The Value of Dune Width in Avalon, New Jersey: A Hedonic Pricing Analysis

Matthew Mignon
Colby College

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The Value of Dune Width in Avalon, New Jersey: A Hedonic Pricing Analysis
Matt Mignon
Economics Department, Colby College, Waterville, ME

Introduction

- Previous research on the economics of coastal housing markets has proven that housing values along the east coast of the United States capitalize on the attributes of local beaches.
- Recent studies document two important findings: i) that beach width positively affects coastal property values; ii) and that there is a proximity effect, in which distance from the beach plays a significant role in the capitalization of local beach attributes.
- This paper builds upon previous research by exploring the influence that dune width has on coastal property values in Avalon, New Jersey.

Motivation

- The motivation behind this topic stems from the negative effects associated with climate change and rising sea levels around the world.
- Specifically, Hurricane Sandy was extremely detrimental along the New Jersey coastline in 2012, but Avalon was relatively unscathed. Many attribute this to the protection provided by the high dunes that are extremely unique along the entire east coast.
- Avalon’s high dunes stand up to 16.5 yards high and reach as far as 400 yards wide.

Approach and Methodology

- A dataset was constructed that combines real estate data with beach attribute data.
- The dataset includes sales records for 748 residential properties in Avalon, New Jersey from 2010 to 2015.
- A hedonic pricing model was then used to estimate the value of dune width that is capitalized in Avalon property values.
- The following two models were analyzed:

\[
\ln(\text{SalePrice}) = \beta_1 \text{Bedrooms} + \beta_2 \text{Bedrooms}^2 + \beta_3 \text{Bathrooms} + \beta_4 \text{Bathrooms}^2 + \beta_5 \text{Lavatories} + \beta_6 \text{Lavatories}^2 + \beta_7 \text{Street} + \beta_8 \text{PropertyType} + \beta_9 \text{BeachAccess} + \beta_{10} \text{DuneWidth} + \beta_{11} \text{Distance} \ast \text{DuneWidth} + \beta_{12} \text{YearlySaleDummies} + \epsilon
\]

\[
\ln(\text{SalePrice}) = \beta_1 \text{Bedrooms} + \beta_2 \text{Bedrooms}^2 + \beta_3 \text{Bathrooms} + \beta_4 \text{Bathrooms}^2 + \beta_5 \text{Lavatories} + \beta_6 \text{Lavatories}^2 + \beta_7 \text{Street} + \beta_8 \text{PropertyType} + \beta_9 \text{BeachAccess} + \beta_{10} \ln(\text{DuneWidth}) + \beta_{11} \text{Distance} \ast \ln(\text{DuneWidth}) + \beta_{12} \text{YearlySaleDummies} + \epsilon
\]

Results

- The findings in this paper suggest that property values in Avalon, New Jersey increase as dune width increases, but the effect that dune width has on property values decreases as the distance from the beach increases.

Hedonic Pricing Model Results (within 2 blocks from beach):

<table>
<thead>
<tr>
<th>Variable</th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Bedrooms</td>
<td>0.548***</td>
<td>0.600***</td>
</tr>
<tr>
<td>Bedrooms^2</td>
<td>-0.0515***</td>
<td>-0.0574***</td>
</tr>
<tr>
<td>Number of Full Bathrooms</td>
<td>0.134**</td>
<td>0.114**</td>
</tr>
<tr>
<td>Full Bathrooms^2</td>
<td>0.00280</td>
<td>0.00551</td>
</tr>
<tr>
<td>Number of Lavatories</td>
<td>0.136***</td>
<td>0.117***</td>
</tr>
<tr>
<td>Lavatories^2</td>
<td>0.00495</td>
<td>-0.000183</td>
</tr>
<tr>
<td>Street</td>
<td>0.000219</td>
<td>0.000415</td>
</tr>
<tr>
<td>Type (=1 if single family home)</td>
<td>0.568***</td>
<td>0.559***</td>
</tr>
<tr>
<td>Beach Access (=1 if yes)</td>
<td>0.113</td>
<td>0.190***</td>
</tr>
<tr>
<td>Dune Width (yards)</td>
<td>0.00133***</td>
<td>(0.00901)</td>
</tr>
<tr>
<td>Distance x Width (yards)</td>
<td>-0.00177***</td>
<td>(0.00284)</td>
</tr>
<tr>
<td>ln(DuneWidth)</td>
<td>0.160***</td>
<td>(0.0404)</td>
</tr>
<tr>
<td>ln(Distance x ln(DuneWidth))</td>
<td>-0.0621***</td>
<td>(0.00751)</td>
</tr>
<tr>
<td>Constant</td>
<td>11.85***</td>
<td>11.45***</td>
</tr>
<tr>
<td>Yearly Sale Dummies</td>
<td>Included</td>
<td>Included</td>
</tr>
</tbody>
</table>

Summary Statistics:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>748</td>
<td>1,222,000</td>
<td>12,400,000</td>
</tr>
<tr>
<td>Bedrooms</td>
<td>748</td>
<td>1,222,000</td>
<td>12,400,000</td>
</tr>
<tr>
<td>Full Bathrooms</td>
<td>748</td>
<td>1,222,000</td>
<td>12,400,000</td>
</tr>
<tr>
<td>Lavatories</td>
<td>748</td>
<td>1,222,000</td>
<td>12,400,000</td>
</tr>
<tr>
<td>Street</td>
<td>748</td>
<td>1,222,000</td>
<td>12,400,000</td>
</tr>
<tr>
<td>Property Type Dummy</td>
<td>748</td>
<td>1,222,000</td>
<td>12,400,000</td>
</tr>
<tr>
<td>Beach Access Dummy</td>
<td>748</td>
<td>1,222,000</td>
<td>12,400,000</td>
</tr>
<tr>
<td>Dune Width</td>
<td>748</td>
<td>1,222,000</td>
<td>12,400,000</td>
</tr>
<tr>
<td>Distance to Beach</td>
<td>748</td>
<td>1,222,000</td>
<td>12,400,000</td>
</tr>
<tr>
<td>2010 Dummy</td>
<td>748</td>
<td>1,222,000</td>
<td>12,400,000</td>
</tr>
<tr>
<td>2011 Dummy</td>
<td>748</td>
<td>1,222,000</td>
<td>12,400,000</td>
</tr>
<tr>
<td>2012 Dummy</td>
<td>748</td>
<td>1,222,000</td>
<td>12,400,000</td>
</tr>
<tr>
<td>2013 Dummy</td>
<td>748</td>
<td>1,222,000</td>
<td>12,400,000</td>
</tr>
<tr>
<td>2014 Dummy</td>
<td>748</td>
<td>1,222,000</td>
<td>12,400,000</td>
</tr>
<tr>
<td>2015 Dummy</td>
<td>748</td>
<td>1,222,000</td>
<td>12,400,000</td>
</tr>
</tbody>
</table>

“The high dunes stretch from 40th to 59th Streets, offering not only hurricane protection to island residents but also a home to hundreds of species of birds and animals”
-Protect Avalon’s Dunes, Inc.

“The Borough of Avalon has long realized that the dunes are important for public safety and the protection of property. The Borough is also proud to claim one of the few examples of a mature maritime forest to be found between Virginia and Massachusetts”
-Brian Reynolds, Ph.d., Chairman, Avalon Borough Environmental Commission