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*****Note: Full text of article below**

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Abstract

Although previous research indicates that condominium unit location within a development has an effect on its value, no research has examined oceanfront condominium units and the unique influences to which they are exposed. This study analyzes data from condominium sales along the Gulf Coast of Alabama using hedonic pricing models that account for the externalities associated with their location. The findings indicate that the positive externalities associated with upper-floor and corner units have a positive and substantial effect on value. Corner units offer even greater positive externalities and sell at a premium to interior units, primarily due to their more panoramic view. Failure to account for both the positive and negative externalities specific to resort type properties could result in serious misspecification when applying hedonic modeling to these property types.

The valuation of real estate has always been difficult because so many factors affect the amount that a prospective buyer is willing to pay for a property. Real estate valuation is made even more difficult because no two properties are ever exactly alike. However, one area of real estate valuation where lenders, appraisers, and others tend to treat properties as close, or even identical, substitutes is within a multi-unit condominium complex. All the units are at the same geographic location, built at exactly the same time, using the same construction methods and materials, and have identical complex amenities. Because of these similarities, appraisers, real estate agents, and others have a difficult time making intra-project location adjustments.

Regardless of the difficulties that appraisers and other professionals have, it is no secret that condominium buyers have definite preferences regarding the location of their units within a complex. Some buyers prefer the convenience of lower floors with less time spent on elevators and easier evacuation during emergencies, while others prefer the sweeping vistas only available from higher floors and the quietness and privacy that come from being so far above traffic, swimming pools, and parking areas. Some buyers, because of their fear of heights, will only consider very low floors or even the ground floor. Buyers' beliefs regarding the likelihood of hurricane damage and the probability of burglary and other crimes in different locations within a building can also affect preferences. Therefore, the vertical location of a unit is associated with positive and negative externalities. It is not clear, however, if there is a differential in demand that would create pricing differences based on unit elevation.

Another location element that makes a difference with some buyers is whether the unit is located on a corner of the building. Corner units typically have better views, larger balconies, more natural light, and lower levels of noise since there are neighbors on only one side. However, they also can have higher utility bills since there are more windows and an additional side that is exposed to the elements. Corner units are also typically the farthest from elevators. Given the importance of view to resort owners and vacationers, will the better view from a corner unit offset any potential negative influences? Stated differently, will the positive externalities of floor level and corner location exceed, offset, or be overcome by their associated negative externalities.

The purpose of this study is to determine if the intra-project location of a unit is an important determinant of value in multi-story resort condominium projects. It differs from previous studies that have focused on predominantly full-time residential units where there are many additional determinants of value, such as school district, that are not as important for resort properties. The results provide information that can be put into practice by appraisers and other real estate and investment professionals as they attempt to value either individual units or entire complexes.

In order to remove as many external hedonic variables as possible, this study is conducted using only oceanfront condominiums along the Gulf Coast of Alabama. Only Gulf view units are included in the database. Complexes with units that have indirect views in addition to direct views are eliminated as are complexes not located directly on the Gulf. The data are obtained from transactions in Gulf Shores, Orange Beach, and Fort Morgan, Alabama. These cities are very popular vacation destinations and are in close proximity to one another.

The following sections include a discussion of the relevant literature, data, and methodology, and then conclude with a discussion of the results and any conclusions that can be drawn from the study.

Literature Review

There is an extensive body of research on externalities, but the focus here is directed at externalities associated with the location of real estate parcels and their resulting effect on value. Up to this point, none of the work that has investigated the hedonic factors affecting condominium pricing has focused specifically on intra-project location within a complex as a determinant of value. A few studies have included the "floor" variable as one of the explanatory variables in hedonic models, but the results are mixed and the studies did not focus on resort type properties. Other studies have included "view" as an explanatory variable with highly significant results. In this study, all of the units are oceanfront and all have a direct ocean view. The important question addressed in this study is whether or not there is a discernible preference for units located on a higher or lower floor or between corner and interior (non-corner) units.

Chan, Chu, Lentz, and Wang (1998), using condominium transactions in Irvine and Santa Ana, California, studied the effect of intra-project location in condominiums used primarily as full-time residences. They concluded that "externalities such as greenspace, swimming pools, recreational areas, traffic noise and the like, and project layout variables representing the location of individual condominium units within multiunit structures, have significant effects on the property values of units within a condominium project." The only vertical variable studied was whether or not the unit was on the first or second floor with the result being that first floor units sold for more than second floor units. The authors conclude that this was probably because the inconvenience of having to climb stairs to a second floor unit outweighed the benefit of not having a neighbor directly above your unit. Corner units exhibited no significant price differences.

Choy, Mak, and Ho (2007) used floor as an explanatory variable in their model of Hong Kong condominium prices and concluded that being on a higher floor increased prices at an increasing rate and then at a decreasing rate. This study was complicated by the influence of feng shui, since buyers in the Hong Kong market tended to discount prices on floors with "unlucky" numbers. A study by Chau, Ma, and Ho (2001) focused purely on the floor variable to see if floors with "lucky" numbers sold at a premium. The authors concluded that units on floors such as 8, 18, or 28, which are considered lucky numbers, sold for a premium to units on other floors. They further discovered that the premium was much higher during times of economic strength than it was during recessions.

Mok, Chan, and Cho (1995) used a hedonic pricing model to "explore the effects of locational, structural, and neighborhood attributes on the price structure of private condominiums in Hong Kong." Condominium prices were found to be negatively associated with the age of the building and distance from the central business district, but positively related to the floor where the condominium was located.

Although they did not directly address location within a building, Johnson and Bowers (2010) found that spatial permeability is related to the incidence of unit break-ins. Negative externalities associated with dwellings located on major roads and streets are more likely to be burglarized. Cul-de-sacs are less likely to be burglarized. This is relevant to the extent that first floor units are more accessible and thus might be more likely to be burglarized. This idea is also supported by the work of Johnson, et al. (2007) in their discussion of *opportunity theory*, which is the idea that criminals do not want to travel too far to commit a crime. Kilpatrick, Throupe, Carruthers, and Krause (2007) found somewhat contradictory evidence in this regard in that there are a number of positive and negative externalities associated with proximity to major traffic corridors.[1]

Chock (2005) studied the relative damage effects of hurricanes on buildings of different construction types and heights. This author concluded that the number of stories in a building was positively related to the incidence of damage, but negatively related to damage cost. It is not clear if buyer perceptions match these scientific findings, but anecdotal evidence suggests that the catastrophic damage to lower floors caused by the storm surge from recent Gulf Coast hurricanes received much more attention than wind damage to higher levels of multi-story buildings. For example, the U.S. Geological Survey noted after hurricane Ivan in 2004 that: "The barrier islands exposed to Ivan's strongest winds, for example, the communities of Gulf Shores and Orange Beach, AL, are, in places, low lying, their dunes rising up only several meters, which is insufficient to have contained Ivan's storm surge. The Gulf spilled across the islands in a strong current capable of transporting massive amounts of sand landward, undermining buildings and roads, and opening new island breaches. On top of the surge, breaking waves nearly as tall as the water was deep, eroded dunes and battered structures."[2]

Several studies cover the effects of environmental externalities and include studies of hazardous waste sites by Smolen, Moore, and Conway (1992) and Thayer, Albers, and Rahmatian (1992), a study of refineries by Flower and Ragas (1994), and a study of landfills by Reichert, Small, and Mohanty (1992). Boyle and Kiel (2001) provide an overview of the body of environmental externality literature.

The "view" of a property also has a visual externality associated with it, which can be positive or negative. Unappealing views are negative visual externalities. Examples would be a view of a junkyard, industrial storage site, or a landfill. Ready (2010) found that large landfills had a major negative impact on properties in close proximity to these sites.[3]

Positive externalities are often associated with appealing views such a view of a golf course, lake, mountain, or ocean.[4] Bourassa, Hoesli, and Sun (2005) explore the prices of three aesthetic externalities (a water view, the appearance of nearby improvements, and the quality of neighborhood landscaping) and determine that the implicit price of the externalities vary with the residential real estate cycle. They further find that the price is negatively related to the supply of a positive externality. Sirmans and Macpherson (2003), in a review of much of the previous hedonic pricing research, concluded that "any location on water, or with a water view, adds value to a house."

Bond, Seiler, and Seiler (2002) reported an 89.9% premium for a sample of homes with a waterfront view of Lake Erie. Bourassa, Hoesli, and Sun (2004) examined nearly 5,000 residential property sales from 1986 to 1996 in the urban areas of Auckland, New Zealand. The Auckland sample includes homes with various types of water views. Wide waterfront views were found to add an average of 59% to property values with the premium being inversely related to distance to the water.

Wyman and Sperry (2010) studied the value of golf course, lake, and mountain views using the sale of several hundred vacant lots in a large resort development. Prime lakefront point lots with the very best views were found to sell at a premium of approximately 287% in comparison to an interior lot in the same development. Water views from coves and from deep water, non-point lots had price premiums of 124% and 219%, respectively. This study confirms that not all views are created equal and lends credibility to the thought that there might be a similar hierarchy of values within condominium developments.[5]

Studies of ocean views have found large premiums. Benson, Hansen, Schwartz, and Smersh (1998) studied the value of the view amenity in single-family homes in Bellingham, Washington and found that "the willingness to pay for a view is quite high." They found that the highest quality ocean views could increase prices as much as 60%, while even low-quality ocean views increased prices about 8%. The value of the view was found to vary inversely with the distance from the water. Sirmans, Macpherson, and Zietz (2005) report that ocean views have been a factor in four previous research studies using hedonic pricing models. In each case, the effect of an ocean view was positive and significant.

Data and Methodology

The original sample consisted of 1,682 sales of ocean-front condominiums on the Alabama Gulf Coast in Fort Morgan, Gulf Shores, and Orange Beach during the period from 2006 to early 2011. Only units with direct ocean views are included in the sample to make it more homogeneous; 1,051 of these units were furnished and the remainder were unfurnished. Many of the unfurnished unit sales were new units sold directly by developers and it is not clear whether or not developer pricing reflects buyer preferences to the same extent that more traditional sales do, given that there is normally no significant price negotiation on developer sales. Using only sales of furnished units should provide a sample that more purely reflects the market between traditional buyers and sellers and results in a final sample size of 1,051 sales.

In the final sample there were 38 first-floor units, 318 units on floors 2–5, 403 units on floors 6–10, 217 units on floors 11–15, and 75 units on floors 16 and above. The selling prices and descriptive features were obtained from the Baldwin County Association of Realtors Multiple Listing Service.

Hedonic pricing models are used extensively in the real estate literature to measure the influence of housing characteristics on house prices. Gatzlaff and Ling (1994) find that only a few variables such as square footage, age, and lot size can often explain much of the variation in housing prices. Sirmans, Macpherson, and Zietz (2005) provide a comprehensive review of recent studies that have used hedonic models to estimate housing prices. The dependent variable of interest is the selling price in hedonic regression models, while independent variables may include construction and structure, internal and external house features, natural and environmental characteristics, neighborhood and locational factors, public service amenities, marketing and occupancy factors, and financing issues.

There is precedence for using hedonic pricing models in the valuation of condominium units. Goodman and Goodman (1997) used this technique when investigating whether or not co-op units sold for less than condominiums, everything else equal. A study by Tong and Glascock (2000) used semi-log hedonic regressions to compare the price dynamics of single-family detached homes to townhouses and condominiums and Uyeno, Hamilton, and Biggs (1993) used a hedonic pricing model to estimate the loss in value caused by airport noise to both single-family detached homes and condominiums. There has also been previous research where the traditional hedonic model was modified with good results. Bao and Wan (2007) added the expert knowledge of appraisers as non-sample data in a hedonic pricing model being applied using condominium sales in the Hong Kong real estate market.

To assess the effect of floor elevation and corner location, a hedonic pricing model is constructed and applied to the data. As a base, the number of bedrooms and bathrooms are expected to positively relate to the price. Unit floor locations are grouped into ranges. Given the size of the buildings in the sample, the most logical floor groups are, 1, 2–5, 6–10, 11–15, and 16+. A dummy variable for corner location units is also included in the model.

In addition to the floor and corner location, several control variables based on time of sale were added to the model. These include a series of dummy variables for the month of sale, with January serving as the omitted variable in the regressions. Likewise, dummy variables for the year of sale are also included in the regressions with the 2006 calendar year dummy variable omitted from the regressions.

A major event that happened during the time of the study was the BP (Deepwater Horizon) oil spill. Oil from an oil well leak in the Gulf of Mexico came ashore in the study area and devastated the tourist economy during the summer of 2010. There was a lot of uncertainty during that period regarding how long the leak would continue and what kinds of long-term problems might remain after the leak was stopped. A dummy variable was included to capture effects caused by the BP oil spill. The variable takes on a value of one from April 20, 2010 when the oil spill started to September 19, 2010 when the well was permanently capped.

Because of the years covered in the data sample, there were a significant number of distressed sales in the sample. It is expected that units sold in distressed situations will sell at lower prices than those sold under more normal marketing conditions. Units identified as distressed were those with comments indicating they were foreclosures (REO properties), short sales, or otherwise had sellers who were highly motivated to sell their units. Owners that have property that is foreclosed on in Alabama have one year from the date of the foreclosure sale to redeem their condominiums by paying what they owed plus interest and the cost of some repairs and improvements. Redemption is very rare, but does sometimes occur and tends to hurt the market value of any property subject to the right of redemption. A complete list of variables can be found in Exhibit 1.

On balance we anticipate that units on the ground level and slightly above will have lower selling prices, largely because of the lower quality view, less privacy, additional noise, and possible elevated risk of burglary. Although there are some positive externalities of owning a lower-level unit, the expectation is that the disadvantages will outweigh the advantages. Units on the highest floors are sometimes harder to sell or rent due to acrophobia and a view that is sometimes not as appealing to some as a mid-level view. If true, this should adversely affect their selling price. Corner units are expected to sell at a premium relative to interior units. The positive externalities of a superior view, along with increased natural light and lower noise levels from neighbors, may offset any possible negative externalities associated with a corner location such as distance to elevators.

The effect of the calendar month in which a unit sells is expected to be higher in the spring and summer months. If buyers time their purchases based purely on economic considerations, then the effect would be expected to be strongest just prior to the largest revenue grossing time of the year, which begins in late May starting with the Memorial Day holiday. Of course, the time of purchase for most purchasers is probably not based purely on economic considerations, but also on emotional and other factors.

The year of sale is expected to be progressively negative and significant because the condominium real estate market peaked in late 2005–early 2006 and was followed by periods of significant price declines. The housing correction affected many areas of the United States and especially affected second home and investment properties.

Empirical Results

Summary Statistics

Exhibit 2 reports the descriptive statistics for the final sample. The geographic distribution shown in the exhibit indicates that 384 (37%) of these sales were in Gulf Shores, 508 in Orange Beach (48%), and 159 (15%) in Fort Morgan. The average selling price of these units was $368,739. About 30% of units in the sample were on floors 2–5 and another 38% on floors 6–10. The other primary variable of interest in this study, corner units, comprises 13% of the sample. The peak month of sale was May at 11% of annual sales; the second most active months are the adjacent months of April and June, with about 10% of annual

Exhibit 1 | Descriptions of Variables

Variable	Description
FL1DV	Units on Ground Floor of Complex
FL2TO5	Units on Floors 2–5
FL6TO10	Units on Floors 6–10
FL11TO15	Units on Floors 11–15
FL16PLUS	Units of Floors 16+
CORNER	Units Located on a Corner of the Building
JAN	Dummy for Units Sold in January
FEB	Dummy for Units Sold in February
MAR	Dummy for Units Sold in March
APR	Dummy for Units Sold in April
MAY	Dummy for Units Sold in May
JUN	Dummy for Units Sold in June
JUL	Dummy for Units Sold in July
AUG	Dummy for Units Sold in August
SEP	Dummy for Units Sold in September
OCT	Dummy for Units Sold in October
NOV	Dummy for Units Sold in November
DEC	Dummy for Units Sold in December
SPILL	Dummy Covering Time During BP Spill
YRD06	Dummy for Units Sold in 2006
YRD07	Dummy for Units Sold in 2007
YRD08	Dummy for Units Sold in 2008
YRD09	Dummy for Units Sold in 2009
YRD10	Dummy for Units Sold in 2010
YRD11	Dummy for Units Sold in 2011
BEDROOMS	Number of Bedrooms in Unit
TOTBATHS	Number of Bathrooms in Unit
REO	Foreclosed Property Now Owned by Lender, FNMA, etc.
SHORTSL	Unit Potentially Sold for Less than Mortgage Balance
OTHDISTR	Unit Sold by a Highly Motivated Seller
MORTRT[a]	Average Mortgage Interest Rate in Month of Sale
UR[b]	Unemployment Rate During Month of Sale
LSP	Natural Log of Selling Price
SP	Selling Price (in $1,000)
ORANBCH	Indicates Units Located in Orange Beach, AL
GULFSHR	Indicates Units Located in Gulf Shores, AL

Exhibit 1 | (continued)

Descriptions of Variables

Variable	Description
FTMORG	Indicates Units Located in Fort Morgan, AL
GRPSIZE	Total Number of Units in Sample Divided by Total Number of Complexes

Notes:
[a]Mortgage rates obtained from HSH Associates. http://www.hsh.com/abouthsh.html.
[b]Unemployment rate obtained from U.S. Department of Labor: Bureau of Labor Statistics.

sales each. About 9% of the sales occurred during the BP oil spill in the spring and summer of 2010. In addition, about 17% of the sales were units that were sold under some type of financial distress, which is not unexpected given that the sample includes units sold since the collapse of the housing bubble began.

Exhibit 3 reveals additional information about the subsamples by floor level. The average selling price increases as units are situated on higher floor levels. In comparison to first-floor units, for example, the increase is 5% for units on floors 2–5, 13% for units on floors 6–10, 24% more on floors 11–15, and 62% more for units on floors 16+. It should be noted that these price differences are not adjusted for characteristics of the unit or condominium complex, or for the location.

Exhibit 3 indicates other important differences as well. In taller buildings, the footprint is smaller but as a consequence, there are more floors and conceivably more corner units. For units on floors 16+, 17% of these were corner units, while first-floor units (which could be in a building of any number of floors) had 8% of the units located on a corner. The total number of bedrooms and bathrooms increases for units on higher floor levels. For example, units on the first floor averaged 1.92 baths, while those on floors 16+ had an average of 2.93 baths, suggesting that the higher-level units may be more desirable and command a higher price. Building ordinances, topography, and other factors influence building height. Fort Morgan has 31% of the unit sales for floors 16+, yet only 15% of the total sample sales. Conversely, Orange Beach has 48% of total unit sales, but only 7% of the sales for units on floors 16+. Not surprisingly, taller buildings generally have more units in total; therefore, first-floor unit sales (which could be in a building with any number of floors) had an average number of sales per building of 38, while the subsample of units sold on floors 16+, by definition in the tallest buildings (units in floors 16+), had an average of 66 units sold in the sample.

A more detailed analysis of selling price differences is shown in Exhibit 4. As reported earlier, the selling prices of condominium units increase by floor level.

Exhibit 2 | Descriptive Statistics

Variable	Mean	Std. Dev.	Min.	Max.
FL1DV	0.04	0.19	0.00	1.00
FL2TO5	0.30	0.46	0.00	1.00
FL6TO10	0.38	0.49	0.00	1.00
FL11TO15	0.21	0.40	0.00	1.00
FL16PLUS	0.07	0.26	0.00	1.00
CORNER	0.13	0.34	0.00	1.00
JAN	0.07	0.25	0.00	1.00
FEB	0.07	0.26	0.00	1.00
MAR	0.08	0.27	0.00	1.00
APR	0.10	0.30	0.00	1.00
MAY	0.11	0.31	0.00	1.00
JUN	0.10	0.30	0.00	1.00
JUL	0.08	0.27	0.00	1.00
AUG	0.08	0.27	0.00	1.00
SEP	0.08	0.26	0.00	1.00
OCT	0.09	0.28	0.00	1.00
NOV	0.08	0.28	0.00	1.00
DEC	0.08	0.27	0.00	1.00
YRD07	0.17	0.38	0.00	1.00
YRD08	0.20	0.40	0.00	1.00
YRD09	0.26	0.44	0.00	1.00
YRD10	0.24	0.43	0.00	1.00
YRD11	0.05	0.22	0.00	1.00
SPILL	0.09	0.29	0.00	1.00
BEDROOMS	2.29	0.80	1.00	8.00
TOTBATHS	2.18	0.68	1.00	5.00
REO	0.05	0.22	0.00	1.00
SHORTSL	0.08	0.27	0.00	1.00
OTHDISTR	0.04	0.21	0.00	1.00
MORTRT	5.88	0.70	4.64	7.00
UR	7.16	2.85	3.30	10.40
LSP	12.75	0.36	11.63	14.51
SP	368,739.00	152,899.00	112,500.00	2,000,000.00
ORANBCH	0.48	0.50	0.00	1.00
GULFSHR	0.36	0.48	0.00	1.00
FTMORG	0.15	0.36	0.00	1.00
GRPSIZE	41.37	48.69	1.00	154.00

Note: N = 1,051.

Exhibit 3 | Descriptive Statistics by Floor Level

	First Floor		Floors 2 to 5		Floors 6 to 10		Floors 11 to 15		Floors 16+	
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
SP	318.37	114.70	333.38	129.71	359.27	124.29	395.41	169.08	515.78	233.84
FL2TO5	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FL6TO10	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
FL11TO15	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
FL16PLUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
CORNER	0.08	0.27	0.14	0.35	0.13	0.34	0.12	0.32	0.17	0.38
JAN	0.05	0.23	0.09	0.29	0.06	0.24	0.05	0.22	0.04	0.20
FEB	0.11	0.31	0.06	0.24	0.08	0.28	0.07	0.26	0.01	0.12
MAR	0.05	0.23	0.07	0.25	0.06	0.25	0.09	0.29	0.13	0.34
APR	0.05	0.23	0.10	0.31	0.11	0.32	0.08	0.28	0.08	0.27
MAY	0.11	0.31	0.11	0.31	0.11	0.31	0.10	0.30	0.12	0.33
JUN	0.11	0.31	0.10	0.30	0.10	0.30	0.10	0.30	0.08	0.27
JUL	0.08	0.27	0.08	0.26	0.07	0.26	0.10	0.30	0.11	0.31
AUG	0.13	0.34	0.06	0.24	0.07	0.26	0.08	0.27	0.11	0.31
SEP	0.08	0.27	0.08	0.27	0.07	0.25	0.06	0.25	0.12	0.33
OCT	0.08	0.27	0.08	0.28	0.10	0.30	0.07	0.26	0.07	0.25
NOV	0.11	0.31	0.10	0.30	0.07	0.26	0.09	0.29	0.03	0.16
DEC	0.05	0.23	0.06	0.24	0.08	0.27	0.10	0.30	0.11	0.31
YRD06	0.08	0.27	0.08	0.27	0.08	0.27	0.08	0.27	0.05	0.23

Exhibit 3 | (continued)

Descriptive Statistics by Floor Level

	First Floor		Floors 2 to 5		Floors 6 to 10		Floors 11 to 15		Floors 16+	
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
YRD07	0.24	0.43	0.17	0.37	0.17	0.37	0.16	0.37	0.19	0.39
YRD08	0.08	0.27	0.21	0.41	0.23	0.42	0.17	0.38	0.13	0.34
YRD09	0.24	0.43	0.27	0.44	0.25	0.43	0.27	0.44	0.29	0.46
YRD10	0.26	0.45	0.21	0.41	0.23	0.42	0.27	0.44	0.31	0.46
YRD11	0.11	0.31	0.07	0.25	0.04	0.19	0.06	0.23	0.03	0.16
SPILL	0.11	0.31	0.09	0.29	0.08	0.27	0.12	0.32	0.12	0.33
BEDROOMS	2.03	0.91	2.19	0.84	2.26	0.74	2.33	0.75	2.85	0.82
TOTBATHS	1.92	0.64	2.03	0.58	2.15	0.60	2.24	0.68	2.93	0.91
REO	0.05	0.23	0.04	0.21	0.06	0.23	0.06	0.25	0.03	0.16
SHORTSL	0.03	0.16	0.06	0.24	0.09	0.29	0.07	0.25	0.13	0.34
OTHDISTR	0.05	0.23	0.06	0.23	0.04	0.19	0.05	0.22	0.01	0.12
MORTRT	5.78	0.73	5.88	0.69	5.92	0.71	5.84	0.68	5.83	0.68
UR	7.30	2.99	7.13	2.81	6.93	2.85	7.46	2.86	7.58	2.92
LSP	12.60	0.39	12.65	0.36	12.74	0.32	12.83	0.33	13.07	0.40
ORANBCH	0.79	0.41	0.52	0.50	0.49	0.50	0.52	0.50	0.07	0.25
GULFSHR	0.03	0.16	0.35	0.48	0.39	0.49	0.29	0.45	0.63	0.49
FTMORG	0.18	0.39	0.13	0.34	0.12	0.32	0.19	0.40	0.31	0.46
GRPSIZE	38.42	51.53	34.37	44.30	37.36	45.04	51.05	52.48	66.11	60.36

Notes: For the first floor, N = 38; for floors 2 to 5, N = 318; for floors 6 to 10, N = 403; for floors 11 to 15, N = 217; for floors 16+, N = 75.

Exhibit 4 | Analysis of Floor Elevation and Sales Price

Floor Elevation	Mean Sales Price	Std. Dev.	Coeff. of Variation	First Floor	Floors 2 to 5	Floors 6 to 10	Floors 11 to 15	Floors 16+
First Floor	318,366	114,735	0.36	—	—	—	—	—
Floors 2 to 5	333,883	129,709	0.39	15,517	—	—	—	—
Floors 6 to 10	359,266	124,292	0.35	40,900*	25,383**	—	—	—
Floors 11 to 15	395,410	169,081	0.43	77,044***	61,527***	36,144***	—	—
Floors 16+	515,775	233,836	0.45	197,409***	181,892***	156,509***	120,365***	—

Notes:
*Statistically significant at 0.10.
**Statistically significant at 0.05.
***Statistically significant at 0.01.

The findings in Exhibit 4 indicate that the selling price differences are statistically significant in all cases except for the first floor versus floors 2–5. However, the differences in the selling prices increase at a decreasing rate as elevation increases. For example, comparing units on floors 6–10 with those on the first floor, the difference is $40,900 in selling price but decreases to $25,383 compared to selling prices of units on floors 2–5. A similar pattern applies to all elevations. Exhibit 4 also shows that the variation in selling prices for lower elevation condominium units is less in relative terms. For example, the coefficient of variation, measured as the standard deviation of the selling prices divided by the mean of the selling prices, is 0.36 for units on the first floor, but it is 0.45 for units on the 16th floor and above.

Hedonic Regressions

The selling price regression findings are shown in Exhibit 5. Three sets of regressions are reported including an ordinary least squares (OLS) model without fixed effects (FE), an OLS model with FE, and a heteroscedasticity-robust standard error model with FE.

Model A in Exhibit 5, which included all furnished units, is run using an OLS model without FE. The adjusted R^2 is 75% with a log likelihood ratio of 317.33, which is statistically significant at the 0.01 level. While the floor elevation dummy variables have the correct anticipated sign, the magnitudes are larger than the other two models that included FE. In addition, the *CORNER* dummy variable has a negative coefficient, which is unexpected. The magnitude of the effect of many other variables such as *BEDROOMS*, *TOTBATHS*, and *MORTRT* are considerably larger than the FE model. Therefore, the findings suggest the need to consider a FE model.

Model B in Exhibit 5 included FE. It holds constant specific complex effects, including the appeal of each complex, age, number of stories, year built, and location and also accounts for differences in amenities offered in the various complexes. The model explains a significant portion of the variance in condominium selling prices and has an adjusted R^2 of 91% with a log likelihood ratio of 896.29. The condo building FE are tested for statistical significance using a joint F-test, and the FE are statistically significant at the 0.01 level.[6]

The primary variables of interest were the floor locations and whether the unit is a corner unit or not. Results indicate that units on all floors above ground level sell for more than ground-level units. Floors 2–5 sell for 3.5% (3.6%) more compared to first-floor units, which is statistically significant at the 10% level.[7] The effect is stronger as the floor level increases. For example, floors 11–15 sell for 5.3% (5.4%) more than first-floor units, while floors 16+ sell for an 11.8% (12.5%) premium. Because there were not any buildings with 21–25 stories and only two with 26 stories, it is difficult to generalize the results for units on floors above 20 too broadly. However, it is clear that units on higher floors sell for

Exhibit 5 | Regression of Elevation and Selling Price

Variable	Model A: OLS without FE		Model B: OLS with FE		Model C: Het Adj. and FE	
	Coeff.	*t*-ratio	Coeff.	*t*-ratio	Coeff.	*t*-ratio
ONE	11.860	73.747***	–	–	–	–
FL2TO5	0.000	0.010	0.035	1.735*	0.035	1.841*
FL6TO10	0.049	1.577	0.038	1.920*	0.038	2.094**
FL11TO15	0.122	3.791***	0.053	2.553**	0.053	2.775***
FL16PLUS	0.155	4.121***	0.118	4.751***	0.118	4.746***
CORNER	−0.056	−3.212***	0.031	2.732***	0.031	2.056**
FEB	0.006	0.206	0.004	0.208	0.004	0.276
MAR	0.021	0.690	−0.017	−0.906	−0.017	−1.279
APR	0.041	1.404	0.009	0.500	0.009	0.644
MAY	0.021	0.684	0.014	0.756	0.014	0.931
JUN	0.020	0.633	−0.007	−0.381	−0.007	−0.464
JUL	−0.001	−0.044	−0.018	−0.899	−0.018	−1.116
AUG	0.007	0.203	−0.044	−2.181**	−0.044	−2.575***
SEP	−0.011	−0.337	−0.032	−1.611	−0.032	−1.962**
OCT	−0.063	−2.032**	−0.077	−4.012***	−0.077	−3.952***
NOV	−0.022	−0.701	−0.056	−2.943***	−0.056	−3.557***
DEC	−0.047	−1.440	−0.081	−4.045***	−0.081	−4.959***
YRD07	−0.150	−6.093***	−0.152	−9.989***	−0.152	−8.608***
YRD08	−0.303	−10.705***	−0.280	−15.955***	−0.280	−16.357***
YRD09	−0.485	−7.239***	−0.398	−9.656***	−0.398	−11.413***
YRD10	−0.511	−7.282***	−0.472	−10.972***	−0.472	−12.926***
YRD11	−0.559	−7.553***	−0.536	−11.824***	−0.536	−13.948***
SPILL	0.001	0.022	−0.030	−1.780*	−0.030	−1.758*
BEDROOMS	0.178	16.431***	0.128	13.102***	0.128	3.201***
TOTBATHS	0.175	13.298***	0.161	12.799***	0.161	5.436***
REO	−0.091	−3.498***	−0.071	−4.335***	−0.071	−4.328***
SHORTSL	−0.071	−3.237***	−0.047	−3.404***	−0.047	−4.625***
OTHDISTR	−0.067	−2.450**	−0.025	−1.450	−0.025	−1.878*
MORTRT	0.056	2.404**	0.010	0.681	0.010	0.752
UR	0.015	1.671*	−0.007	−1.289	−0.007	−1.533

Notes: The dependent variable is ln(*SP*). *N* = 1,051. For Model A, adj. R^2 = 0.746, log-likelihood = 317.330***; for Model B, adj. R^2 = 0.910, log-likelihood = 896.287***, group effects (*F*-test) = 28.611***; for Model C, adj. R^2 = 0.910, log-likelihood = 896.287***, group effects (*F*-test) = 28.611***.

*Statistically significant at 0.10.

**Statistically significant at 0.05.

***Statistically significant at 0.01.

significantly more than units on the ground level. Corner units are also shown to sell at a 3.1% premium to interior units. This result is as expected given the significant benefits of owning a corner unit. They generally have much larger balconies with more expansive views and more windows as well.

The only seasonal pattern exhibited in the results is that prices tended to drop after the peak summer season. The month coefficients tend to be negative and statistically significant in the winter months in the latter part of the year. The year dummy variables illustrate a continued downward progression of average condominium prices from 2006 to 2011. During the BP oil spill, selling prices decreased about 3% from April 20 to September 19, 2010. The coefficient reaches statistical significance at the 0.10 level.

The coefficients for the number of bedrooms and the number of baths are positive and highly significant. An additional bedroom adds 12.8% (13.7%) to the selling price, while baths added 16.1% (17.5%). As predicted, distressed sales are discounted relative to non-distressed sales. This can be explained in part by the interior condition of the units, and also, by the fact that many of the units sold are still in the one-year right of redemption period mandated by Alabama law. REO units were discounted by 7.1% (7.4%), while short sales, which were unaffected by the redemption law, had a 4.7% (4.8%) discount. Units with other types of financial distress sold at a 2.5% discount. The macro economic variables of mortgage rate and unemployment rate are not statistically significant.

Model B in Exhibit 5 is also tested for heteroscedasticity. Because it is found to be present, the White (1980) corrected covariance matrix is estimated and the t-values using the corrected standard errors are reported in the last column. The coefficients and other test-statistics remain unchanged.

The statistical significance of the coefficients after correcting for heteroscedasticity is largely unaffected, although there are a few changes that should be noted. The dummy variable coefficient for floors 6–10 is statistically significant at the 0.05 level, whereas it was previously significant at the 0.10 level. The statistical significance of the coefficients for the month and year of sale are generally stronger. Perhaps the greatest effect is the change in the effect of the number of bedrooms and bathrooms. While still strong variables, the number of bedrooms t-value drops from 13.1 to 3.2, and the total number of bathrooms t-value decreases from 12.8 to 5.4.

Conclusion

The results indicate that buyers have clear preferences when it comes to unit location. Units on floors above ground level consistently sell for more than units on the ground level; the higher the floor, the greater the value of the unit. This is due to the positive externalities associated with higher floor locations such as better views, increased privacy, and noise reduction. The price effect is an increase of 3.6% on floors 2–5 compared to the first floor and the effect gets increasingly stronger on higher floor elevations. Corner units are also determined to sell at 3.1% higher prices, which is most likely related to the superior view, larger balconies, and additional windows available in a corner unit. It is difficult to extrapolate the results to floors above 20 stories, given the size of the buildings in the sample, but these results should give clear guidance to those professionals needing to estimate the value of oceanfront condominium units or those designing buildings for maximum value.

In this study, the main variables of interest are floor location and whether or not the condominium unit is a corner unit or an interior unit. This study clearly shows that ground level units sell at a discount to units on higher floors and that corner units sell at a premium to interior units.

Endnotes

1 The authors found that proximity to superhighways and tunnels alone, without direct access had a negative impact on nearby housing values. When there is access, it appears that positive externalities outweigh negative ones. Portnov, Genkin, and Barzilay (2009) found similar results regarding the location of urban railways.

2 http://coastal.er.usgs.gov/hurricanes/ivan/photos/index.html.

3 In contrast, Hoen, et al. (2011) found that neither the view of wind energy sites nor their distances from homes had an appreciable impact on value. Their results, however, are difficult to generalize.

4 See Shultz and Nicholas (2009) on the impact of golf course frontage on housing values.

5 Wyman and Sperry also found a hierarchy of prices among golf course lots, with fairway view lots selling for less than those with views of "prime" golf course areas. Lake views are found to be worth more than golf course views.

6 A LaGrange multiplier test of the fixed effects and random effects models versus the classic covariate model (Model 1) results in a LM statistic of 892.66, which is statistically significant at the 0.01 level. A Hausman test of the random effects versus the fixed effects model is 91.01, which favors the fixed effects model reported as Model B.

7 The exact percentage changes in this section are shown in parentheses, which are obtained by using the transformation, $y = (\exp(x) - 1)*100$, where x is the regression coefficient.

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