CATASTROPHIC RISK AND THE BEHAVIOR OF RESIDENTIAL REAL ESTATE MARKET PARTICIPANTS

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Eastern Finance Association
Baltimore
April 2002

Forthcoming: *Natural Hazards Review*

The Cameron School of Business and the Charles L. Cahill Faculty Research and Development Award Program, both at UNC-Wilmington, provided support for this research. Initial research support was provided also by the Center for the Advancement of Real Estate Education and Research at the University of South Carolina.

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Abstract

We gather home sales data for the Cape Fear region of North Carolina and model residential real estate market activity in this coastal area between 1995 and 2000, a period of unprecedented hurricane activity. We extend earlier research revealing an adverse relationship between home values and the series of hurricane strikes beginning in 1996 in the area. We construct a framework to consider the changing sentiment of the residential real estate market.. Sentiment is the perception of risk by investors in the securities markets, proxied by such measures as trading volume and bid/ask spreads. We hold that residential real estate markets can also be framed by selected measures of sentiment. We employ three sentiment proxies: the spread between listing (asking) and selling prices, average days of a home on the market and single-family homes sold per month. We find larger spreads and reduced monthly unit sales, but no significant effect upon the marketing time, in the region following the final hurricane landfalls. We believe that these measures of tempered sentiment are likely associated with perceptions of greater catastrophic risk, with the housing market disregarding early landfalls as little more than bad luck, but perhaps viewing later landfalls as evidence of increasing catastrophic risk in the study area.

I. Introduction

Hirshleifer (2001) holds that "the basic paradigm of asset pricing is in vibrant flux." Focusing on studies of investor behavior in the capital markets, he suggests that pricing and return patterns in the securities markets are inadequately described by existing financial theory. He highlights the importance of investor psychology, and sometime irrational behavior, in more completely describing security returns than is the case with "traditional" financial theory. The real estate market does not customarily lend itself to traditional financial or economic theory. We believe that we have the opportunity, however, to extend the understanding of real estate with a coupling of contemporary financial theory and real estate market behavior, in an environment where increasing levels of catastrophic risk seem to be influencing the behavior of real estate market participants.

Though homeowner and buyer behavior may not be irrational in responding to perceptions of increased catastrophic risk following multiple hurricane landfalls in the study region, the sentiment of market participants may well have changed; we examine proxies for that changing sentiment. Surrogates for investor sentiment can be adopted to describe responses by "investors" in the housing market to the exposure of the market to hurricane landfalls and catastrophic risk. These "surrogates" include the spread between listing (asking) and selling prices of homes, average days of a house on the market and the number of single-family houses sold per month. We employ these proxies to examine investor responses to perceptions of increased catastrophic risk. We discover progressively greater and more significant changes in these measures with successive hurricane strikes in an area with seemingly increasing exposure to catastrophic risk. In our tests, we find evidence of changing sentiment among the participants in the residential real estate market; our models suggest that the housing market in our study region is

likely responding to a new set of previously unexamined and unpriced factors, and that increasing "bid/ask spreads" and decreasing unit sales are associated with the last in a series of unprecedented hurricane landfalls.

Our findings should be of interest to several audiences. Developers can use the information as they assess the storm impacts on housing demand. Real estate agents might employ our research as they develop marketing plans. Government officials can use the information when formulating policy to regulate housing construction. Finally, lenders and insurers could use our findings in assessing financial and insurance needs, as they relate to the risk of hurricanes.

We briefly review the recent history of hurricanes in the study region in the next section. We consider extant research on investor sentiment and real estate pricing in Section III. In Section IV, we develop a model with which we measure changes in real estate investor sentiment as a function of a series of hurricane landfalls in the study region. We describe our data collection and provide summary statistics in Section V. We summarize our empirical results in Section VI. Some closing remarks conclude the paper.

II Hurricane History in the Study Region

A highly unlikely series of storms made landfall in the Cape Fear region of southeastern North Carolina in the four hurricane seasons ended in 1999. Referencing Table 1 and its associated storm probabilities, the chances of four storms making landfall over a four-year period is less than one in 10,000. Yet the area, including Wilmington, NC, suffered four hurricanes in four years. As in Figure 1, Bertha made landfall in mid-summer, 1996; Fran struck in September of that same year. On the Saffir-Simpson scale, portrayed in Table 1, Hurricane Bertha was a category 2 storm and Fran was a category 3 hurricane. Also in that figure, Bonnie hit the area in August of 1998 and Floyd made landfall 13 months later; these last two storms were category 2 hurricanes when they struck. The media report that Bertha inflicted $270 million in damages to the United States. Hurricane Fran caused around $3.2 billion in damages. Bonnie was a borderline category 2/3 storm that inflicted over a quarter of a billion dollars in damage, while Floyd caused between causing $3 - 6 billion in damages, depending on the inclusion of extensive inland flooding caused by Floyd's rains.

III. Background

In recent work, Graham and Hall (2001) find that the series of hurricane strikes in the Wilmington, NC, area are associated with increasing adverse impacts on average home selling prices with each successive hurricane landfall. Graham and Hall show that monthly home prices generally increase between December of 1995 and June

of 2000, but this pattern is abbreviated following Bonnie and Floyd. In their model, after controlling for time, location, costs of financing and general economic conditions, they show significant adverse price effects following the most recent storms. They allow that the declinations in price can be attributed to changing perceptions by buyers of the exposure of the area to catastrophic risk, but generate no explicit measures of changing perceptions – outside of the price changes – in their study.

There is considerable debate over the impact upon consumer behavior of low-probability, high-risk events such as hurricanes and earthquakes. Brookshire, Thayer, Tschirhart and Schulze (1985) suggest that the expected utility hypothesis is a "reasonable" description of the behavior of consumers when faced with a low-probability, high-risk natural hazard event. Similar to Hirshleifer's (2001) remarks, however, Camerer and Kunreuther (1989) propose that normative models of choice, such as expected utility theory, fail to provide adequate descriptions of individual choices with respect to these sorts of events. They conclude that people often do not behave according to economic rationality and do not always "effectively " use information to estimate the probabilities of risky events. It is important to note, however, that behavior deemed "irrational" before a series of hurricane landfalls, such as in a house pricing concession, may well be appropriate given a perception of increasing catastrophic risks in an area. We reach no conclusion on the rationality of the residential housing market, but seek to comment instead on the general sentiment of that market with our tests.

Although a fairly broad literature has developed in the academic sector that considers the importance of investor sentiment in describing security prices, we find no such study widely circulating in the real estate community. Even as real estate constitutes a significant portion of most investors' portfolios – a majority for most homeowners given the recent retrenchments in the securities markets – there is a dearth of research on real estate investor sentiment.[1] However, several authors – noted below - consider proxies similar to those we employ for changing real estate market particapant sentiment, as they explain the behavior of the capital and real estate marketplaces.

III. A. Spread between the listing and selling price

Our basic premise is that spreads between listing and selling prices will increase as the sentiment of residential market participants changes with perceptions of increased exposure to hurricanes and catastrophic risk. Homebuyers become less willing to purchase at current prices and sellers more willing to sell at lower prices, ceteris

[1] See Alan Abelson's editorial in *Barron's*, August 13, 2001, p.4.

paribus, due to expectations of increasing future hurricane losses. As a result, sellers are willing to provide some price concession to compensate less-motivated buyers for the assumption of additional risk.[2]

Many authors consider the spread between home listing and selling prices. Kang and Gardner (1989) acknowledge the complex relationships between listing prices and selling prices and housing market conditions. Asabere and Huffman (1993) find the spread narrows with increased time of the house on the market; these results are similar to Kalra, Chan and Lai (1997), who discover a positive relationship between time on the market and ultimate selling price. A declining listing price for a distressed seller, and narrower spread, is suggested by Springer (1996); he finds faster home sales at lower prices for these sellers in financial distress. His findings echo across foreclosures, a distressed element of the housing market. However, none of these studies consider the impact of increasing catastrophic risk on these spreads.

III. B. Average days on the market

We believe that with growing homebuyer aversion to a perception of increased catastrophic risk, the average days of a typical home on the market, absent the sorts of price concessions that might be provided by a more motivated seller, will increase. Asabere and Huffman (1993) find that sales prices actually increase with more time on the market, other things equal, but they do not specifically consider the explanatory power of days on the market for a market in distress. Zeitz and Zeitz (2000) uncover a positive relationship between price discounts and days on the market for mid-price homes; they imply an element of distress in this mid-priced market, similar to the distress that may exist in a market at perceived increasing risk of hurricane strike.

Haurin (1988) finds a longer marketing time, and increased days on the market, associated with "atypical" homes that invite a greater variation in offers relative to more conventional homes that can be more easily priced by both buyers and sellers. Jud, Seaks and Winkler (1996) show that the probability of sale increases with the days a home is on the market. Kalra and Chan (1994) find that days on the market are increased with lot size and decreased with price concessions and fireplaces (especially in their study area of Fargo, ND!); in a partitioning of their data, mortgage rates and local employment are significant in explaining time on the market for a portion of the housing

[2] Analogous to greater volatility in home prices in this context, Brown (1999) finds greater discounts on the selling prices of closed-end funds (CEF's) with increased CEF price volatility; his work extends a decade-long debate on the importance of investor sentiment in describing pricing and volume behavior in the securities markets. The CEF "puzzle" is examined earlier by Lee, Shleifer and Thaler (1991), who find that discounts – similar to listing/selling spreads for homes – on CEF's narrow when buyers perceive less risk in the CEF purchase. The buyers are willing to pay a price for the CEF that is closer to the "full" value of all of its included assets. Elton, Gruber and Busse

stock. Variability in the days on the market as a function of mortgage interest rates is also found by Kang and Gardner (1989); they show that attempts by sellers to extract higher prices in periods of low interest rates are typically unsuccessful and that newer homes sell faster. Mentioned above, Kalra, Chan and Lai (1997) portray a positive influence of time on the market on the home's selling price. Each of these authors augments the story told by a home's "days on the market," but none ties this marketing period to overall market sentiment.

III. C Unit sales per month

As a belief develops among homebuyers that a housing market is increasingly susceptible to new and previously unpriced elements of risk, a period of time is required for the market's participants to set new prices and adjust to the new risk factor. In this light, we expect greater days on the market to be required to sell extant housing inventory, as new hurricanes make landfall. This expectation is tempered where sellers and buyers perceive similar changes in the marketplace and are able simultaneously to adjust their pricing expectations. Absent this "simultaneous" adjustment, it logically follows that the average monthly unit sales in the market, with this new and unpriced risk, will fall.[3] In the examinations that follow, controls are provided for these three measures of market sentiment, in an attempt to discover the role played by this sentiment in describing the response by the housing market to this new catastrophic risk.

IV. Methodology

Our main premise is that the overall sentiment of the residential real estate market, in an area of perceived increasing exposure to catastrophic risk, will deteriorate. Testable implications of this deterioration include an increase in the average spreads between home selling prices and original listing prices, a greater average number of days on the market for homes sold and decreasing units of homes sold per month in the market in the periods following this increase in risk exposure. Prosaic models portray each of these testable implications as a function over time of the area's series of hurricane strikes. Our principal hypothesis is that initial hurricane strikes are viewed as random events, with no appreciable impact on spreads or days on the market or units sold, while later strikes may be viewed as part of a pattern of increasing susceptibility of the region to catastrophic risk. The following models test the strength of each of these three elements of this principal hypothesis.

(1998) do not support the findings of Lee, Shleifer and Thaler, yet Neal and Wheatley (1998) find that spreads on CEF's *are* important sentiment measures; these discounts predict later fund returns.

IV. A. Test for an increasing spread between the listing and selling prices of homes

Random catastrophic events such as hurricanes or earthquakes should have no impact on the perception of market participants of the susceptibility of the area to this risk. However, a series of these events in a short period of time, such as the successive hurricane strikes in our study region, likely impacts market perceptions of the likelihood of increasing expected future catastrophic losses. This changing perception of the riskiness, for example, of a home purchase, manifests itself in a widening spread between asking (listing) and selling prices; buyers are increasingly averse to the greater risk and require compensation – in the form of a discount of the selling price from the listing price – for assuming the risk. The following model can test for this increasing spread:

where,

$$(1) \qquad \text{Spread} = \beta_0 + \beta_1 \text{ Time} + \beta_2 \text{ Fran} + \beta_3 \text{ Bonnie} + \beta_4 \text{ Floyd} + \varepsilon,$$

with the spread being a function over time of a constant term, time and the successive landfalls of Hurricanes Fran (and Bertha), Bonnie and Floyd.[4] The dependent variable is the ratio of the difference between the average listing and selling prices each month of the study period to the average listing price. The final factor is an error term. We expect that the landfalls of Fran and Bertha in the summer of 1996 are likely to have been viewed as nothing more than "bad luck" by the home-buying and selling public, with no significant impact on prevailing spreads between asking and selling prices in the single-family housing market. However, we believe that market participants may view the later landfalls of Bonnie and Floyd in a different fashion; we hold that spreads will widen after Bonnie and Floyd as the market responds to perceptions of the area being at increased exposure to catastrophic risk.

Inasmuch as we suggest changing levels of spreads, days on the market and unit sales near the end of the data stream, we construct interactive dummy variables accounting for the periods following the hurricane strikes. The timeline in Figure 1 portrays the benchmarked period before September of 1996 for which we do not control with a dummy variable; the period from month 10 (October of 1996) to month 33 (September of 1998) is controlled by the dummy for Hurricane Fran; the period from month 34 (October of 1998) to month 45 (September of 1999) is captured by the dummy for Hurricane Bonnie, and months 46 through 54 separate the impact on market participant sentiment of Hurricane Floyd. Each of these dichotomous factors is the product of the dummy variable for the period after each storm and time squared, respectively. This dummy variable construction allows for the impact of

[3] This is counter to the findings of Brown (1999) in his examinations of investor sentiment and CEF's. He finds increased trading activity in periods of increased investor perceptions of risk in the CEF market.
[4] We do not include a separate variable for Bertha, as the storm made landfall within six weeks of Fran.

events at the end of the data stream, such as the most recent hurricane strikes, to be more clearly portrayed. Time is a linear variable from 0 to 54 for each of the 55 months of the study. We expect the dummy variable for Fran in 1996 to be insignificant. Our premise suggests that the dummies for Bonnie in 1998 and Floyd in 1999, however, will be successively more positive and significant as the market "prices" the perception of increasing catastrophic risk of expected future hurricane losses. We believe that sellers might later narrow this spread with less ambitious prices, but that an increasing contrast between selling and listing prices will first betray changing market sentiment.

IV. B. Test for an increasing number of average days of a home on the market

We test for a perception of increased catastrophic exposure also using the average days of a home on the market as a proxy for this perception.

Where, similar to our test for a widening spread, we hold:

(2) $\text{Days on the Market} = \beta_0 + \beta_1 \text{ Time} + \beta_2 \text{ Fran} + \beta_3 \text{ Bonnie} + \beta_4 \text{ Floyd} + \varepsilon,$

with days on the market being a function over time of a constant term, time and the successive landfalls of Hurricanes Fran (and Bertha), Bonnie and Floyd. The dependent variable is the average days on the market from initial listing until sale. As with the spread analysis above, we expect no significant impact on the average length of time for a home on the market after Fran. However, we hypothesize that the later landfalls of Bonnie and Floyd are viewed in a different fashion; we suggest that the time on the market will increase after Bonnie and Floyd as the market responds to perceptions of increasing catastrophic risk. We predict increasingly positive and significant coefficients for the dummy variables for Bonnie and Floyd.

IV. C. Test for decreasing single-family homes sold per month

We test for a perception of increased catastrophic exposure, as well, using single-family homes sold per month as a final proxy for this perception.

Where, as with our first two tests, we hold that:

(3) $\text{Unit Sales Per Month} = \beta_0 + \beta_1 \text{ Time} + \beta_2 \text{ Fran} + \beta_3 \text{ Bonnie} + \beta_4 \text{ Floyd} + \varepsilon.$

The dependent variable is the total number of home sales closed during each month of the study period. Expectations for the hurricane dummies follow logic similar to that developed in the two models above. We expect unit sales to be described by the constant term, time, an insignificant dummy variable for Fran (and Bertha), and progressively more significant and negative values for the coefficients of Bonnie and Floyd. In a growing economy, we also anticipate monthly unit sales increasing over time. However, we expect the market to respond to perceptions

of increasing exposure of the area to hurricane losses with reduced buying activity and reduced unit sales per month especially following the most recent storms.

V. Data Collection and Summary Statistics

To test each of these three elements of our main hypothesis, we use monthly sales data gathered for the study region between December of 1995 and June of 2000, a period of 55 months. Data are provided by the Multiple Listing Service and the Association of Realtors for Brunswick, New Hanover and Pender Counties. Wilmington, in New Hanover County, is the largest city in this coastal area of southeastern North Carolina. A general description of the housing market for the Wilmington area over the study period is given in Table 2. Housing market activity is increasing over much of the study period, with some retrenchment in 1999 and 2000, perhaps in part attributable to the increasing hurricane activity. Housing inventories, that are expected to increase in a growing market, could also expand in a contracting market, as existing product is left unpurchased.

In Table 2, the dollar spread between average listing and selling prices is given for selected times during the study period. Similarly, average days of homes on the market and unit sales per month are shown. Several general patterns emerge. Days on the market fall and then rise near the end of the study period. Unit sales increase through 1999, but then decrease dramatically in the period following Floyd. Admittedly, these trends may simply be a function of the periods reported, as a comprehensive presentation of all the data is omitted for simplicity of presentation. However, the tests results reported below, employing the entire 55-month data set, suggest this cursory initial review is on target.

VI. Empirical Results

A priori predicted signs of our explanatory variables and test results of Equations 1 – 3 are given in Table 3. We test for the separable relationships between the dependent variables and each hurricane landfall. We do not suggest that the only determinants in the change in these dependent variables are these hurricane landfalls. We recognize that other factors are at play. Dummy variable construction in our models provides that the coefficient values for Fran, Bonnie and Floyd are merely benchmarked against the period between December of 1995 and August of 1996, prior to the arrival of any in this series of hurricanes. Chi-square values and F-tests reported in Table 3 affirm reasonably constructed models and a measure of the explanatory power of the three functions, respectively.

With our first function, we expect a positive and significant constant, as few homes sell at a premium to listing price. We have no expectations about the signs or significance levels of the Time or Fran coefficients. We expect successively more positive and significant coefficients for the Bonnie and Floyd factors, respectively. The results generally support our contentions. The size and power of the Floyd factor, for example, suggests that the average spread between asking and selling prices, relative to the listing prices, increases by over 8% of a home's value in the months following Floyd. In Table 3, a coefficient value of .00004 for Floyd means that the average change in the log of a home's value in the first month following Floyd (October of 1999 is month number 46 in our study, with the monthly data beginning in December of 1995, month 0) is 46-squared times .00004 or .08464. Assuming the average listing price is $150,000, with a log of 11.9184, a change of .08464 suggests a log of 11.8338; this equates to a value of $137,833 and suggests an increase in the spread of over $12,000, or over 8% of a home's value for the average sale. A less significant increase in the average percentage spread of around 4% is observed in the months following Bonnie.

These results with Equation 1 are even more telling given the much greater local housing damage following Fran than with Bonnie and Floyd in later years. It could be argued that homeowners simply lowered home prices following the storms, given the damage inflicted by the storms. If that were the case, a positive and significant factor would especially have been observed after Fran, and it was not. Tempered responses would be expected following Bonnie and Floyd, given their relatively modest damage to the housing inventory. However, this was not the case. The most significant result is observed following Floyd, suggesting market participants are likely responding to a set of factors – including perceived catastrophic risk – that did not exist following the first storm in the series.

Equation 2 describes the impact of successive hurricane strikes on the average days on the market for listed homes that later sell. Results do not support our initial premise. Only the intercept term and the Time variable are significant in describing movements in the dependent variable. We expect that the average days on the market will increase, with increasing aversion by homebuyers to the new element of risk in the housing market, but our findings are not significant. This suggests that perhaps sellers, as proxied by this measure of market sentiment, are adjusting their expectations and moving product out of the market, in a timely fashion, albeit at lower prices and with greater distances from earlier set asking prices. These insignificant results are tempered, however, as we consider the possibility that homes may have been delisted and relisted following the storms, camouflaging the extended time that homes may have spent on the market following the storms. Days on the market is "reset" with each new listing.

Contrary to our discoveries for Equation 2, however, results at the bottom of Table 3 confirm most of our expectations for Equation 3. Unit sales per month decline significantly in the months following the landfall of Hurricane Floyd. Monthly unit sales are increasing over the study period, as captured by the Time variable. This is consistent with an overall healthy and growing local economy. Unit sales are not significantly impacted in the period following Bonnie, but the impact following Floyd is dramatic. The data suggest that average monthly sales in the first month following Floyd drop by 225 units. Considering the results of Equations 2 and 3, it only follows that the available inventory of homes falls by the time of Floyd's arrival.

VII. Concluding Remarks

We extend earlier studies that find relationships between home values and a series of catastrophic events. Prior work suggests, and we affirm, an adverse relationship between a series of hurricane strikes and home selling prices in the Cape Fear area. In this paper we find also that two measures of market sentiment are negatively associated with the last in a series of storms in the study region and may be the result of perceptions of increasing catastrophic risk. The two proxies for sentiment, the average relative spread between listing prices and selling prices and average units sold in the market per month, both increase following the most recent storm, Floyd, in 1999. The average spread begins to increase significantly following Bonnie, the penultimate hurricane in 1998.

No direct measures of investor sentiment exist for either the securities or real estate markets. However, it is possible to infer patterns in security or residential market sentiment with the use of selected surrogates. We adopt measures in this paper that we believe begin to describe the sentiment of the residential real estate market. We hold that the sentiment of this coastal region's housing market is compromised by a perception of increased exposure to the catastrophic risk posed by an unprecedented number of hurricane landfalls in a short period of time. With the potential homebuyer anticipating greater future expected property losses, we find greater spreads and fewer units sold in the periods following the most recent hurricanes.

These results are of interest to several audiences. First, knowledge of this influence on housing demand may help developers better plan their building activity. Second, this knowledge may assist real estate agents better market properties in the subject area. Third, local government planners could use the results, as well, in directing growth to minimize hurricane losses. Finally, lenders and insurers might use the data to better plan their activities and to anticipate changes in the demands for real estate funding and home insurance.

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Table 1
Tropical Weather Wind Speed Categories and Associated Probabilities for the Wilmington, North Carolina Area

Saffir-Simpson Storm Category	Category Wind Speed Ranges	Annual Probabilities of Maximum Sustained Winds
Tropical Storm	39-73mph	0.15336
Category 1	74-95mph	0.02826
Category 2	96-110mph	0.00817
Category 3	111-130mph	0.00520
Category 4	131-154mph	0.00254
Category 5	155+mph	0.00010

Table 2
Housing Market Activity in the Cape Fear Region for December of 1995 – June of 2000

	Actual Spread[1]	D. O. M.[2]	U. S. [3]
Dec. 1995	$54,078	146	209
1st Quarter 1996	$49,040	109	584
2nd Quarter 1996	$56,941	64	624
3rd Quarter 1996	$45,268	109	716
4th Quarter 1996	-$18,083	106	628
1st Quarter 1997	$39,008	123	580
2nd Quarter 1997	$50,394	120	857
3rd Quarter 1997	$55,864	116	835
4th Quarter 1997	$50,775	107	780
1st Quarter 1998	$61,679	131	797
2nd Quarter 1998	$38,653	132	1,078
3rd Quarter 1998	$23,150	134	751
4th Quarter 1998	$30,529	139	651
1st Quarter 1999	$71,752	156	659
2nd Quarter 1999	$53,574	123	1,130
3rd Quarter 1999	$40,409	141	781
4th Quarter 1999	$44,810	168	419
1st Quarter 2000	$40,814	151	133
2nd Quarter 2000	$65,863	148	339

[1] Actual Spread is the average listing price minus the average sales price.
[2] D. O. M. is the average time (days on market) a home "sits on the market" after being listed until being sold.
[3] U. S. is total units of MLS listed properties sold per month for December of 1995 and per quarter thereafter.

Table 3
Empirical Results of Equations 1 - 3

	Predicted Sign	Coefficient	P-Value	Model Specification Test
Eq. 1, Relative Spread[1]				
Intercept	+	0.30569	<0.0001	$\chi^2 = 8.06$
Time	?	-0.0034	0.0008	p-value = 0.91
Fran	?	0.00005	0.4943	
Bonnie	+	0.00004	0.0656	
Floyd	+	0.00004	0.0147	
F = 2.39				
p-value = 0.05				
Eq. 2, D.O.M.[2].				
Intercept	+	101.730	<0.0001	$\chi^2 = 5.32$
Time	?	1.05777	0.0275	p-value = 0.71
Fran	?	0.00124	0.9727	
Bonnie	+	-0.0018	0.8490	
Floyd	+	0.00275	0.7121	
F = 7.06				
p – value < 0.01				
Eq. 3, U.S.[3]				
Intercept	+	177.414	<0.0001	$\chi^2 = 16.34$
Time	+	4.22407	0.0006	p-value = 0.55
Fran	?	0.04093	0.6463	
Bonnie	-	-0.00761	0.7366	
Floyd	-	-0.10222	<0.0001	
F = 16.74				
p – value <0.01				

[1.] Relative Spread is the average listing price minus the average sales price, this divided by the average listing price.
[2.] D. O. M. is the average time (days on market) a home "sits on the market" after being listed until being sold.
[3.] U. S. is total units of MLS listed properties sold per month.

Figure 1

Time Line of Monthly Counter Variable and Hurricane Strikes