Natural Hazards, Amenities and Landuse

• Common theme of the economics work: (Kriesel and Ferreira)
  – Investigate working of the real estate markets in coastal areas.

• The GIS work: (Kramer)
  – Online tools for visualization of alternative development and growth scenarios
Logic of the real estate analysis parallels property appraisal

• Comparable sales approach

• Cost of replacement/reproduction

• Net income capitalization approach
Statistical Method

• Multiple regression analysis of how property prices are determined by 3 types of characteristics

  – Home sq. footage, age, lot size, hurricane protection, boat dock, etc.

  – Neighborhood characteristics

  – Amenity factors like marsh proximity and communal space
Data Collection

• Three coastal Georgia counties
  - Chatham
  - Glynn
  - Camden

• Sources of Data
  - County Tax Assessor’s Office
  - Natural Resources Spatial Analysis Laboratory
  - U.S. Census Bureau
Research has proceeded in 3 phases

- Past: Do residential subdivision developers have a market incentive to incorporate more open space, smaller lot sizes?

- Current: Did the incentives change during the housing bust?

- Future: What are the benefits of elevation retrofitting houses for flood resilience?
Past long story - short

• All but 2 of 16 independent variables statistically significant

• All variables had predicted direction of influence.

• R-square ranged around 75%
Simulation scenarios

• Status quo: 20 ha, 100 homes, 5% Commons, 15% impervious surface, $300,000/home, $30 mil revenue

• Conventional design: more Commons, less impervious surface, same lot size, 90 salable lots

• Conservation design: more Commons, less impervious surface, smaller lot size, 100 salable lots

• How is the gross revenue of $30 mil affected?
## Summary Subdivision Design Simulations

Change from base gross revenue of $30,000,000

<table>
<thead>
<tr>
<th></th>
<th>10 % Commons</th>
<th>15% Commons</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>10% Commons</td>
<td>5% Impervious</td>
</tr>
<tr>
<td></td>
<td>10% Impervious</td>
<td></td>
</tr>
<tr>
<td><strong>Constant lot size</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chatham</td>
<td>-$317,000</td>
<td>Chatham</td>
</tr>
<tr>
<td>Glynn</td>
<td>-$898,000</td>
<td>Glynn</td>
</tr>
<tr>
<td>Camden</td>
<td>-$474,585</td>
<td>Camden</td>
</tr>
<tr>
<td><strong>Variable lot size</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chatham</td>
<td>$1,075,000</td>
<td>Chatham</td>
</tr>
<tr>
<td>Glynn</td>
<td>$818,000</td>
<td>Glynn</td>
</tr>
<tr>
<td>Camden</td>
<td>$317,000</td>
<td>Camden</td>
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</tbody>
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|                      |                       |                     |
|                      | $1,036,000             | $2,265,000          |
|                      | $1,664,000             | $117,000            |
Main Conclusions

• Residential subdivision developers have a market incentive for planning:
  – Higher density developments
  – Developments with more open/communal space
  – Developments with less impervious surface

• Effect is strongest in urbanized market areas
Current: Did Homebuyers’ Preferences Change during the housing bust?

- Research in Nashville and Knoxville indicates natural amenities lost their relative value.
  
  – Buyers with uncertain employment may seek out basic shelter

  – Sellers facing foreclosure may discount the property’s natural amenity
4 tests of the null hypothesis: market valuation of the amenity did not decrease

1. side-by-side comparison of marginal WTP
2. pooled data with interactions
3. pooled data with D-I-D
4. pooled data with D-I-D and repeated sales

Analyzed Chatham and Camden
• None of the tests could reject the null hypothesis
Future: what are the benefits of elevation retrofitting homes?

1. More freeboard reduces the flood insurance premium,
   benefit= discounted stream of savings

2. Elevating the first floor:
   – Home appears safer, more substantial
   – Creates useful storage space
   – Better curb appeal

• Estimate these with real estate analysis
Preliminary analysis for Camden County

• The average house built on a slab is worth about $14,000 less than one that is not.

• The average house built on a slab and located inside SFHA is worth about $17,000 less than one that is not.

• Benefits from getting a flood-prone house off a slab potentially $31,000.
Better data is needed to measure freeboard

• 1. LIDAR – resolution is too low

• 2. Google street view –
  – Measurement error
  – Time consuming

• 3. Obtain info from elevation certificates.
GIS and Visualization (Kramer)

- completed the modeling of the Camden county land use change for 2050.
- developed a new methodology that integrates population projections with land use change predictions.
- developed a series of data layers that link future housing stock changes with hazards
- developed scenarios of future housing distributions based upon 3 scenarios of development.
## Value of property improvements at risk of flooding damage under base development scenario ($2010)

<table>
<thead>
<tr>
<th>Year</th>
<th>Parcels in 100-year Zone</th>
<th>Parcels in 100 and 500-year Zone</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Value, $ Million</td>
<td>As % of County’s Total</td>
</tr>
<tr>
<td>2010</td>
<td>514</td>
<td>30.34238</td>
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<tr>
<td>2020</td>
<td>638</td>
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<tr>
<td>2030</td>
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<tr>
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<tr>
<td>2050</td>
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