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Subject: The Capitalization of Stricter Building Codes In Jacksonville, Florida House Prices

One important factor impacting the safety of a house is the construction standards that are in place at the time a house is built. These construction standards are defined by the building code. A building code is a set of rules designed to provide general public safety relative to buildings and other structures. Requirements established under the building code typically include construction methods used to make the structures more resistant to loss (e.g., higher quality roofing shingles that are better able to withstand higher wind speeds). As such, a building code can be viewed as containing a package of mitigation features that will evolve and improve over time as technology and building materials improve.

Regulations on building and construction can be traced back to early recorded history with the establishment of penalties for building collapse appearing in The Code of Hammurabi (around 1790 B.C.). In the United States, George Washington and Thomas Jefferson were early advocates for minimum building regulations. National building code standards evolved through time and the International Code Council was established in 1944 for the purpose of developing a single set of comprehensive national construction codes.

Florida began mandating statewide building codes during the construction boom of the 1970s. These codes provided “state minimum building code” guidelines for municipalities and counties. The Florida Building Code, which became effective on March 1, 2002, set stricter requirements for home construction and was designed to eliminate the existing patchwork of building regulations within the state. This new code, through stricter requirements for siding and shingles, was designed to ensure that buildings in high-intensity hurricane areas could better withstand the impact of wind-borne debris. The Windborne Debris Region (WBDR) in Florida is defined as areas where the basic wind speed is 120 miles per hour or areas within one mile of the coast that experience winds of 110 or greater miles per hour.

The new code presented homeowners with three options for meeting the increased wind standards: (1) installing impact-resistant doors and windows that use laminated glass similar to that found in car windshields; (2) installing window shutters including plywood in some areas; or (3) building a reinforced roof that won’t become detached should wind enter the home. In general, evidence shows that homes built under the new Florida Building Code are better at withstanding a major disaster. This is a direct result of the mitigation features embedded in the new building code. A 2005 study by University of Florida engineer Kurt Gurley shows that newer homes withstood the four hurricanes of 2004 better than older homes. In reports provided to the Office of Insurance Regulation, Applied Research Associates (ARA) reported on the improvement in performance for the newer homes (i.e., built under the newer building code). The ARA study shows that the newer homes perform better across all wind speeds, but the strongest performance (lower ratio) are for wind speeds that would be classified as major hurricanes (i.e., category 3 or higher).

For the stakeholders in an insurance marketplace with catastrophe exposure, mitigation provides the hope for a future of lower losses and price volatility. As such, mitigation affects every participant in the insurance marketplace and the importance of effective mitigation cannot be understated. However, mitigation adds to construction costs and some builders and officials estimated that construction costs may increase by as much as 10 percent and that wind compliance alone could add as much as \$3,500 to \$12,000 to a 2,000 square-foot house (Kimel,

2002). A Department of Community Affairs study estimated that the materials and processes required under the new code could increase the cost of a new home between 0.5 percent and 10 percent (Sams, 2002). It is against this tension between safety, costs, and consumer risk perceptions that this study takes place.

This study examines the capitalization of the 2002 Florida Building Code in house prices for the Jacksonville, Florida housing market. It extends the Dumm, Sirmans, and Smersh (2008) study by examining consumer buying behavior in a market that has been impacted by a significant and more recent change in building code standards (2002 Building Code versus 1994 South Florida Building Code) as well as a market with lower hurricane risks (Jacksonville versus Miami-Dade County). As such, this study addresses the value to consumers of safety as signaled by the institution of a stronger building code in a setting where this change is more recent and it also examines the relationship between building code and consumer preferences for consumers whose risk exposure expectations may be significantly lower than consumers in south Florida.

A hedonic pricing model is used to estimate the differential effect on house prices of the stricter 2002 Florida Building Code. The model also tests whether the stricter building code became more valuable to homebuyers after the disaster “reality checks” of 2004 and 2005. The results show that houses in the Windborne Debris Region that were built under the new, stricter building code sold for about 4.50 percent more, on average, than houses built under the older, less strict code. Thus, for the area with the greatest risk exposure, consumers were recognizing the value of the stricter building code and were willing to pay a premium for the additional safety. The reality check variables show that this premium did not change after the devastating storms of 2004 and 2005.

The results for the interior wind zones (110 and 100 mile per hour) show a negative premium for building code. Thus, for these zones, the stricter building code was not valued by consumers and houses built under the newer code actually sold for less, on average. The post-catastrophe variables for homes in the 110 mile per hour zone show that, after the 2004 hurricanes, the building code premium became less negative and, after the 2005 hurricanes, became positive. After the relatively quiet 2006 hurricane season, the premium once again turns negative. The

results for homes in the 100 mile per hour zone show that, after the 2004 hurricanes, the negative premium did not change. However, after the 2005 hurricanes, the building code premium turns positive. After the 2006 hurricane season, the building code premium shrinks but remains positive. Thus the impact of these storms on consumer behavior was substantial for these zones.

The post-catastrophe (“reality check”) variables provide some interesting insight into consumer behavior. For the zone with the most risk exposure, the existing positive premium for building code did not change after either the “close call” of 2004 (Hurricane Charlie) or the 2005 hurricanes. For the inland zone with the highest negative premium (the 110 mile per hour zone) the negative building code premium was reduced immediately following the 2004 hurricane season. This may in part reflect the proximity of Hurricane Charlie as it crossed the state from west to east and exited the state near Jacksonville. This behavior is affected even more after losses from an additional three hurricanes in 2005.

However, it appears that consumer’s memories are short since the building code premium disappears (and returns to a negative level) after the relatively quiet 2006 hurricane season. A similar result is observed for the 100 MPH zone where, after the 2006 hurricane season, the building code premium decreases but does remain positive. This may be the result of the “test of time” syndrome for consumers. A homebuyer may see no advantage of paying a premium for a newer-code home (which may have fewer amenities) relative to an older home that has stood the test of several severe natural disasters. In other words, consumers have a greater preference for additional amenities as opposed to disaster mitigation. In addition, factors such as the cost-effectiveness of substituting hazard insurance for hurricane disaster, consumers’ preferences for product characteristics over solid construction, and the availability of social insurance (efficient evacuation, National Guard protection of property) may affect the value that consumers attach to the stricter building code.

The results for the building code variables for the neighborhood zones also show differences in consumer willingness to pay a premium for safety. For the Beaches and Southside neighborhoods, the coefficient on the building code variable is positive and significant. For the Northside and Westside neighborhoods, there is a negative premium for homes built under the

2002 Florida building code. As observed for wind zone locations, there is a positive premium for homes sold after the 2005 hurricane season. The premium ranges from 3.65 percent for the Beaches neighborhood to just over 16 percent for the Northside neighborhood. For homes sales after the 2006 hurricane season, the Beaches, Arlington, and Westside neighborhoods continue to show a premium albeit small for Arlington (1.19 percent) and Westside (1.36 percent). For the Southside neighborhood, the premium turned negative for the post 2006 hurricane season period (5.84 percent).

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