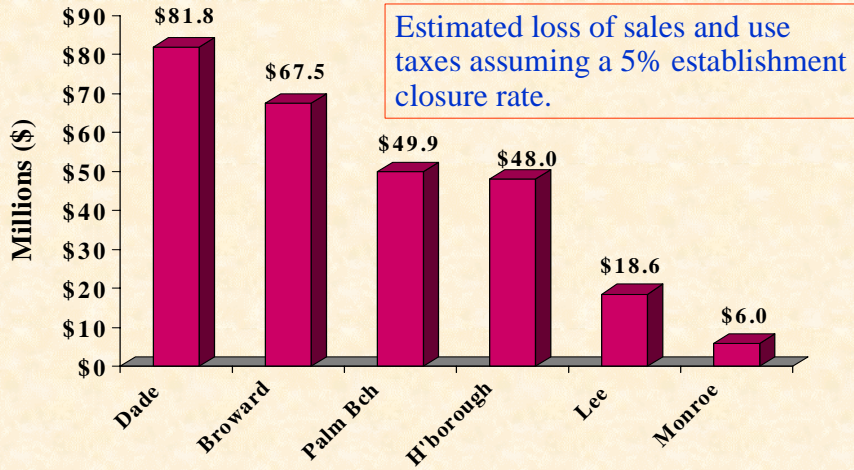
Figure 3B: 5% Hurricane Closure Scenario
Sales Lost



Source: Insurance Information Institute from Florida Department of Revenue data.



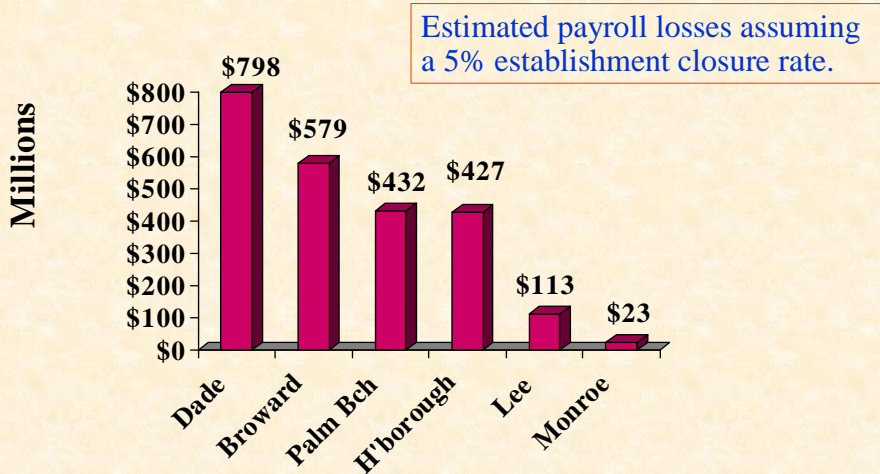
Figure 3C: 5% Hurricane Closure Scenario Sales & Use Tax Losses



Source: Insurance Information Institute from Florida Department of Revenue data.



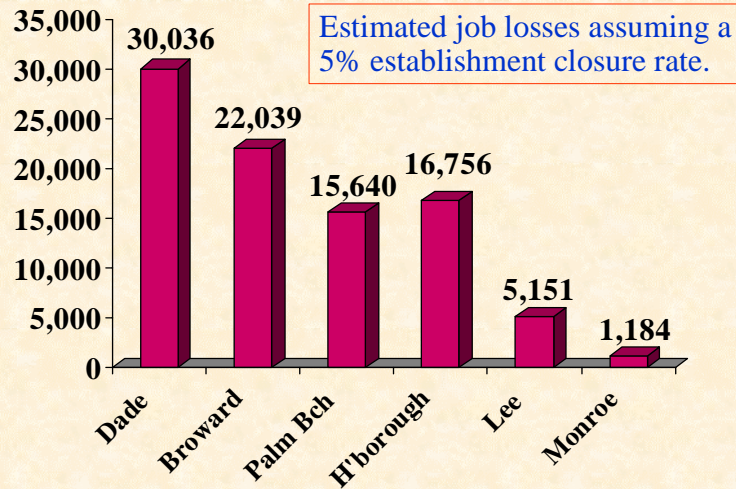
Figure 3D: 5% Hurricane Closure Scenario Payroll Losses



Source: Insurance Information Institute from Florida Department of Revenue data.



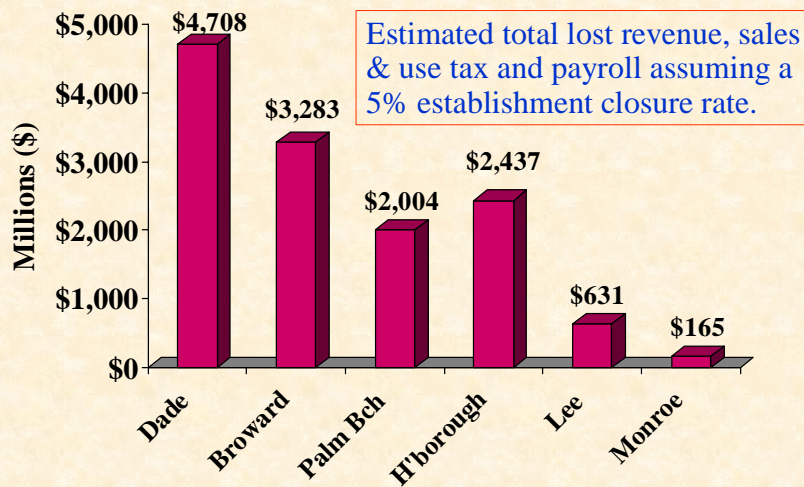
Figure 3E: 5% Hurricane Closure Scenario
Job Losses



Source: Insurance Information Institute from US Census of Manufactures data.



Figure 3F: 5% Hurricane Closure Scenario
Total Losses

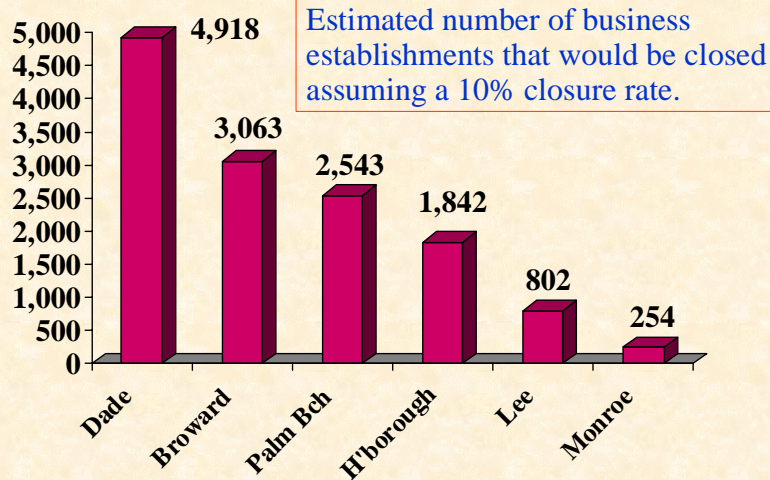


Source: Insurance Information Institute from US Census of Manufactures and Florida Department of Revenue data.

10% Business Closure Scenario

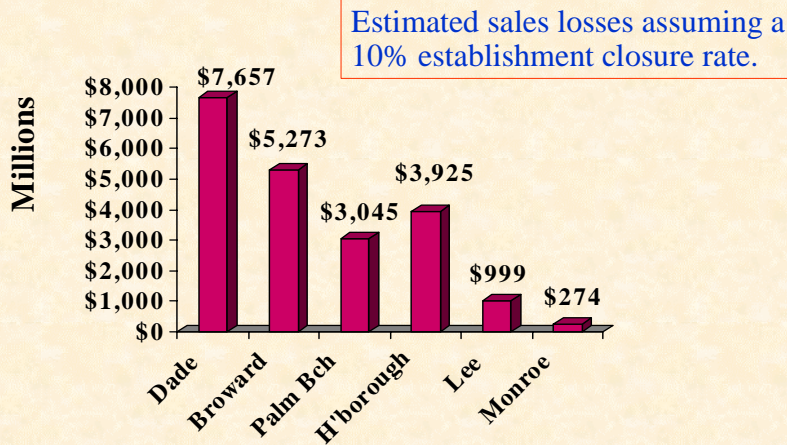
(approximates experience under Hurricane Andrew in 1992)

Figure 4A: 10% Hurricane Closure Scenario
Number of Business Closures



Source: Insurance Information Institute from US Census of Manufactures data.

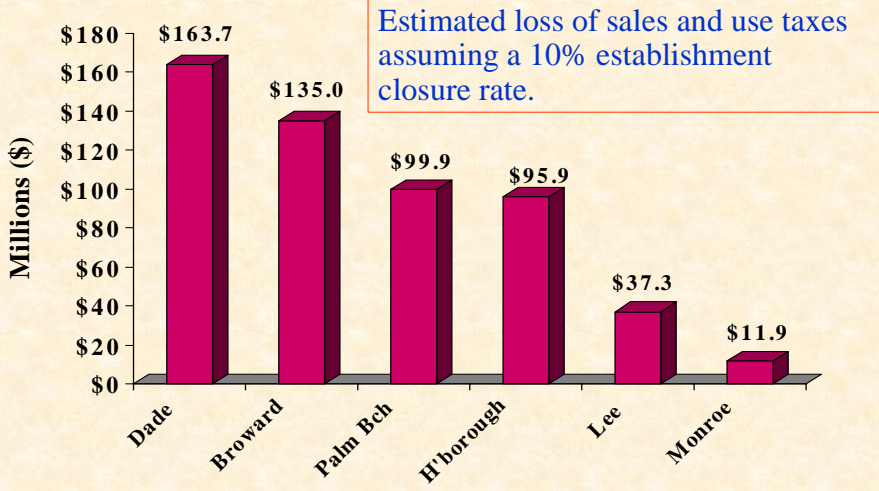
Figure 4B: 10% Hurricane Closure Scenario
Sales Lost



Source: Insurance Information Institute from Florida Department of Revenue data.



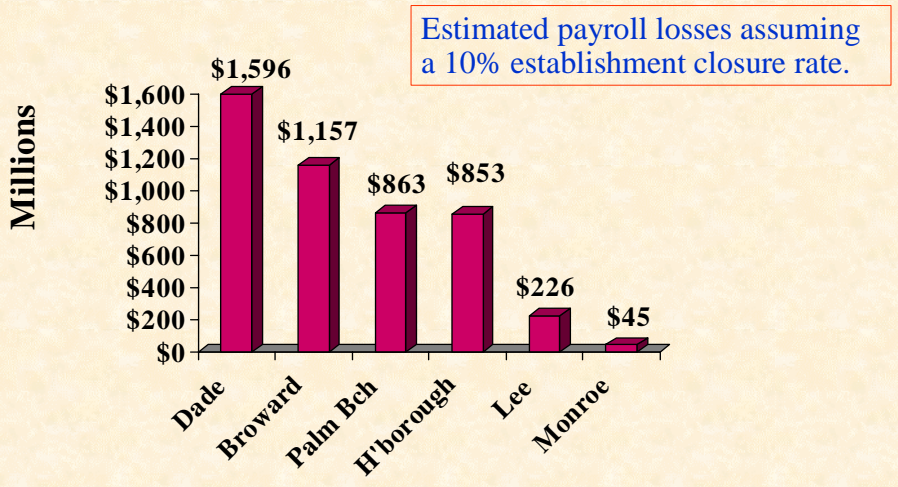
Figure 4C: 10% Hurricane Closure Scenario Sales & Use Tax Losses



Source: Insurance Information Institute from Florida Department of Revenue data.



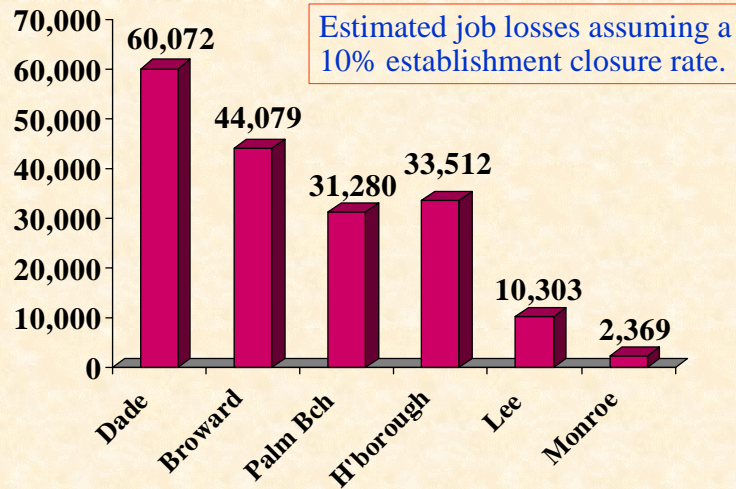
Figure 4D: 10% Hurricane Closure Scenario Payroll Losses



Source: Insurance Information Institute from Florida Department of Revenue data.



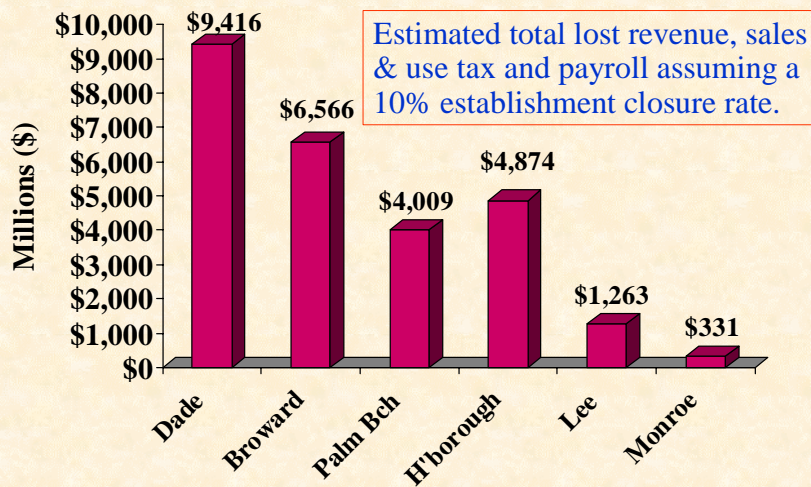
Figure 4E: 10% Hurricane Closure Scenario
Job Losses



Source: Insurance Information Institute from US Census of Manufactures data.



Figure 4F: 10% Hurricane Closure Scenario
Total Losses



Source: Insurance Information Institute from US Census of Manufactures and Florida Department of Revenue data.