

**The Impact of Hurricanes on  
Housing and Economic Activity:  
*A Case Study for Florida***

*Produced by*  
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## Executive Summary

- Hurricanes of at least Category 3 strength making landfall on Florida shores, surprisingly, were quite rare in the latter half of the 20th century. Six hurricanes of such intensity hit the Florida coast in the 50-year time span -- roughly only one per decade.
- However, an unprecedented number of strong hurricanes, including the most powerful hurricane ever measured - Hurricane Wilma, caused unprecedented devastation in 2004 and 2005. Eight hurricanes rated Category 3 or higher blew past Florida in just two years.
- Local economies of the affected regions, at least in Florida, generally rebounded quickly after the storms. The job markets strengthened following the hurricanes, due to reconstruction efforts in the region. Both federal assistance and private insurance payouts surely contributed to the quick rebound.
- Housing activity declined significantly in the months immediately following the hurricanes. But, as with the job market, housing activity returned to pre-storm conditions generally within three or four months after the hurricanes.
- Florida has been the top state in terms of net migration for quite some time. The number of people moving into the Sunshine State far exceeded the number of people moving out. Only one-third of current Florida residents were born in the state. Recent migration patterns of people moving into and out of the hurricane affected regions and all of Florida suggest no lasting longer-term migration impact. The impacted regions continued to draw a high number of new residents, essentially the same as before the hurricanes.
- REALTOR<sup>®</sup> membership was relatively unaffected by the recent hurricanes. Membership was principally driven by commission revenue opportunities. The doubling of membership in the Florida Association of REALTORS<sup>®</sup> in the past five years was due to record home sales and a surge in home prices.
- However, the insurance industry, both private and Florida state-run program, has come under great financial strain due to record claims from the 2004 and 2005 hurricanes. Insurance companies have been forced to significantly raise premiums and in some cases have denied coverage in high-risk regions. The state's insurance of last resort, CITIZENS, has also come under great financial distress and have been forced to raise its insurance premiums significantly.
- The current high cost and limited coverage of property insurance appear to be impacting the housing market. Unlike, past hurricanes, home sales in the recently affected regions and other Florida regions have been lowered significantly with no evident signs of pick-up, even five months (to date) since the 2005 hurricanes

hit. Though part of the current shift in the market may be attributed to higher mortgage rates and the dramatic rise in Florida home prices of the past five years, the current sales in Florida appear far lower than can be justified purely by these economic factors.

- Slowing housing activity often presages an economic slowdown. With Florida as the largest and most consistent top job generators in the country, a downfall in Florida will inevitably have national repercussions.
- The highly unusual number hurricanes in 2004 and 2005 was both catastrophic and “unpredictable.” Hurricanes of such strength and frequency could not have been anticipated through normal historical actuarial analysis and, hence, cannot be considered as normal insurable losses. A nationwide federal catastrophic insurance coverage will permit insurance companies to better manage risk and widen insurance availability at reasonable costs. Just as with federal terrorism insurance, coverage on unknowable events allows the private insurance market to continue its presence.
- A federal catastrophic insurance program will not only benefit Floridians, but also residents living near the Mississippi River (flooding), people in Kansas and Oklahoma (tornadoes), West Coast residents from San Diego to Alaska (earthquakes), Texans and Coloradoans (wildfires), and numerous other people in cases of unforeseen and “unpredictable” natural disasters - far more frequent and/or much more destructive than would be expected based on normal historical patterns.

## Introduction

A record 15 hurricanes developed in the Atlantic Ocean in 2005. Among them was Hurricane Wilma, which struck Southern Florida in October and was the most intense hurricane ever recorded. Many researchers in climatology believe that due to certain periodic jet stream patterns through the Atlantic Ocean the United States is likely to experience several more years of severe hurricane seasons, similar to hurricane cycles in the 1920s and 1960s. Some even contend that the number and intensity of hurricanes are likely to increase on a permanent basis due to rising ocean temperatures wrought by global warming.

Hurricanes leave behind extensive property damage, devastate local economy, and in some cases bring about a high number of human deaths. Florida historically accounted for most losses from hurricanes: 38 percent of total U.S. insurable losses according to ISO, an insurance industry research firm. Texas was a distant second accounting for 11 percent of total losses. Given that Florida bears the brunt of hurricane damage, the Florida Association of REALTORS® commissioned this paper to examine the impact of disaster events on housing and economic activity in its state.

After the devastating 2005 hurricane season, private insurance companies sharply raised insurance premiums and/or drastically lowered their insurance coverage. The limited availability of private insurance, in turn, has forced many homeowners to seek Florida's public insurance system. But Florida's CITIZENS Property Insurance Corporation, specifically set up to provide insurance in high-risk areas where there are limited private insurance options, has also come under great financial strain and, thereby been forced to significantly raise insurance premiums. Currently, 800,000 Florida homeowners are covered through CITIZENS and it is running a deficit of \$1 billion.<sup>1</sup>

The limited availability and much higher cost of obtaining property insurance in Florida have impacted home transactions. Florida's housing market, which had been one of the hottest markets in the country, has undergone a sharp negative turn since the end of the last hurricane season. Home sales fell 15 percent in December from a year before. Sales have come down even more in January and February of 2006 (the latest data available as of this writing). The sharp decline in sales, in turn, has resulted in a dramatic rise in the number of unsold homes on the market. The seller's market has quickly shifted to becoming a buyer's market. Home price appreciation, though still respectable, has slowed noticeably from the super-heated pace of better than 30 percent before the 2005 storms.

The sales decline could be a soft landing that is not likely to cause damage to other sectors of the economy. In fact, part of the current adjustments in the housing market is due to a natural correcting mechanism of strong price increases dampening home buying enthusiasm. But a measurable amount of the decline is also likely due to the much more limited insurance coverage.

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<sup>1</sup> Wall Street Journal, February 1, 2006.

If the weakening sales trend continues, then other sectors could also undergo market distress. A slowdown in Florida's economy, in turn, can slow the broader U.S. economic growth. Low growth, with lower accompanying tax revenue and higher federal transfer payments, will raise the federal deficit and further burden the U.S. economy.

Such a scenario, however, can be averted if there is a nationwide catastrophic insurance program. The recent powerful and frequent hurricanes could not have been anticipated through normal historical actuarial analysis and, hence, cannot be considered as normal insurance losses. The events resemble that of the horrific events of September 11, 2001 in terms of unanticipated catastrophic property damage.

Just as federal terrorism insurance was made available September 11, the availability of federal catastrophic insurance, which by design would cap insurable losses to private companies, would provide better risk management for extensive natural disasters. Private insurance companies could, therefore, expand coverage while keeping affordable insurance premiums to match only those disaster events of more predictable occurrences.

By spreading risk across the country, a federal catastrophic insurance program would not only benefit Floridians, but also residents living near the Mississippi River (flooding), people in Kansas and Oklahoma (tornadoes), West Coast residents from San Diego to Alaska (earthquakes), Texans and Coloradoans (wildfires), and numerous other people in the case of truly unforeseen natural disasters.

It would be unfortunate for such a fast growing and strong economy like Florida to experience a reversal in economic dynamism due to the lack of federal catastrophic insurance. The reversal in Florida's fortune would surely then spread to the rest of the country.

## **Hurricanes in Florida**

Hurricanes are expected in Florida. By far, more property damages from hurricanes have been recorded in Florida than in any other state. Even the University of Miami's sports team competes as "The Hurricanes"! Yet, perhaps surprisingly, the destructive hurricanes of Category 3 or higher that made landfall in Florida were quite rare prior to 2004.

According to National Hurricane Center, about six Atlantic hurricanes develop per year and 1.6 hurricanes per year actually make landfall in the United States. Of those rated Category 3 or higher (wind speeds of at least 110 mph with the potential to cause structural damage to small residences), an average of just one hits U.S. shores every two years.<sup>2</sup> Hurricanes hits to a subset of the United States will, of course, be even rarer.

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<sup>2</sup> Because of more stringent building codes to withstand hurricanes over the years, a hurricane of the same magnitude would cause less damage today compared to past years. The market system is working in a sense that insurers have demanded stronger building codes before providing coverage. Natural disasters are

There were only six hurricanes rated Category 3 or higher that made landfall to Florida shores from 1950 to 2000: one in the 1950s, two in 1960s, one in the 1970s, none in the 1980s, and two in the 1990s. The frequency was higher in the first half of the 20<sup>th</sup> century when there were 21 such hurricanes. Nonetheless, the actual number of powerful hurricanes hitting Florida shores is likely to be far less than most people assume. Consider, only three times in all of the 20th century had the most destructive hurricanes of Category 5 strength hit the U.S. shores.<sup>3</sup>

However, an unprecedented number of hurricanes made landfall in Florida in 2004 and 2005. Also, an unprecedented number of tropical storms - which get wide media coverage from the very start of their potential developments - brewed in the Atlantic Ocean. They would have undoubtedly contributed to psychological fatigue and possible relocation decisions for state residents as well as for those who may have had contemplated moving into Florida.

Due to the data availability to make an impact study, in this paper, we study the impact of only those hurricanes rated Category 3 or higher that made landfall in Florida in *recent* history. Specifically, the following hurricanes and their impacts are analyzed:

- Hurricane Andrew in 1992 - the most destructive to hit the state up to that time
- Hurricane Opal in 1995
- Hurricanes Charley, Frances, Ivan, and Jeanne in 2004 - the combined four hurricanes resulting in more damage than 1992 Andrew
- Hurricanes Rita and Wilma in 2005 - both reached Category 5 (the strongest of Hurricanes with sustained winds greater than 155 mph) with Wilma being the strongest hurricane ever measured

The destructive hurricanes prior to Andrew in 1992 go all the way back to the 1970s and the impact data are very limited for that period. Also lower rated hurricanes can leave behind major damages - such as the Category 2 Hurricane Irene in 1999 - but to limit the scope of the study, only the hurricanes of Category 3 and higher are examined. Summary descriptions of the each of the hurricanes to be studied are listed in the table below.

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truly of horrific nature in many developing countries precisely due to much lower or non-existent building codes.

<sup>3</sup> All data according to National Oceanic & Atmospheric Administration

Hurricane	Time Period	Category	Landfall in Florida	Damage
Andrew	August 24, 1992	4	Miami region	\$27 billion
Opal	October 4, 1995	3	Panhandle region	\$3 billion
Charley	August 13, 2004	4	Punta Gorda region	\$15 billion
Frances	September 4, 2004	4	Port St. Lucie region	\$9 billion
Ivan	September 16, 2004	5	Pensacola region	\$14 billion
Jeanne	September 25, 2004	3	Port St. Lucie region	\$7 billion
Dennis	July 10, 2005	3	Pensacola	\$1.2 billion
Katrina	August 25, 2005	5	South Florida as Category 1 (then later to Louisiana and Mississippi as Category 5)	\$75 billion (mostly from levy breach in New Orleans)
Rita	September 20, 2005	5	South Florida region as Category 2 (then later to Texas and Louisiana as Category 5)	\$4 to \$7 billion
Wilma	October, 24, 2005	5	Key West and Miami region	\$12 billion
Source: National Hurricane Center, Risk Management Solutions				

## Hurricanes' Impact

Businesses shut down on days immediately leading up to and subsequent to hurricanes making a landfall. Hurricane evacuations and damages will, at best, lead to only a few days of business closings and, with regard to housing, a few days of delay in settlements. At worst, there may be significant relocations among affected residents and “changing minds” about home purchases in the region.

For each of the above listed hurricanes, changes, if any, in home sales and home prices subsequent to the storm are examined. As with all economic analysis, changes in market conditions always occur even in the absence of natural disasters - such as changes in mortgage rates. Therefore, all impact studies will specifically make comparisons to those regions not impacted by hurricanes.

## Hurricane Andrew

Hurricane Andrew made landfall in the Miami region in late August 1992. The category 4 hurricane destroyed 23,000 homes and seriously damaged an additional 285,000 homes. There were 700,000 insurance claims valued at \$20 billion according to the Insurance Information Institute. The damage was four times larger than the previous high insurance payouts.

According to NAR home sales data, Florida sales fell 4.1 percent in the third quarter of 1992 when the hurricane hit from the second quarter, even after accounting for normal seasonal sales changes.<sup>4</sup> That is, home sales in Florida declined from a seasonally adjusted annual pace of 206,900 in the second quarter to 198,400 in the third quarter. Nationally, for the comparable period, sales declined by 2.0 percent, only half the decline of Florida's. On a year-over-year basis, sales in Florida fell 4.8 percent in the third quarter while national home sales rose 5.2 percent.

The decline in home sales lowered home prices in the Miami/Ft. Lauderdale region. The median home price declined by 0.9 percent in the third quarter (compared to the third quarter of 1991).<sup>5</sup> In the quarter prior, the local prices had risen 3.2 percent. Nationally, the median home price rose 2.1 percent in the second quarter and then 0.9 percent in the third quarter. Therefore, there was a much sharper turn in Miami/Ft. Lauderdale home prices (a 4.1 percentage point increase) compared to national prices (a change by 1.2 percentage points) in the immediate three months following Hurricane Andrew.

The local job market was surprisingly resilient. A hurricane's immediate impact has generally been to reduce economic activity because of power outages, stoppages in business activity, and a loss of income. However, the unemployment rate in August and September were identical at 10.5 percent, implying no impact on the job market in the first month following Hurricane Andrew. The unemployment rate then fell noticeably in October to 8.4 percent, likely due to reconstruction in the region. The lower unemployment rate occurred as unemployed people left the area and jobs were gained through rebuilding activity. The number of people unemployed fell from 229,000 in August and September to 180,100 in October - a much larger decline than the 23,100 net new jobs additions in October.<sup>6</sup>

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<sup>4</sup> For 1992 period, the relevant available housing data were home sales at the state level and home prices at the metropolitan level. Though home sales cover regions of Florida not impacted by the hurricane, the sales trend still provides a meaningful figure since the Miami/Fort Lauderdale region accounted for roughly one-third of state jobs, population, and the number of homes at that time. Home prices focused directly on the impacted Miami/Fort Lauderdale region.

<sup>5</sup> Home price growth always should be compared to the same time year ago. The principal reason is due to different mix of homes getting sold at different times of the year. For example, raw price data always show a lower price in the fourth quarter compared to the second quarter in any given year. This does not reflect price depreciation, but rather a higher proportion of smaller-sized homes selling in winter months compared to summer months. Families with children, who need larger sized homes, do not prefer moving in winter, so as to not disrupt the school year. Therefore, home prices should always be compared on a year-over-year basis, so as to maintain a roughly similar mix of homes getting sold during the quarter.

<sup>6</sup> Part of the gain is due to the normal seasonal rise in jobs in October. To control for seasonal factors, a year-over-year job gain should be examined. The 12-month job gain to October was 31,600 compared to



<b>Time Period</b>	<b>Unemployment Rate in Miami/Ft. Lauderdale region</b>	<b>Change in Unemployment Rate from a Year Ago (percentage point change)</b>
1992 - Jan	10.0	2.4
1992 - Feb	9.8	1.9
1992 - Mar	9.4	1.4
1992 - Apr	9.4	1.4
1992 - May	9.5	0.8
1992 - Jun	10.3	1.2
1992 - Jul	10.3	1.2
1992 - Aug (Hurricane Andrew)	10.5	1.2
1992 - Sep	10.5	1.1
1992 - Oct	8.4	-1.0
1992 - Nov	8.1	-0.9
1992 - Dec	7.8	-1.5

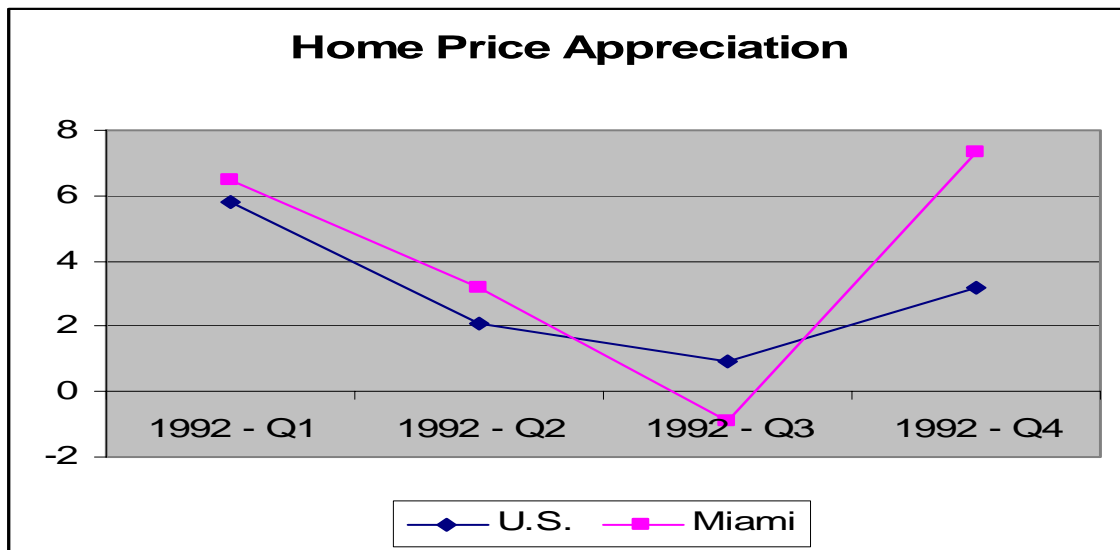
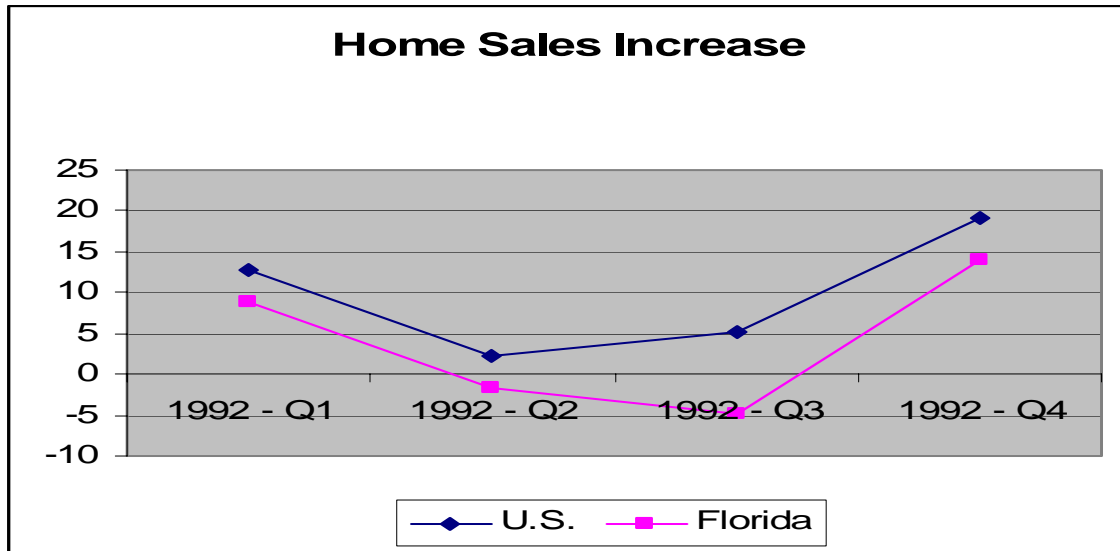
The recovering job market from the apparent rebuilding efforts as private insurance money and federal dollars flowed into the region then sparked the housing market to strengthen significantly. By the fourth quarter of 1992, existing-home sales in Florida rose to 260,300 (seasonally adjusted annualized rate), which is an increase of 31 percent from the third quarter. Part of the increase may have been caused by settlements that had been planned for late August and September getting pushed back to October. On a year-over-year basis, home sales in the state rose by 14.1 percent. National home sales activity had also increased a significant 19.1 percent in the same time period. Therefore, at least, home sales activity in Florida appeared to have returned to normal levels after only a single quarter.

A strong recovering housing demand pushed up home prices as well. Annual price appreciation was 7.3 percent in the fourth quarter for the Miami/Ft. Lauderdale region. Nationally, home prices rose at a much slower, though more stable, 3.2 percent rate in the fourth quarter. The two charts below illustrate clear changes in housing activity in the

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less than 16,000 in the hurricane impacted months of August and September - which again implies strengthening job market conditions after the hurricane.

third quarter (when Hurricane Andrew landed) and in the fourth quarter (when rebuilding efforts were underway).



The short-term impact of Hurricane Andrew, therefore, was to reduce home sales and home prices in the affected area - far lower than the trends observed for the country as a whole - in the immediate months after the hurricane's landfall. But the market quickly and rather robustly rebounded in the three-to-six months subsequent to the hurricane. The local job market was largely unaffected over the short run, but began to pick up noticeably, apparently due to rebuilding efforts following the hurricane.

Because insurance policies get renewed once a year, it is possible that housing market activity is impacted at much later point when insurance premiums rise or get cancelled. However, the data suggest that home sales were not negatively impacted after one year.

Florida enjoyed one of the best years for home sales in all of 1993 as sales rose by 22 percent.

Another longer-term impact to monitor are changes in the migration pattern of people moving into and out of the affected region. The number of households moving out of Dade County<sup>7</sup> increased significantly by more than 10,000 in a single year: from 30,468 in 1991 to 40,973 in 1992.<sup>8</sup> Meanwhile, there were no noticeable changes in the number of households moving into the county in 1992, or in the following year. The migration results imply a permanent displacement by a sizable number of people away from the hit region following this particular hurricane.

<b>Dade County</b>	<b>Number of Households Moving Into Dade County</b>	<b>Number of Households Moving Out of Dade County</b>
1991	26,664	30,468
1992 (Hurricane Andrew)	25,258	40,973
1993	26,149	32,726

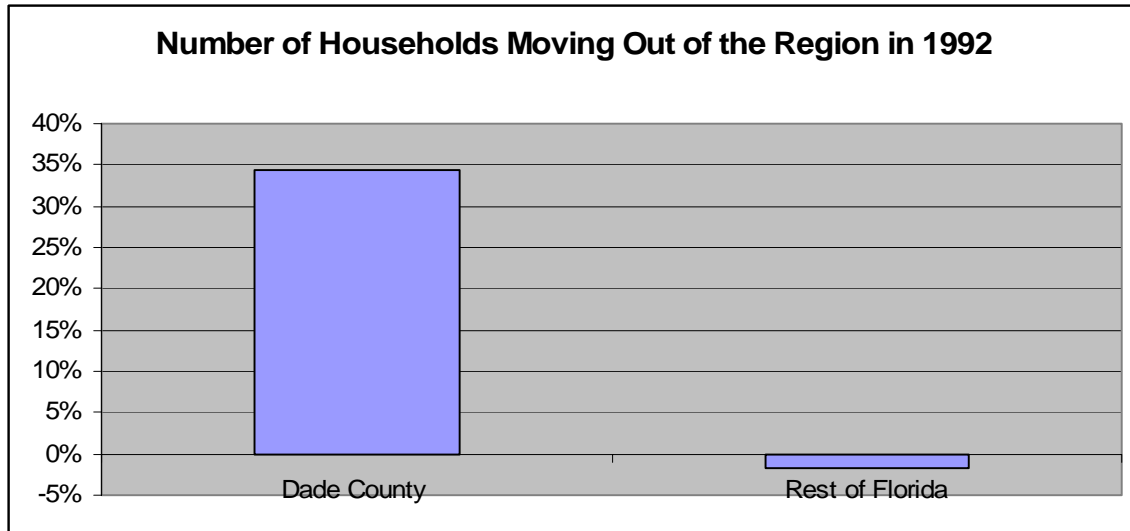
Interestingly, the migration pattern was favorable for the rest of Florida with more people moving in rather than moving out. For example, the number of people moving into Florida (excluding Dade County) rose by 3,425 and the number of people moving out of Florida (excluding Dade County) declined by 5,388 in 1992.

<b>Florida (excluding Dade County)</b>	<b>Number of Households Moving Into Rest of Florida</b>	<b>Number of Households Moving Out of Rest of Florida</b>
1991	389,955	329,469
1992 (Hurricane Andrew)	393,380	324,081
1993	390,354	323,991

In percentage terms, the number of households moving out of Dade County rose by 34 percent in 1992 while the rest of Florida experienced a 2 percent decline. Similarly, the number of households moving into Dade County declined by 5 percent while it rose by 1 percent for the rest of Florida in 1992.

<sup>7</sup> Dade County is now Miami-Dade County.

<sup>8</sup> The data is based on IRS tax filing records. IRS publishes annual the number of households moving into and out of a given county based on the change in tax filing address of persons with same social security number. The data, therefore, will not pick up movements of people who do not file tax returns for two consecutive years.

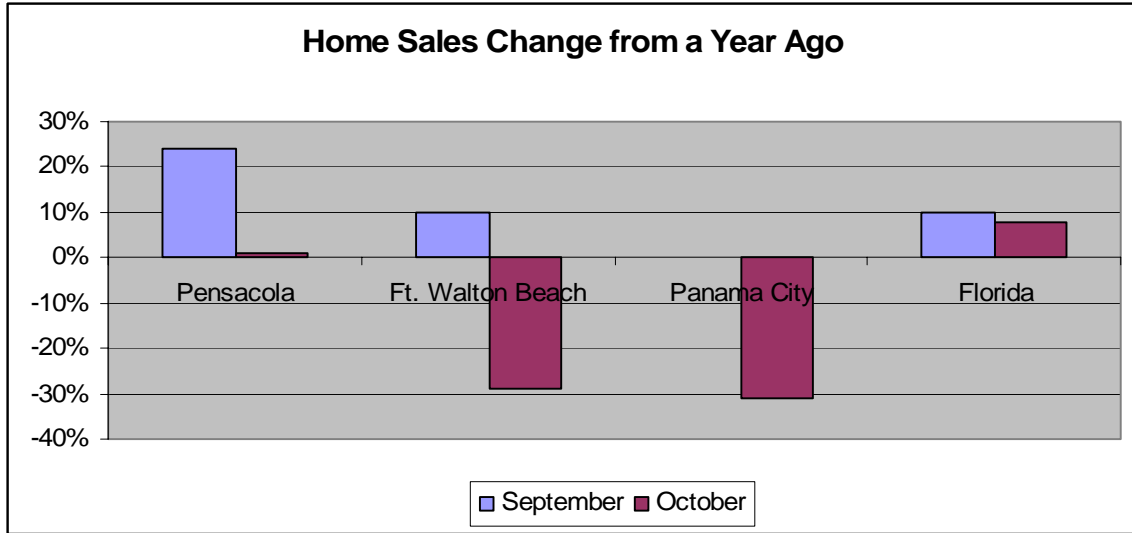


In sum, home sales and home prices declined much more than other non-affected regions in the immediate months following Hurricane Andrew. The job market was largely stable. After a few months, both the job market and housing activity began to pick up noticeably. But the long-term impact was mixed. The housing market remained robust while there was a pick up in the number of households leaving the affected region.

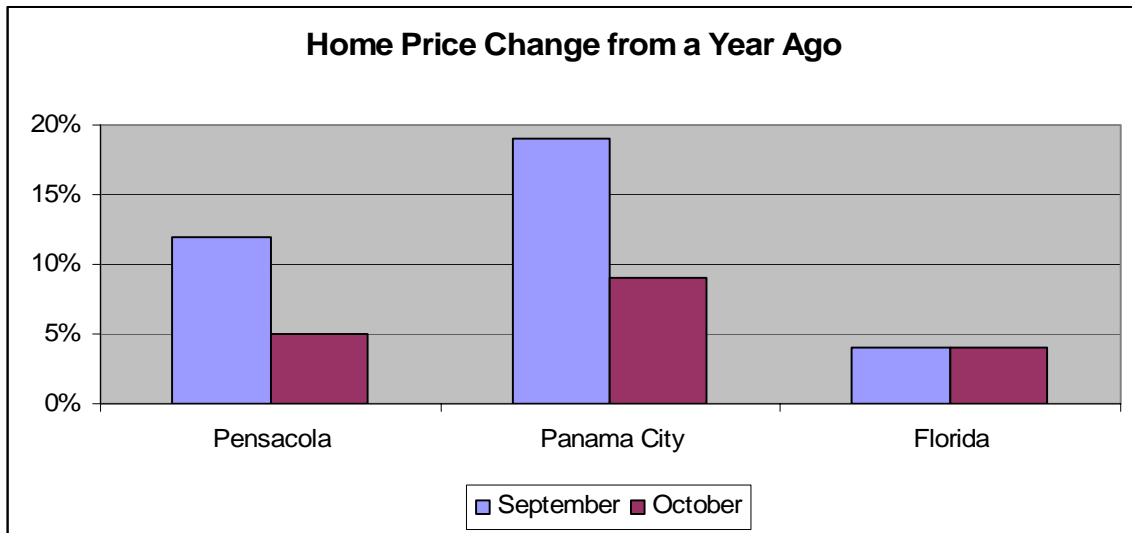
### **Hurricane Opal**

Hurricane Opal made landfall between Fort Walton Beach and Panama City in early October 1995. It was the first major hurricane to hit the Florida panhandle region in 20 years. The damage estimate was \$3 billion from this Category 3 hurricane - far less than that of Hurricane Andrew but certainly not an insignificant sum.

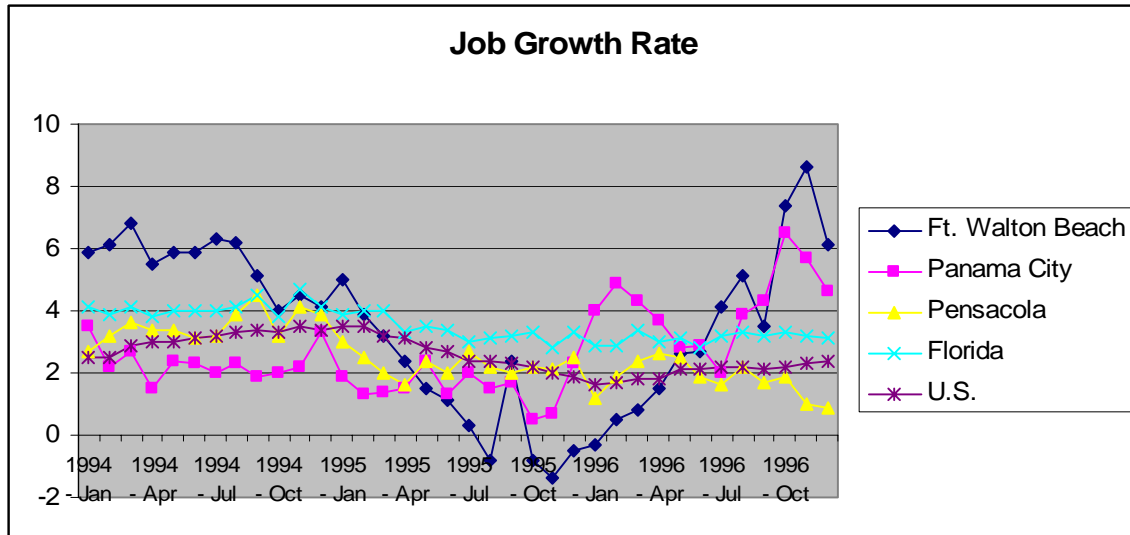
According to Florida Association of REALTORS® data, home sales fell significantly in October in the panhandle region. In September (the month prior to the hurricane) home sales in Pensacola were up 24 percent from a year before, up 10 percent in Fort Walton Beach, and neutral in Panama City. In October, sales were just 1 percent higher in Pensacola, down 29 percent in Fort Walton Beach, and down 31 percent in Panama City. For the state as a whole, home sales rose 8 percent in October, essentially the same rise as in September. Clearly, as in Hurricane Andrew, home sales were impacted heavily in the immediate month of the hurricane hit.



The substantial changes in home sales resulted in substantial changes in home prices. The panhandle region had enjoyed a strong double-digit growth in home prices prior to the hurricane. (Price data were unavailable for Fort Walton Beach). The price growth then slowed significantly after the hurricane. The home price trend was essentially the same before and after the storm for the rest of Florida not affected by it.

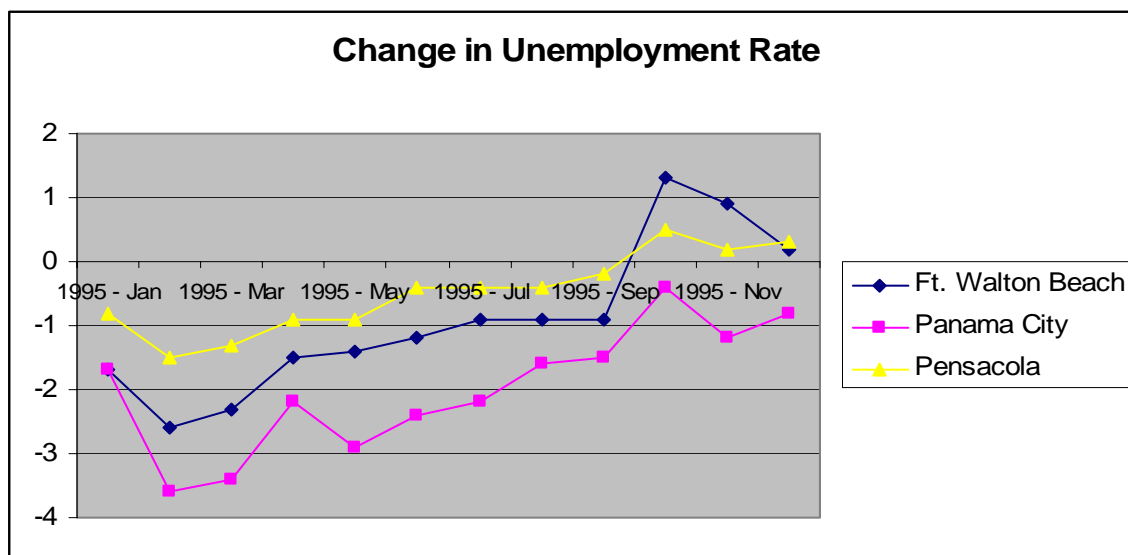


Unlike Hurricane Andrew, Hurricane Opal impacted job growth in the affected region over the short term. Job growth rates in the panhandle region had been performing better or near the U.S. growth rate for many months prior to the hurricane. The job growth then took a sharp downward turn in the months immediately following the hurricane in the affected region. Jobs, subsequently, rebounded strongly by early 1996 - presumably due to reconstruction in the hurricane-hit regions. As with Hurricane Andrew, the job market improved significantly once rebuilding work started.



A similar short-term negative impact on the job market is observed by examining another measure of local job market conditions: the unemployment rate. The changes in the jobless rate in the months immediately before and after Hurricane Opal made landfall in the region are provided in the table below. Unemployment, rather declining as it was before the storm, increased after the storm.

<b>Time Period</b>	<b>Fort Walton Beach: Change in Unemployment Rate from a Year Ago</b>	<b>Panama City: Change in Unemployment Rate from a Year Ago</b>	<b>Pensacola: Change in Unemployment Rate from a Year Ago</b>
1995 - Jan	-1.7	-1.7	-0.8
1995 - Feb	-2.6	-3.6	-1.5
1995 - Mar	-2.3	-3.4	-1.3
1995 - Apr	-1.5	-2.2	-0.9
1995 - May	-1.4	-2.9	-0.9
1995 - Jun	-1.2	-2.4	-0.4
1995 - Jul	-0.9	-2.2	-0.4
1995 - Aug	-0.9	-1.6	-0.4
1995 - Sep	-0.9	-1.5	-0.2
1995 - Oct (Hurricane Opal)	1.3	-0.4	0.5
1995 - Nov	0.9	-1.2	0.2
1995 - Dec	0.2	-0.8	0.3



For a longer-term impact, we again turn to migration trends. The five most northwest counties adjacent to the Gulf of Mexico are studied. They are Escambia, Santa Rosa, Okaloosa, Walton, and Bay Counties. For simplicity, they are referred to in this report as the Panhandle counties and the migration trends are shown below.

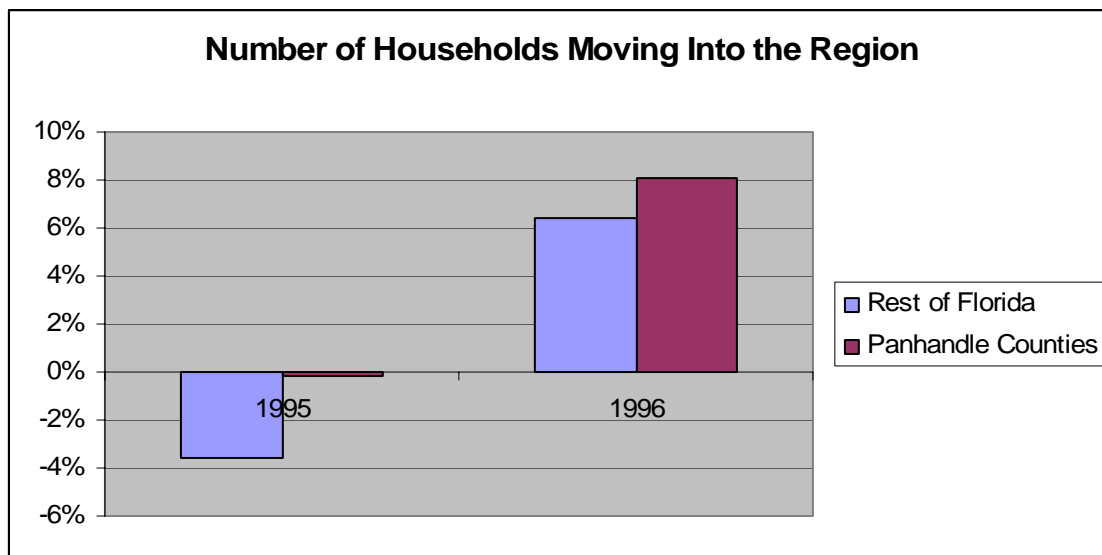
Panhandle Counties	Number of Households Moving Into Panhandle Counties	Number of Households Moving Out of Panhandle Counties
1994	27,104	23,793
1995 (Hurricane Opal)	27,062	23,324
1996	29,241	25,005

Interestingly, there was no discernable change in the migration trend in the Panhandle counties. The number of households moving into the region was essentially the same in 1995 as in 1994. Furthermore, it rose in 1996.

Also the number of households moving out of the Panhandle region in 1995 was essentially the same as in 1994. It then rose in 1996, suggesting a delayed increase in the number of people wanting to move out after the hurricane. However, the number of people moving into the region increased by a greater amount.

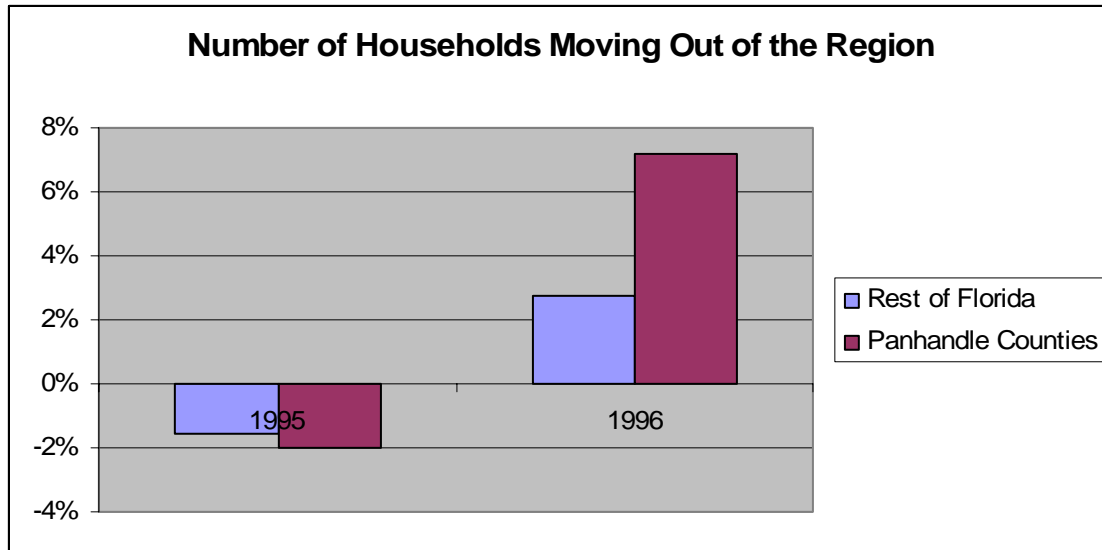
Florida (excluding Panhandle Counties)	Number of Households Moving Into Rest of Florida	Number of Households Moving Out of Rest of Florida
1994	401,556	346,905
1995 (Hurricane Opal)	387,252	341,428
1996	412,065	350,817

The percentage of households moving out of the Panhandle counties was more than twice the rate for the rest of Florida in 1996 - suggesting a delayed reaction after the October 1995 hurricane hit. But the number of households moving into the Panhandle region also increased in 1996 -- and at a faster pace than for the rest of the state. Therefore, it is difficult to draw conclusions as to whether or not Hurricane Opal “scared away” people from the affected region. In fact, the net migration (inflow minus outflow) for the state and for the Panhandle region actually improved in 1996.



Finally, housing market activity in the affected region showed no marked differences from the rest of the state after one year. In 1996, existing-home sales rose 4 percent in Fort Walton Beach, 5 percent in Panama City, and 15 percent in Pensacola. Sales rose 6 percent statewide. Home prices also did not show measurable differences between the affected region and the rest of the state after one year. Statewide, the median price rose 5 percent in 1996 versus an average of 5 percent in the three affected markets. In sum, it is safe to conclude that there were no lasting damages to housing activity over the long term after Hurricane Opal.





## 2004 Hurricanes

Hurricanes Charley, Frances, Ivan, and Jeanne – all in 2004 -- brought forth more destruction than the notorious Hurricane Andrew in 1992. The \$45 billion in destruction for the four hurricanes well exceeded the \$36 billion damage total (in 2004 dollars) of Andrew. Two million homeowners filed insurance claims.

The main affected regions were Port St. Lucie (twice hit, first by Frances and then by Jeanne), Punta Gorda, and Pensacola. The major Florida cities of Miami, Tampa, Orlando and Jacksonville largely escaped the brunt of the damage. However, the four destructive hurricanes and a historically high number of tropical storms and hurricanes that brewed over the Atlantic Ocean in 2004 exposed Florida's vulnerability to hurricanes, and therefore, may have impacted the whole state in terms of relocation decisions.

FEMA Damage Assessment and Volunteer Florida Evaluation placed the following 16 counties (with the associated MSA in parenthesis) as the hardest hit during the 2004 hurricane season:

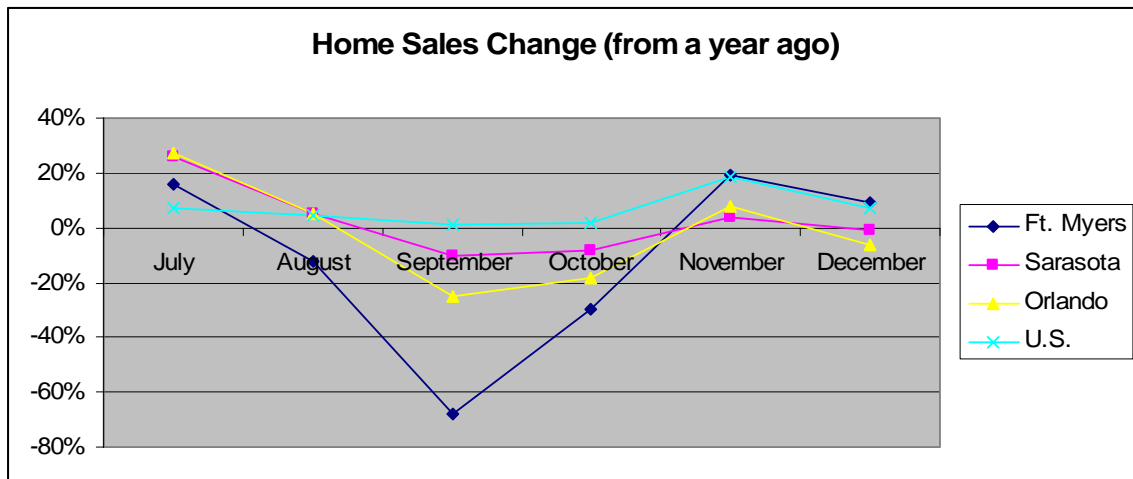
- Brevard (Melbourne-Titusville-Palm Bay)
- Charlotte (Punta Gorda)
- DeSoto (non-MSA, north of Punta Gorda)
- Escambia (Pensacola)
- Hardee (non-MSA, north of Punta Gorda)
- Highlands (non-MSA, west of Port St. Lucie)
- Indian River (non-MSA, north of Port St. Lucie)
- Martin (Fort Pierce - Port St. Lucie)
- Okeechobee (non-MSA, west of Port St. Lucie)
- Osceola (Orlando)
- Palm Beach (West Palm Beach)

- Polk (Lakeland - Winter Haven)
- Putnam (non-MSA, northwest of Daytona Beach)
- St. Lucie (Fort Pierce - Port St. Lucie)
- Santa Rosa (Pensacola)
- Volusia (Daytona Beach)

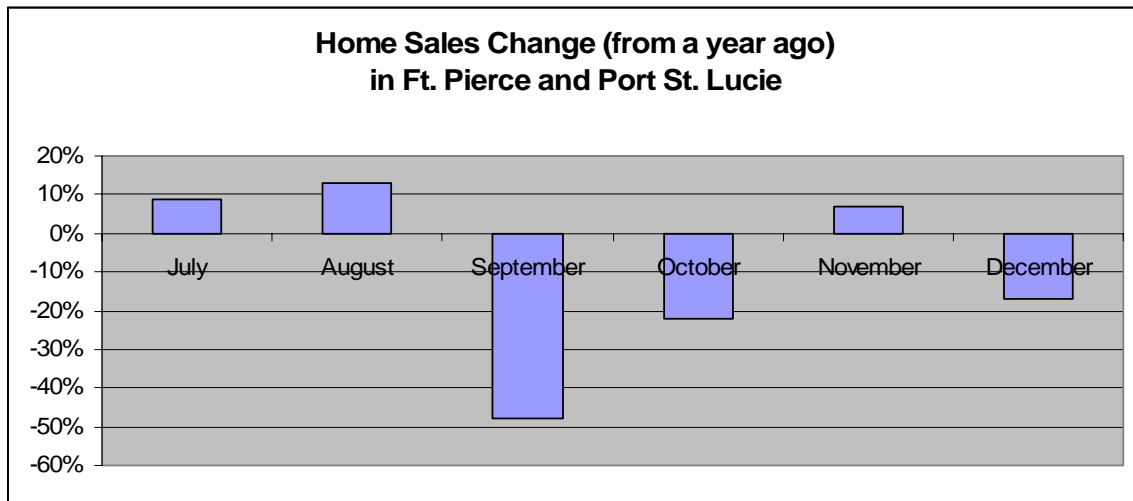
To the extent possible, the impact analysis will attempt to closely match these geographic regions. However, data availability will at times muddy the impact results. For example, Osceola County was one of the hard-hit counties, but the neighboring and much more populous Orange County was not. Both counties are part of the Orlando MSA. As a result, Orlando may get skewed by the less-impacted Orange County. By contrast, Fort Pierce - Port St. Lucie MSA took direct hard hits from two hurricanes, so the impact results can be considered more pure for this MSA.

The four hurricanes occurred in a 42-day time span from August 13<sup>th</sup> to September 25<sup>th</sup>. Before the hurricanes - up to July - the Florida housing market had been exceptionally robust with year-to-date sales up 23 percent and home prices rising by 16 percent. However, home sales drastically slowed in August when Hurricane Charley ripped through the Southern Gulf Coast of Florida. The home sales trend dramatically changed from July to August. Sales in August fell 12 percent (year-over-year) in Ft. Myers-Cape Coral, compared with a 16 percent increase in July. Sales increased only 5 percent in Sarasota (a less harshly hit region) in August, versus 26 percent in July. Even in Orlando, where the weakening Charley passed over, sales decelerated to a 5 percent increase in August, compared with a 27 percent increase the prior month. (No data were available for the directly hit region of Punta Gorda).

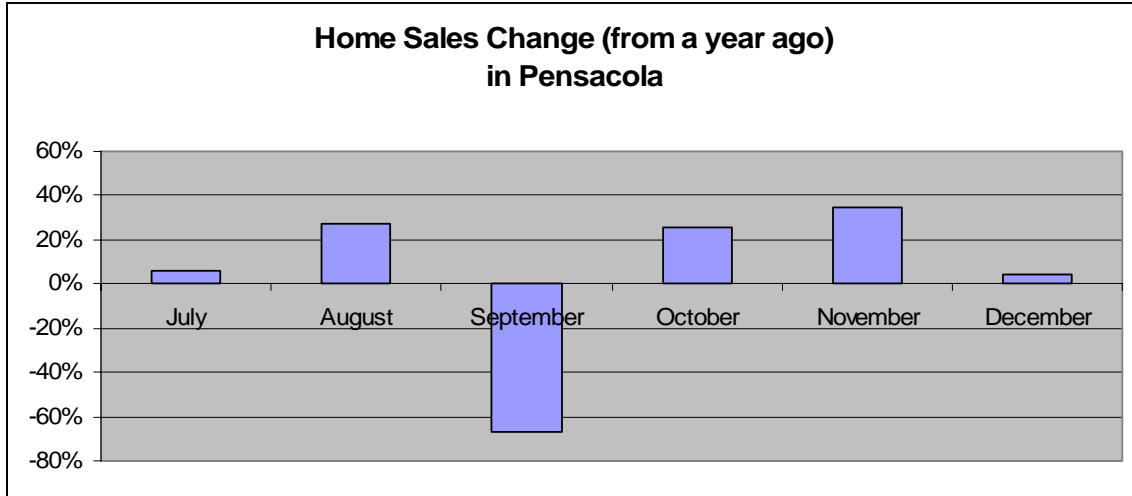
The home sales situation worsened in September. For Orlando, the residual impact of subsequent Hurricanes Frances and Jeanne in September undoubtedly lowered sales activity. The continuing decline in Ft. Myers and Sarasota is puzzling, at least compared with past hurricanes, which saw a quick rebound. By November though, sales activity in all three markets roughly resembled trends before the hurricane. As a comparison, the much more stable U.S. home sales trend is provided in the chart below.



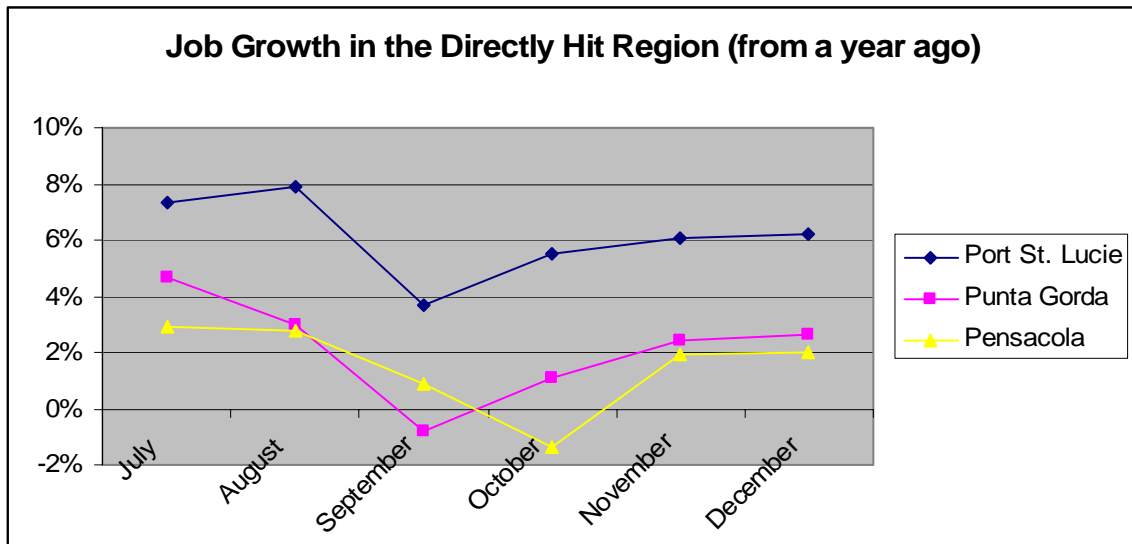
The most interesting region to observe is the Fort Pierce-Port St. Lucie market. Hurricanes Frances and Jeanne both made landfall there in September, just three weeks apart. As with other Florida markets, the Fort Pierce-Port St. Lucie market was rolling prior to the hurricanes. Sales were up 9 percent with home prices growth at a whopping 32 percent in July. August figures were just as spectacular: a 13 percent increase in sales and a 26 percent increase in prices. September sales then plummeted by 48 percent. Sales remained weak in October with a 22 percent drop. By November, some normalcy returned with sales rising 7 percent. Home prices, surprisingly, remained resilient throughout this period, recording nearly the same appreciation rate before and after the hurricanes.

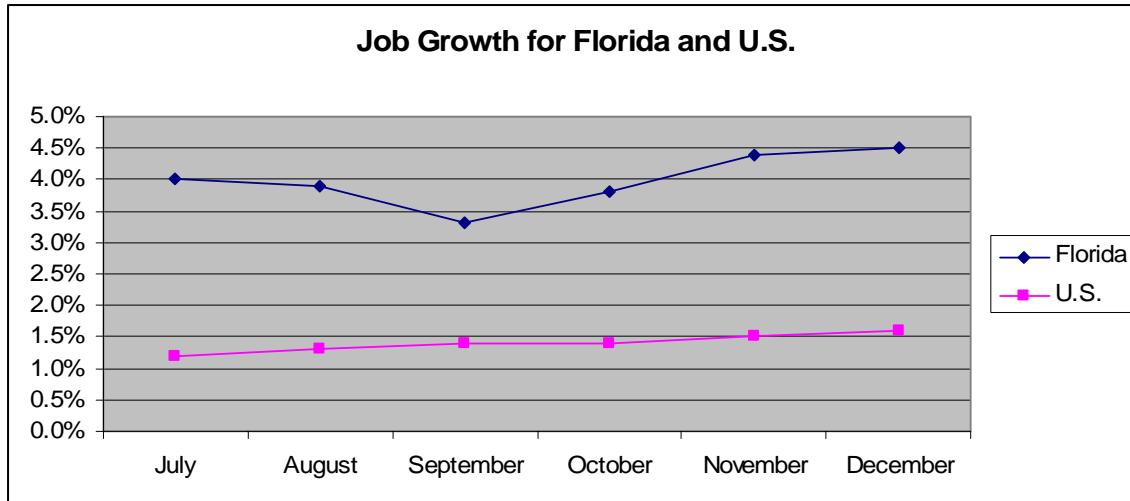


Hurricane Ivan's impact was relatively short-lived. Sales took a tumble the month the hurricane hit in Pensacola. But sales quickly rebounded the next month. As with other markets, home prices did not bear any negative impact following the hurricane. Pensacola, if anything, showed an accelerating price trend after the hurricane. Part of the explanation may be an increase in the number of larger and expensive homes selling after the hurricane. Though speculative, the wealthy residents or wealthy vacation-home owners may have been more inclined sell and exit the market.



The job markets in all three directly hit regions experienced only a minor temporary set back. The overall Florida job market was exceptionally healthy in comparison to the country before the hurricanes and continued to be so afterwards. As with Andrew (1992) and Opal (1995), the rebuilding efforts and insurance payouts apparently provided a boost to the local job market in the aftermath of four major hurricanes in 2004.





As to the longer term impact, the Florida housing market became red hot through the first half of 2005 (after the 2004 hurricane season and before the start of the 2005 hurricane season). The median home price had risen by a dramatic 28 percent compared from the same time a year before. Home sales were setting a record pace with a 3 percent jump from the record setting year in 2004.

The state led the country by a wide margin in total net in-migration (inflow of people minus outflow of people) from 2000 to 2005<sup>9</sup>. Florida gained 1.06 million net new people arriving from other states, with Arizona coming in at distant second with 408,000 net new people from other states. From 2004 to 2005, even after the unprecedented number of hurricanes, Florida gained more net new residents (263,000) than any other state.

Furthermore, every county in Florida, aside from Escambia and Monroe Counties, saw an increase in population from July 2003 to July 2005, according to annual U.S. Census Bureau estimates - before and after the 2004 hurricanes. The growth rates for most counties greatly exceeded the two-year national growth rate of 1.9 percent. Therefore, the far higher than normal frequency of hurricanes in 2004 did not significantly change people's desire to move into the Sunshine State.

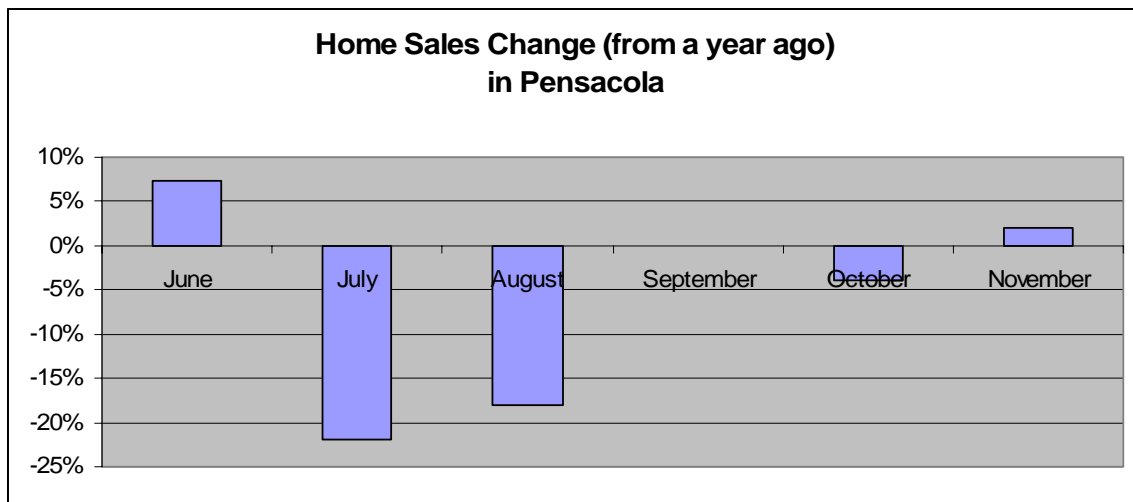
<sup>9</sup> IRS migration data is not yet available for 2004, so a county level migration pattern cannot be analyzed. The state level migration data is based on estimates by the U.S. Bureau of Census. The time period is from July 2000 to July 2005, which would have captured the 2004 hurricane impacts but not 2005 hurricanes.

<b>County</b>	<b>2-year population growth</b>
Alachua County	1.2%
Baker County	4.9%
Bay County	4.3%
Bradford County	4.4%
Brevard County	5.1%
Broward County	2.9%
Calhoun County	2.6%
Charlotte County	3.1%
Citrus County	6.1%
Clay County	9.0%
Collier County	7.4%
Columbia County	6.3%
DeSoto County	4.2%
Dixie County	5.2%
Duval County	1.8%
Escambia County	-0.3%
Flagler County	21.9%
Franklin County	1.0%
Gadsden County	2.6%
Gilchrist County	5.1%
Glades County	2.3%
Gulf County	3.0%
Hamilton County	0.0%
Hardee County	2.1%
Hendry County	6.5%
Hernando County	10.4%
Highlands County	5.0%
Hillsborough County	5.5%
Holmes County	1.3%
Indian River County	6.9%
Jackson County	4.5%
Jefferson County	3.2%
Lafayette County	8.5%
Lake County	12.2%
Lee County	10.7%
Leon County	1.3%
Levy County	4.7%
Liberty County	6.1%
Madison County	1.6%
Manatee County	6.8%
Marion County	8.0%
Martin County	3.5%
Miami-Dade County	1.7%
Monroe County	-3.2%
Nassau County	5.1%
Okaloosa County	2.5%
Okeechobee County	6.1%
Orange County	6.2%
Osceola County	12.4%
Palm Beach County	4.6%
Pasco County	10.6%
Pinellas County	0.3%
Polk County	6.3%
Putnam County	2.6%
St. Johns County	13.0%
St. Lucie County	12.8%
Santa Rosa County	8.2%
Sarasota County	5.6%
Seminole County	4.3%
Sumter County	8.4%
Suwannee County	5.0%
Taylor County	1.4%
Union County	6.9%
Volusia County	4.8%
Wakulla County	8.3%
Walton County	8.6%
Washington County	3.2%

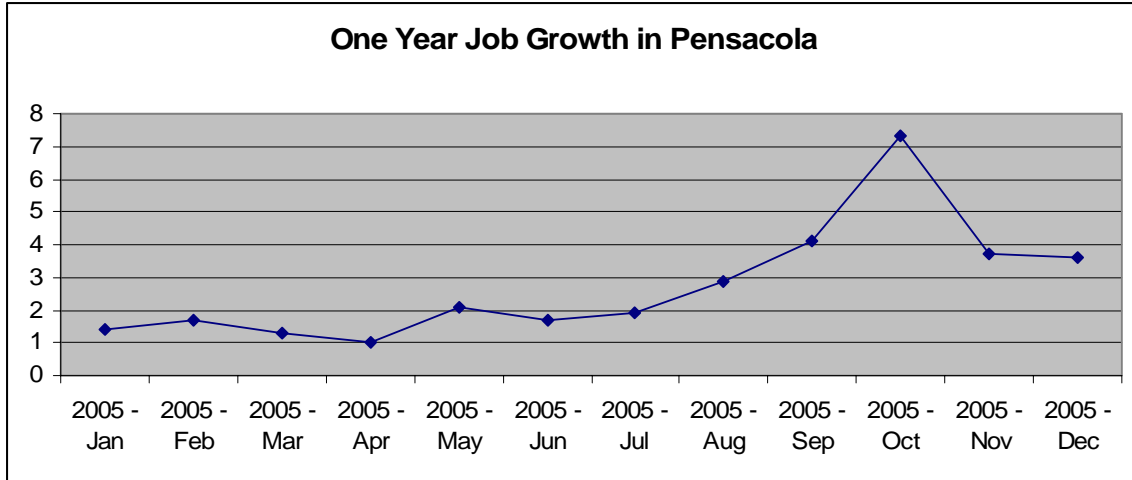
## 2005 Hurricanes

After the destructive 2004 season, hurricane-weary Florida residents received an equally fierce pounding in 2005. Hurricane Dennis scrolled past the Pensacola region with Category 3 strength. The infamous Katrina first made its landfall in South Florida, albeit at Category 1 strength, before heading to the Gulf Coast region near New Orleans. Rita and Wilma then made landfalls - also in South Florida.

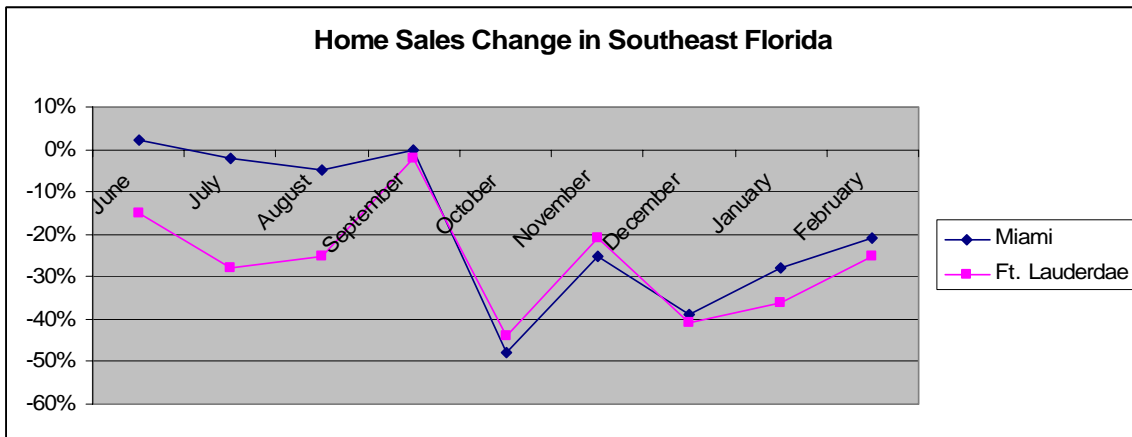
Pensacola was the first recipient of a major hurricane in 2005. As with other hurricane impacts, home sales slid in the month of the hurricane (July) and then returned to normalcy soon afterwards. (September sales were up by 222 percent, but are not comparable due to the September 2004 hurricane, which had drastically lowered sales, and hence, are not included in the below chart). Home price appreciation was exceptionally strong, as was the case with the rest of the Florida market, both before and after Hurricane Dennis.



The local job market response after the hurricane was very similar to responses after other past hurricanes. The rebuilding efforts improved job market conditions from pre-hurricane conditions.

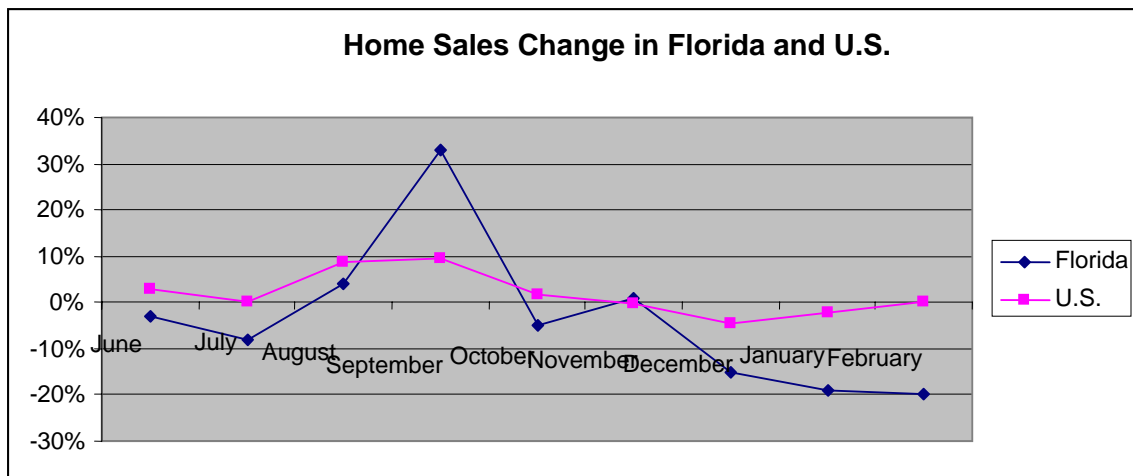
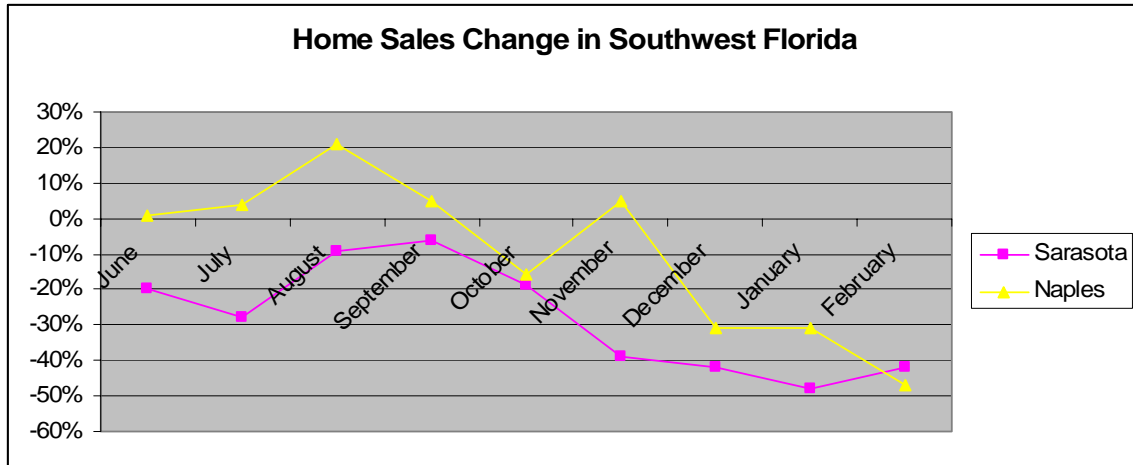


South Florida, from Miami and Ft. Lauderdale to Naples and Sarasota, then took the brunt of the damage in the next three hurricanes from August 25<sup>th</sup> to October 24<sup>th</sup>. Home sales took a turn for the worse as a result.<sup>10</sup> However, unlike previous hurricane impacts, sales remained depressed as of this writing - four months since the last hurricane's passage. The weak sales were not only in the affected region, but spread to the rest of the state.



<sup>10</sup> Ft. Myers data are not shown in charts due to inexplicable volatile movements in the data.





The reason for the continuing soft sales throughout the state could be twofold. First, the Florida market was one of the hottest markets in the country, and affordability could be a cause. Home prices had risen by 17 percent in 2004 and then by 29 percent in 2005. Such a fast home price appreciation tends to tame home-buying demand. Some people just cannot afford to buy a home at such high prices. Furthermore, mortgage rates have been rising since the late summer of 2005, thereby further making it difficult to afford a home.

Second, the weak sales figures, even many months after the last hurricane, may be the availability, or lack thereof, of property insurance. The property insurance market has come under extreme financial strain in light of the record-breaking number of hurricanes of the past two years. Insurance companies have significantly raised premiums, and in some cases, simply left the market.

Whether the depressed sales are being more impacted by high home prices and rising mortgage rates or by higher-priced and limited property insurance is difficult to say at the moment. A passage of time will provide a clearer view of the importance of the two impacts. (Home sales in the Las Vegas region, an area similar to Florida in terms of

dramatic price increases and strong net in-migration, have shown much better resilience in comparison to Florida in the latest months).

One unchanging trend has been the job market conditions. Two things are worth noting in the below table. First, job growth rates both before and after the storms did not deviate much, suggesting once again that hurricanes do not cause lasting harm to the job market. Typically, job growth expands once rebuilding efforts get underway. The second noteworthy item is the much faster job growth rate in Florida markets compared to the country as a whole. The strong job gain in Florida suggests continuing strong migration into the state even though official migration data are not currently available.<sup>11</sup> People are not deterred from moving into the state even after the record-high number of hurricanes in 2004 and 2005.

<b>Job Growth Rate (from a year ago)</b>						
	Miami	Fort Lauderdale	Sarasota	Naples	Florida	U.S.
June	1.2 percent	4.8 percent	7.1 percent	6.4 percent	3.7 percent	1.5 percent
July	2.2 percent	5.4 percent	6.0 percent	6.1 percent	3.7 percent	1.6 percent
August (Katrina)	3.6 percent	6.8 percent	5.9 percent	7.2 percent	4.0 percent	1.7 percent
September (Rita)	2.7 percent	6.3 percent	6.0 percent	7.6 percent	4.7 percent	1.6 percent
October (Wilma)	2.6 percent	4.8 percent	5.6 percent	6.8 percent	4.0 percent	1.3 percent
November	2.1 percent	4.2 percent	5.7 percent	6.0 percent	3.8 percent	1.5 percent
December	1.7 percent	4.2 percent	5.2 percent	5.4 percent	3.8 percent	1.5 percent
January	2.1 percent	4.5 percent	5.8 percent	6.0 percent	3.9 percent	1.6 percent

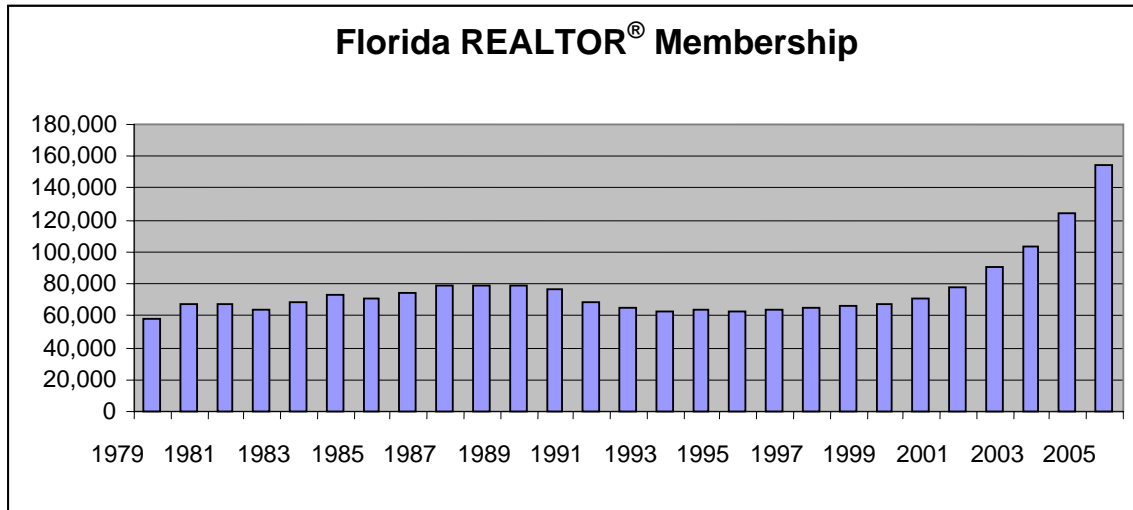
### **Hurricane Impact on REALTOR® Membership**

Do hurricanes impact REALTOR® membership? We found earlier that the housing market, aside from a temporary set back for a month or two, generally rebounds to pre-hurricane levels -- at least in Florida. Given that REALTORS® - entrepreneurial independent contractors - enter the business for profit motives, one would expect REALTOR® membership to respond to commission income changes and not to hurricanes.

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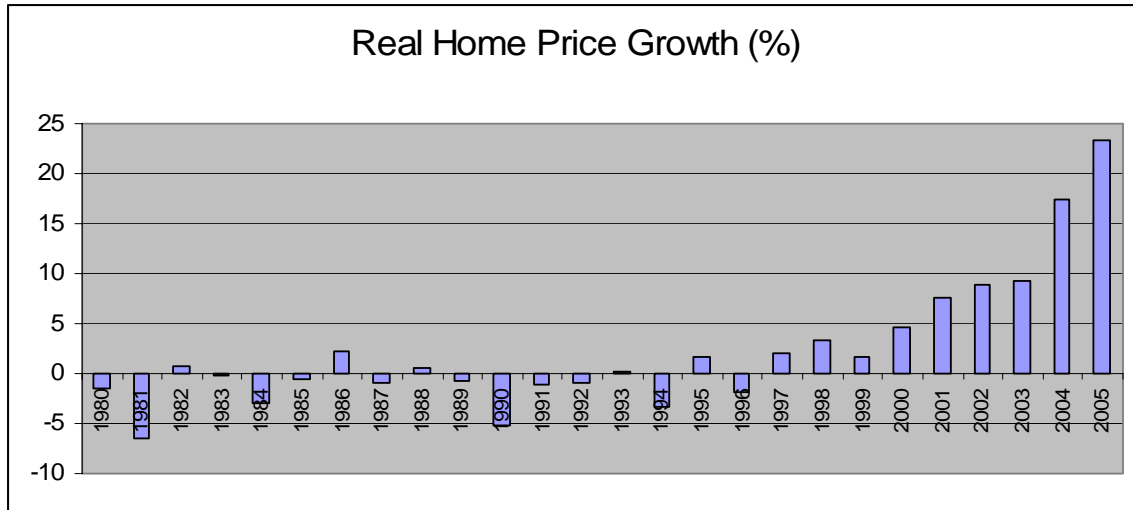
<sup>11</sup> Both the IRS migration data and the Census statewide estimate for the period after July 2005 are not currently available.

As can be seen in the below chart, membership generally trended up in the 1980s and then trended down in the 1990s. The net shift was minor during that period: 67,483 members in 1980 to 67,679 in 1999. Membership then exploded from 2000 to 2005 -- more than doubling in just five years. There were 154,558 Florida REALTORS® in 2005.



The recent membership boom occurred at the same time as an unprecedented real estate market boom in the state. Home sales rose at record levels. More importantly, home price growth increased in the past five years at the highest rate since formal record-keeping began in 1975. In real terms (after subtracting general consumer price index inflation), Florida home prices rose an average of 13.3 percent per year in the past five years versus a 0.4 percent annual average drop in the prior 20 years.

Though housing market conditions and membership trends suggest a strong direct relationship, a formal econometric analysis was also tested. The econometric analysis showed that membership is principally driven by housing market conditions and not by other factors.



Specifically, a regression analysis was performed on Florida REALTOR<sup>®</sup> membership with commission revenue changes as the explanatory variable. To control for other potential influencing factors, Florida job growth was also included in the analysis. The availability of jobs outside of the real estate industry can negatively affect REALTOR<sup>®</sup> membership. If there are more jobs outside the real estate industry, fewer will be encouraged to become REALTORS<sup>®</sup>. Similarly, few outside jobs will draw “underemployed” people to the real estate industry given the low entry barriers to the profession.

The econometric result is shown in the appendix. The result shows that commission revenue has a statistically significant positive impact on membership. The job growth rate in Florida, surprisingly, did not have a statistically meaningful impact. Hurricanes also did not impact membership totals.

The concern now is for the potential membership decline given the significant cooling in the housing market conditions in Florida. As mentioned earlier, it is difficult to decipher how much of the slowdown should be attributed to normal market correcting conditions and how much to the market failure in the insurance market.

### Further Research

The impact of the insurance availability on the housing market was discussed in general terms - such as rising premiums, limited coverage in high risk areas, and the financial deficits and sustainability of the state’s insurance of last resort, CITIZENS. Though outside the scope of this research, the next steps may be to quantify changes occurring in the insurance market in Florida. How much are premiums rising? What is the availability in “high-risk” regions? What is the financial prospect for CITIZENS? How will the insurance market change in the absence of CITIZENS (due to possible insolvency)? How will all the potential changes impact the state’s housing market? Such research will provide a better evidence on the importance of insurance on the housing market.



## **Appendix 1: Hurricane Categories**

Below is a list of the categories of hurricanes based on wind speeds and on potential damages according to the National Hurricane Center.

### **Category 1 Hurricane:**

Winds 74-95 mph. Storm surge generally 4-5 ft above normal. No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Some damage to poorly constructed signs. Also, some coastal road flooding and minor pier damage.

### **Category 2 Hurricane:**

Winds 96-110 mph. Storm surge generally 6-8 feet above normal. Some roofing material, door, and window damage of buildings. Considerable damage to shrubbery and trees with some trees blown down. Considerable damage to mobile homes, poorly constructed signs, and piers. Coastal and low-lying escape routes flood 2-4 hours before arrival of the hurricane center. Small craft in unprotected anchorages break moorings.

### **Category 3 Hurricane:**

Winds 111-130 mph. Storm surge generally 9-12 ft above normal. Some structural damage to small residences and utility buildings with a minor amount of curtainwall failures. Damage to shrubbery and trees with foliage blown off trees and large trees blown down. Mobile homes and poorly constructed signs are destroyed. Low-lying escape routes are cut by rising water 3-5 hours before arrival of the center of the hurricane. Flooding near the coast destroys smaller structures with larger structures damaged by battering from floating debris. Terrain continuously lower than 5 ft above mean sea level may be flooded inland 8 miles or more.

### **Category 4 Hurricane:**

Winds 131-155 mph. Storm surge generally 13-18 ft above normal. More extensive curtainwall failures with some complete roof structure failures on small residences. Shrubs, trees, and all signs are blown down. Complete destruction of mobile homes. Extensive damage to doors and windows. Low-lying escape routes may be cut by rising water 3-5 hours before arrival of the center of the hurricane. Major damage to lower floors of structures near the shore. Terrain lower than 10 ft above sea level may be flooded requiring massive evacuation of residential areas as far inland as 6 miles.

### **Category 5 Hurricane:**

Winds greater than 155 mph. Storm surge generally greater than 18 ft above normal. Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. All shrubs, trees, and signs blown down. Complete destruction of mobile homes.

Severe and extensive window and door damage. Low-lying escape routes are cut by rising water 3-5 hours before arrival of the center of the hurricane. Major damage to lower floors of all structures located less than 15 ft above sea level and within 500 yards of the shoreline. Massive evacuation of residential areas on low ground within 5-10 miles (8-16 km) of the shoreline may be required.

## Appendix 2: Econometric Results on FAR Membership

The following regression analysis was run:

$$\text{Florida REALTORS}^{\text{®}} \text{ membership} = f(\text{commission revenue growth, Florida job growth, prior year's Florida REALTOR}^{\text{®}} \text{ membership})$$

The data is annual frequency from 1980 to 2005. The time period was chosen due to official home sales data for Florida being first available from 1980. The time period, nonetheless, covers two down cycles in the early 1980s and early 1990s, as well the unprecedented real estate boom from 2001 to 2005. The prior year's Florida REALTOR<sup>®</sup> membership is included to control for time series autocorrelations (labeled as FAR(-1)).

The dependent variable is FAR membership (labeled as FAR). The result shows that commission revenue (labeled as REVENUE) has a statistically positive impact on membership. The job growth rate in Florida, surprisingly, was not statistically impacted.<sup>12</sup>

Not shown below, but dummy variables to account for strong hurricanes in 1992, 2004 and 2005, did not produce meaningful results. That is, hurricanes did not in any way impact REALTOR<sup>®</sup> membership in a negative way.

Dependent Variable: FAR

Method: Least Squares

Date: 03/30/06 Time: 10:28

Sample(adjusted): 1981 2005

Included observations: 25 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-29108.12	5571.596	-5.224378	0.0000
REVENUE	161.1145	72.58576	2.219644	0.0376
JOBFL	353.0979	482.3047	0.732105	0.4722
FAR(-1)	1.408664	0.071662	19.65706	0.0000
R-squared	0.962583	Mean dependent var		77462.36
Adjusted R-squared	0.957237	S.D. dependent var		21324.38
S.E. of regression	4409.706	Akaike info criterion		19.76665
Sum squared resid	4.08E+08	Schwarz criterion		19.96167
Log likelihood	-243.0831	F-statistic		180.0783
Durbin-Watson stat	0.635599	Prob(F-statistic)		0.000000

<sup>12</sup> The t-statistic was well below 2.