The Beach Study: An Empirical Analysis of the Distribution of Coastal Property Values

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Abstract: Much casual and less empirical evidence suggests that coastal properties, and particularly those proximate to a beach, have outperformed most real estate market segments over the past decade. Less well understood is the relative importance of the property and location characteristics that drive selling prices in these markets. This information is useful to investors, developers, and taxing jurisdictions, as well as those purchasing mainly for consumption. In this study we examine the impact on property values of proximity to waterfront. We explain differences in the prices of residential properties in Stone Harbor and Avalon, New Jersey from January 2002 through June 2003. We find a steeper land value gradient than have prior studies.

Introduction

Proximity to negative and positive externalities is a key component of location. There is a rich literature that provides empirical estimates of the impact of proximity to amenities such as schools (Brasington, 1999), golf courses (Do and Grudnitski, 1997), and parks (Harner, et al, 1974), and to airport noise (Bell, 2001), overhead transmission lines (Wolverton and Bottenmiller, 2003), and toxic waste sites (Reichert, 1997) on the potentially negative side. Estimates of the impacts of these kinds of location-specific variables are necessary to make informed valuation decisions used by buyers, sellers, lenders, and tax assessors.

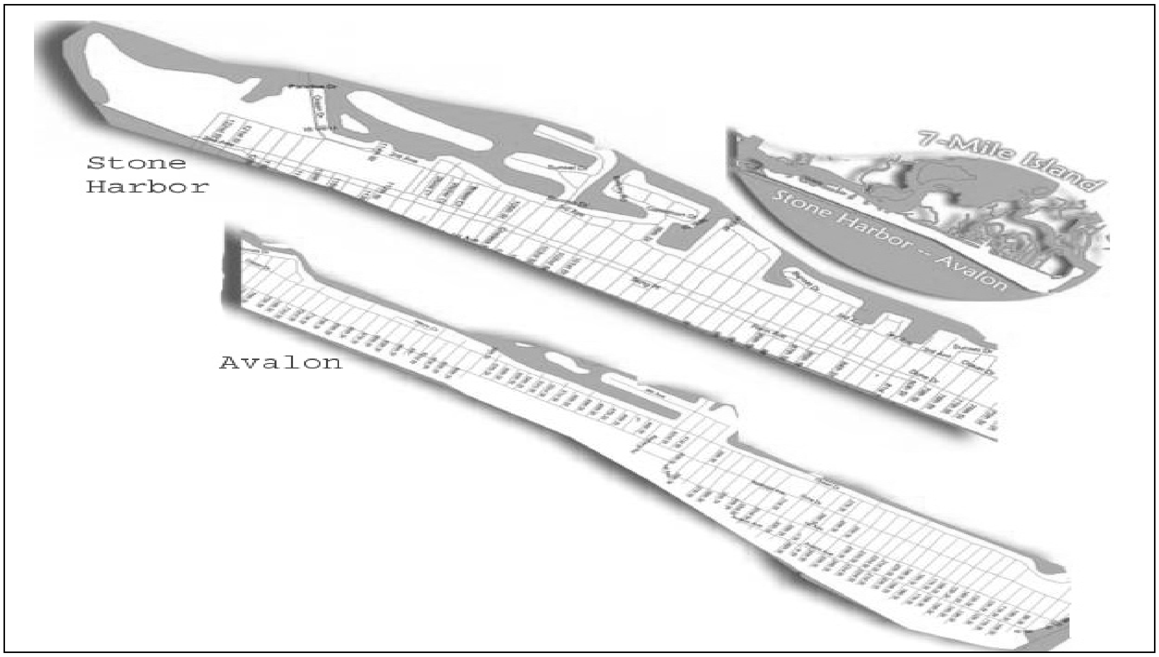
The location attribute of interest in this study is proximity to the ocean. Much casual and less empirical evidence suggests that coastal properties, and particularly those proximate to a beach, have outperformed most real estate market segments over the past decade. Less well understood is the relative importance of the property and location characteristics that drive selling prices in these markets. Prior research has focused mainly on the impact of view. Plattner and Campbell (1978) measured the impact of a water view on the prices of new condominiums in western Massachusetts. They found view premiums of 4%-12%, and that the percentage premium tended to be higher for lower-priced units. Gillard (1981) found a 9% view premium in Los Angeles. Our study comes closest to the work of Benson et. al. (1997). They found that in the Point Roberts, Washington market, oceanfront views added 147% to value, ocean views added 32%, and partial ocean views added 10%. These results, spanning over two decades, show a consistent premium for water proximity, and that the premium has tended to increase over time.

We measure the impact of proximity to the ocean in the contiguous markets of Stone Harbor and Avalon, New Jersey. Our focus is distance and not views, as there is reason to believe that proximity impacts include, but are not limited to, differences in view. Unlike some prior research, we use transactional data rather than assessed values. Our sample period of January 2002 through June 2003 provides a fresh measure of price distribution in what has been a historically volatile type of market.

Data and Methodology

Stone Harbor and Avalon, New Jersey are contiguous communities located on a seven-mile island about 90 miles southeast of Philadelphia and 45 miles south of Atlantic City. In the 2000 Census, the combined total housing units and permanent population of the study market were 8,709 and 3,271 respectively. The Chambers of Commerce estimate that in the summer months, tourists increase the population to 50,000. Figure 1 is a map of the study market. It shows the two communities side by side; in fact it is a continuous market as shown in the 7-Mile Island inset map. This is in some ways an ideal laboratory to measure proximity-to-water impacts. Because it is an island, there is the opportunity to measure both ocean- and bay- front impacts, and there are fewer intervening variables that must be controlled.

Figure 1. **Stone Harbor and Avalon**



The data are from a sample of 249 residential sales that occurred from January 1, 2002 through June 26, 2003. This is 100% of MLS transactions during that period.

Equation 1 is the initial model specification.

Equation 1. **Initial Model Specification**

PRICE = f (LOT SIZE, BATHROOMS, LAVATORIES, BEDROOMS, NEW, BEST NEIGHBORHOOD, NORTH/SOUTH, EAST/WEST, 2^{ND} BLOCK, BEACH BLOCK, BAYFRONT, OCEANFRONT, AVALON, 1^{ST} HALF 2002, 2^{ND} HALF 2002)

where:

PRICE = 2002 – 2003 MLS Sale Price for Stone Harbor or Avalon, NJ Property,

LOT SIZE = square feet of lot size,
BATHROOMS = number of bathrooms,
LAVATORIES = number of lavatories,
BEDROOMS = number of bedrooms,
NEW = 1 or 0 if building built before or after 1975,
BEST NEIGHBORHOOD = 1 in the best neighborhood, 0 if not,
NORTH/SOUTH = 1 if property is on the north side of street, 0 if not,
EAST/WEST = 1 if property is on the east side of the street, 0 if not,
2^{ND} BLOCK = 1 if property is located on the second block from the beach, 0 if not,
BEACHBLOCK = 1 if property is located on the block closest to the beach, 0 if not,
BAYFRONT = 1 if property is located on the bayfront, 0 if not,
OCEANFRONT = 1 if property is located on the oceanfront, 0 if not,
AVALON = 1 if property is in Avalon, 0 if in Stone Harbor,
1^{st} HALF OF 2002 = 1 if property was sold between 1/1/02-6/30/02, 0 if not,
2^{nd} HALF OF 2002 = 1 if property was sold between 7/1/02-12/31/02, 0 if not.

Descriptive statistics and expectations are shown in Table 1.

Table 1. **Descriptive Statistics and Expectations**

		N	Mean	Minimum	Maximum	Expectation
Dependent Variable						
	PRICE		$1,115,199	$215,000	$5,700,000	
Independent Variables						
	LOT SIZE	249	6,348	925	25,950	+
	BATHROOMS	614	2.5	1	6	+
	LAVATORIES	100	0.5	0	3	+
	BEDROOMS	988	4	1	8	+
	NEW	125				+
	NEIGHBORHOOD					
	Best	44				+
	Other	205				-
	SIDE OF STREET					
	North	82				-
	South					Default
	East	67				+
	West					Default
	PROXIMITY TO WATERFRONT					
	Oceanfront	8				+
	Beachblock	55				+
	2nd Block	82				+
	Bayfront	25				+
	Not Proximate	79				Default
	STONE HARBOR/AVALON					
	Avalon	168				?
	Stone Harbor	81				?
	DATE OF SALE					
	2002 1st Half	62				?
	2002 2nd Half	126				?
	2003 1st Half	61				?

Many of our variables are standard in property valuation models, and their empirical expectations shown in Table 1 are well known. We expect lot size, bedrooms, bathrooms, and the best neighborhood to be positively associated with selling price. Other variables are somewhat unique to this kind of market and our empirical expectations are less certain. Being on the north or south side of streets (that run east and west) affects the amount of sunlight a property receives. Being on the east or west side of streets (that run north and south) affects proximity to the beach, not so much because the distance is significantly different, but because a western location requires crossing one extra street to get to the beach. The Stone Harbor/Avalon variable controls for any pricing difference between the two communities. In casual conversations with agents, most thought Stone Harbor would command a premium, but estimates of magnitude varied widely. The date-of-sale variables control for price trends over time. The default is January 1- June 26, 2003. Although property values have increased significantly over the past ten years, that may not be the case during our sample period. Agents claim the recent collapse of the stock market and the weak economy has put downward pressure on prices.

The variables of primary interest are those that measure the impact of proximity to water. Proximity to the ocean is measured as either oceanfront or the number of blocks to the ocean. Proximity to the bay is measured as either bayfront or not. The default variable includes those properties not on the bay and more than two blocks from the ocean. We expect the coefficients on the distance variables to be positive. Finally, a property characteristic typically found to be strongly associated with selling price is square feet of living area. It is omitted in our model because data were not available. According to agents, bathrooms, lavatories, and bedrooms drive values in this predominantly rental market, with total size secondary.

The model was initially estimated using ordinary least squares. The results were acceptable with respect to the R^2 and the signs and magnitudes of most independent variables. Bedrooms, sides of street, and dates of sale were insignificant, and one of them, bedrooms, had the wrong sign. Inspection of the correlation coefficients showed high colinearity between bathrooms and bedrooms. A potentially more serious concern was the presence of mild heteroskedasticity (based on inspection of residual patterns) and the suspicion of autocorrelation based on a marginal Durbin-Watson statistic. These problems were corrected by reestimating Equation (1) using weighted variables in an AR1 model.

Results

The best regression, shown in Table 2, was one that omitted the three variables found insignificant in our initial estimation. Most variables are significant at the 1% or better level. The significance of bayfront is marginally higher than 10%, and one variable, Avalon, is insignificant. All signs are in the expected direction, and the magnitudes of the coefficients on most variables are reasonable. We attribute the seemingly high bathrooms and lavatories coefficients to the fact that they are serving as proxies for the bedroom and living area variables not in the model. The estimation produced an acceptable R^2 (.82), and the Durbin-Watson statistic and an inspection of the residuals indicated autocorrelation and heteroskedasticity were no longer an issue.

Table 2. **Regresion Results with Ten Independent Variables**

Variable	Coefficient	Standard Error	Approx t Value	Pr > |t|
Intercept	-2,318	2,277	-1.02	0.3098
Lot Size	73.8980	16.4130	4.50	<.0001
Bathrooms	141,440	18,085	7.82	<.0001
Lavatories	135,183	23,813	5.68	<.0001
New	54,846	29,778	1.84	0.0668
Oceanfront	1,651,392	127,524	12.95	<.0001
Bayfront	162,416	99,800	1.63	0.1050
Beach Block	487,340	66,496	7.33	<.0001
2nd Block	111,810	36,325	3.08	0.0023
Best Neighborhood	64,959	34,264	1.90	0.0592
Avalon	45,613	90,502	0.50	0.6147

R-Square = 0.817 Durbin-Watson = 2.014

Focusing on proximity impacts, we use as a base price an "average" property; that is, a property with the sample average lot size, number of baths, and so on. We assume the property is in Avalon. The predicted price of this property not proximate to the waterfront (that is, not on the bayfront or within two blocks of the ocean) is $1,055,601. The same property on the 2nd Block would sell for $1,167,411 (+10.5%), on the Beach Block would sell for $1,542,941 (+46%), on the Bayfront would sell for $1,218,017 (+15%), and on the Oceanfront would sell for $2,706,933 (+156%). These results show exponential growth in the price premium as proximity increases. The lower premium for proximity to the bayfront compared to proximity to the oceanfront is as expected.

These findings are similar to the results of prior research. An exponentially increasing premium has typically been found, and in the past several decades these price gradients have become steeper. Our results show these trends continue, and there are reasons to believe that will not change in the foreseeable future. With an aging population and the loss of some confidence in financial markets, the demand for waterfront retirement and vacation homes should remain strong. At the same time, more stringent constraints on development mean the effective supply of shoreline locations is stagnant or effectively declining.

Summary and Conclusion

We estimate a model using a 100% sample of residential sales in a market with varying proximities to two types of water, ocean and bay. The results are consistent with prior findings, with respect to the direction of proximity impact, and suggest an acceleration of the historical trend toward steeper price gradients. One implication is that estimates of property values and distributions of values in these kinds of markets are likely to become stale relatively quickly.

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