Estimating the Effects of Wind Loss Mitigation on Home Value

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Why is this research important?
The insurance climate/demographic problem

- Uncertainty
- Cost of capital
- Economic feasibility
Baldwin County, AL Real Estate & Homes for Sale

764 Homes

Sort by Relevant listings

Brokered by WELLHOUSE REAL ESTATE LLC

New - 17 hours ago

Built by D.R. Horton - Baldwin

New - 19 hours ago

New construction

Note: To increase accuracy, the keyword is the most commonly searched terms. Resume search.
$640,000
LOT 57 Wedgewood Dr, Gulf Shores, AL 36542
4 beds 3 baths 2,420 sqft

Est: $3,573/mo ↗ Get pre-qualified

Residential  Built in 2024  0.25 Acres lot
$264/sqft  $33/mo HOA

What’s special
PRIVATE POOL  LARGE BACK PATIO  HUGE FAMILY ROOM  SPACIOUS PRIMARY SUITE
OVERSIZED ISLAND  WATER CLOSET  TRAY CEILINGS

Welcome home to this beautiful new construction custom home in the Island Wood Subdivision. This split level home has a huge family room with a lot of natural light, high ceilings, crown molding and centered around the fireplace. This spacious kitchen/dining area is an "This Gold" Fortified 4 bedroom, 3 bathroom sing...
## FORTIFIED Insurance Discounts

<table>
<thead>
<tr>
<th>Mitigation category</th>
<th>Existing Home</th>
<th>New and Existing Home</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Roof &gt; 5 years old</td>
<td>Roof ≤ 5 years old</td>
</tr>
<tr>
<td><strong>FORTIFIED™ Gold</strong></td>
<td>40%</td>
<td>50%</td>
</tr>
<tr>
<td><strong>FORTIFIED™ Silver</strong></td>
<td>35%</td>
<td>45%</td>
</tr>
<tr>
<td><strong>FORTIFIED™ Bronze</strong></td>
<td>20%</td>
<td>35%</td>
</tr>
</tbody>
</table>

Discounts apply to the wind portion of insurance premiums.
Do people value risk?
Evaluating Effects on Sale Price

• Two methods:
  – Capitalize insurance savings
  – Direct estimate from sale price data
Methodology 1: Capitalize insurance savings into home value

\[
Value = Savings \times \frac{1 - (1 + r)^{-n}}{r}
\]
Methodology 1 – Gulf Shores, AL

- Average wind premium is approximately 80% of total premium
- House with replacement cost = $150,000
  - Premium with wind = $3,544
  - Premium without wind = $653
  - Wind premium = $2,891

https://www.aldoi.gov/ComparePremiums/HomeZipCodes.aspx
Discount reduces annual cost by $875

Average interest rate = 3.9%

$875 \div 0.039 = $22,436
Methodology 2: simulate appraisals with statistics
Sample

• Transactional data on home sales
  – Baldwin county, Alabama
  – Sold between 2014 and 2017
  – Arms length transaction
  – At least 1 FORTIFIED house sold in subdivision
• IBHS provided FORTIFIED home data
• Total sample size = 1,054 properties
• 235 FORTIFIED
  – Most were Gold
Methodology

• Begin with the standard hedonic regression model
  – Dependent Variable = Natural Log of Sale Price
  – Set of Explanatory Variables
    • House Characteristics: Fortified, square feet, age, bedrooms, bathrooms/bedroom, fireplace, lot size, siding, condition, swimming pool
    • Location: Subdivision, school district, census tract
    • Distance to coast interacted with FORTIFIED

\[
\ln(\text{Price}_{ids}) = \alpha_0 + \beta_f \text{Fortified}_i + \beta_d \text{Distance to Coast}_i \\
+ \beta_{rd} \text{Fortified}_i \times \text{Distance to Coast}_i + \mathbf{X}_c \beta_c + \mathbf{D}_d + \epsilon_{is},
\]
\[i = 1, \ldots, N; \quad d = 1, \ldots, D; \quad s = 1, \ldots, S.\]
Table 4: OLS estimates with school-district fixed effects and subdivision clustered errors.

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent variable: Ln(Sale price)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fortified</td>
<td>0.121***</td>
<td>0.143***</td>
</tr>
<tr>
<td></td>
<td>(0.044)</td>
<td>(0.045)</td>
</tr>
<tr>
<td>Distance to coast</td>
<td>−0.017***</td>
<td>−0.036***</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.007)</td>
</tr>
<tr>
<td>Fortified × Distance to coast</td>
<td>−0.014**</td>
<td>−0.020***</td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td>(0.006)</td>
</tr>
<tr>
<td>Direct marginal effect</td>
<td>0.069***</td>
<td>0.071***</td>
</tr>
<tr>
<td></td>
<td>(0.028)</td>
<td>(0.029)</td>
</tr>
</tbody>
</table>

\[ e^{\beta_r + \beta_r d \times d} - 1 \]
**Table 6** Summary of average marginal effects of Fortified on house value (%).

<table>
<thead>
<tr>
<th>Distance to coast</th>
<th>Mean (4.5 miles)</th>
<th>Median (3.80 miles)</th>
<th>Min. (0.09 miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OLS – FE</td>
<td>5.7</td>
<td>7.1</td>
<td>15.2</td>
</tr>
<tr>
<td>SEM</td>
<td>5.2</td>
<td>6.5</td>
<td>13.4</td>
</tr>
<tr>
<td>SDEM</td>
<td>5.1</td>
<td>6.3</td>
<td>12.7</td>
</tr>
<tr>
<td>SLM</td>
<td>6.3</td>
<td>7.8</td>
<td>15.9</td>
</tr>
<tr>
<td>SAC</td>
<td>4.7</td>
<td>6.0</td>
<td>13.0</td>
</tr>
</tbody>
</table>

*Note:* Results are direct marginal effects of Fortified on house sale price at the sample median, mean, and minimum values of Distance to coast. Inverse distance spatial weights matrices are county-wide. Results are based on estimates of the OLS fixed effects model (second column of Table 4), spatial error model (SEM), spatial Durbin error model (SDEM), spatial lag model (SLM), and the spatial autoregressive combined model (SAC).
Results

• \( \approx 7\% \) positive price differential for FORTIFIED designation

• Average sale price was \$299,000
• \( 7\% \times 299,000 = \$20,930 \)
Method 1 vs. Method 2

• $22,436 vs. $20,930

• Encouraging that they are similar
• Method 1 > Method 2

→ No evidence that risk matters
How can insurers improve resilience?

- Embrace change
- Provide coverage that rebuilds stronger
- Incentivize performance construction capacity
- Advertise FORTIFIED™
- Finance retrofits

SMART HOME AMERICA
Thank you