

Pacific Rim Real Estate Society Conference,
Kuala Lumpur, Malaysia 20-23 January 2008

**The Impact of Feng Shui on
Condominium Prices**

Draft: November 2007

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The Impact of Feng Shui on Condominium Prices

Keywords: Feng Shui – property values - paired sales analysis – multiple regression analysis

Abstract:

Purpose of this paper

To determine if the ancient Chinese tradition of Feng Shui affects residential condominium prices in a Western setting.

Methodology

Two approaches were adopted to measure the impact of Feng Shui design principles on property prices. First, a case study approach using a paired sales analysis was adopted to compare sales transaction prices of Feng Shui designed condominiums with sales prices of condominiums that were built without this design feature. Second, sales transaction data were analysed using multiple regression analysis in a hedonic pricing framework.

Findings

The results were mixed but provide preliminary evidence that Feng Shui impacts positively on property prices in the West.

Research limitations/implications

Firstly, the units were sold as “designer ready”. Prices for these units exclude floor coverings, painting, kitchen and bathroom fittings, appliances, counter tops and plumbing fixtures. The cost of build out is \$87,000, on average, for a 3003 square foot unit. However, this cost varies between units depending on the quality of the build out that the purchaser selects. Prices that purchasers have paid to complete the build-out are between \$26 and \$35 per square foot, and an average of \$29 per square foot was adopted to adjust the selling prices by to allow for comparison with selling prices of build-out units in other buildings. A more precise adjustment was not able to be made as the actual build-out cost for each unit was not available. However, it was felt that the average rate was a reasonable proxy for the cost of a build-out.

Secondly, the case study includes sales of Feng Shui designed units in only one building. A more reliable result would have been achieved had the data set included several buildings constructed using the principles of Feng Shui. However, in the geographical location chosen for the case study additional data was not available. Further, as Feng Shui is not a property characteristic that is commonly recorded in property transaction databases sourcing this information is problematic.

Practical implications

With the rise in popularity of the use of Feng Shui design in Western homes, understanding the effects of this on property values is important to both property valuers and investors of such property.

Value of the paper

Research on the impact of cultural beliefs on residential property values in the West is limited. This paper provides a contribution to understanding the value affects of such beliefs, specifically those relating to Feng Shui.

Introduction

Ancient Chinese traditions are becoming increasingly evident in the West with the adoption of practices such as acupuncture and Feng Shui (pronounced “*Fong Schway*”, meaning “wind” and “water”). Just as in the practice of acupuncture, where work is done to bring about harmony and balance in the free flow of Qi (pronounced “*chee*”, meaning “circulating life energy”) through our bodies, so in Feng Shui the practitioner works to attain the same harmony and balance in the free flow of Qi through our man-made and physical environments.

In the practice of Feng Shui, the Chinese believe that the shape and orientation of a site and building, the building’s construction materials, layout, colours, and the numbers that make up the street address can all influence the health, happiness and prosperity of the occupants. They are willing to pay a premium for auspicious features.

While these beliefs about property are not scientifically proven, they impact on economic behaviour and are measurable in economic terms. According to Bell (1999) the ancient Chinese beliefs can impact on the price paid for property where a buyer’s choice is motivated by these issues. Those purchasers that hold such beliefs will shy away from certain “bad influences” and will seek out “auspicious influences” such as “lucky” and “unlucky” apartment numbers (see Bourassa and Peng, 1999 and Chau, Ma, and Ho, 2001).

With the growing awareness in the West of the advantages of incorporating Feng Shui principles into the design of new and existing buildings, Feng Shui has become a sought-after property characteristic in some locations (for example, in Southern California where there is a relatively high proportion of Chinese residents), just as a desirable location is. It should therefore be possible to measure the impact of Feng Shui on property price.

Research Objectives

This paper outlines the results research conducted in 2007 to determine if Feng Shui affects residential property values in a Western setting. A case study approach was adopted. Understanding the effects of ancient Chinese traditions, such as Feng Shui, on property values in the West is important to both property valuers involved in valuing buildings designed with these ancient Chinese principles and investors of Feng Shui designed property.

The outline for this paper starts with a review of the literature and is followed by a description of the research data and methodology used. The results are then discussed. The final section provides a summary and conclusion.

Literature Review

Hedonic pricing models have been used for over twenty years to measure the impact of housing attributes and dis-amenities on residential sale prices. Such attributes include land area, floor area, number of bedrooms, garaging, air conditioning, age of the building, water views, etc. Dis-amenities include proximity to transmission lines, airports, landfill sites and ground water contamination (see for example, Abelson 1979; Colwell 1990; Dotzour 1997; Simons, Bowen, & Sementelli 1997; Reichert 1997; Dale, Murdoch, Thayer, & Waddell 1999; Bond & Hopkins 2000; Bond 2001, and Benson, Hansen, and Schwartz 2000).

While most of the studies listed above concentrate on housing attributes that brought tangible benefits or costs to the owners there have been very few studies that have examined the effects of attributes that have no observable tangible effects, such as Feng Shui, but are perceived

subjectively as doing so. This is recognized by Cadogan (1999) who outlines the importance of the effects of culture and superstition on property values.

It could be argued, however, that some positive housing attributes, such as a water view, that have been studied extensively could be associated with good Feng Shui. The advantages of living near water and receiving water views is akin to the advantages of living in a Feng Shui designed home with a water feature to the south. Both benefits increase value even though the underlying motivation differs somewhat. In the West a water view is seen as aesthetically pleasing while in the East, water has much greater meaning and is associated with bringing prosperity to the occupants.

The results of a study by Benson, Hansen, and Schwartz (2000) of the impact of a water view on the value of single family homes suggest that depending on the quality of the view, a water view increased a home's value by between 8 and 59 percent in the Bellingham market in 1993. Lake frontage increased a home's value by 126 percent, compared to a non-view, non-frontage home. Additionally, it was found that the value of a water view varies inversely with the home's distance from a body of water.

The results of a study by Hoesli, Bourassa and Sun (2004) of the impact of a view on residential property values in Auckland, New Zealand, show that wide views of water add, on average, 59% to the value of a waterfront property but that this effect diminishes quite rapidly as the distance from the coast increases. The authors conclude that aesthetic externalities are multidimensional and can have a substantial impact on residential property values.

In more recent years, a number of papers have started to appear in the literature on the influence of Feng Shui on house prices. According to Bell (1999) premiums may be paid for properties that have good Feng Shui, and those with bad Feng Shui may be stigmatized and may sell at a discount or not at all. Studies relating to certain numbers that are considered to be either "good" or "bad" Feng Shui due to their special meaning have been conducted to show this effect.¹ Bourassa and Peng (1999) and Chau, Ma, and Ho (2001) found that apartments with "lucky" floor numbers (e.g. numbers 1, 6, 8, and 9) sold at significantly higher prices, compared to those with unlucky numbers such as 5 and 2. This attribute increases price by between 2.4% and 4.8%. However, Chau et al. found that the demand for flats with lucky numbers is very volatile, depending on the state of the real estate market: in booms, demand is high, but demand for this attribute declines during slumps.

Results of a survey conducted by Bell (1999) of real estate agents, brokers and others active in the market indicate that 70% of Asian purchasers in Southern California consider Feng Shui in their buying decisions. Of this 70%, 25% to 30% retain the services of a Feng Shui master to inspect the property or give input before buying. Items considered undesirable include homes that have front doors facing the street, the number "4" in an address, and lots at a T-intersection (a street pointing at it). Good Feng Shui features include hills or mountains to the north of the property, with a southerly orientation and water to the south.

¹ For example, the number four evokes dread among many Chinese and Japanese people as it sounds like the word for "death". According to Bower (2002), an analysis of U.S. mortality statistics over a 25-year period indicates that Chinese and Japanese deaths from heart disease rise sharply on the **forth** day of each month (13% more across the country). This is a pattern that doesn't occur amongst the whites, according to a study in the British Medical Journal, December 22, 2001.

As a result of the survey Bell conducted two case studies to investigate the impact of Feng Shui on property price. The first case study was a vacant industrial site located in Anaheim, California which had “good Feng Shui” in terms of its orientation, contour, corner position and a lake to the south. The property sold for \$1.3 million in 1995. In analyzing the transaction and comparable sales evidence this price represented a slight premium over other properties in the area of approximately 5%. The brokers involved in the sale said that the price paid reflected the good Feng Shui that had motivated the buyer.

The second case study involved a residential subdivision in Southern California that was comprised of 96 homes containing two or three bedrooms. One developer consulted a Feng Shui expert that gave advice on site orientation, landscaping and structural design. The number 4 was eliminated from the address numbers. Competing developments that had not addressed Feng Shui issues had considerably lower absorption rates. Further, lots that faced T-intersections in the competing developments did not sell until they were discounted \$5,000 (approximately 2%).

Tse and Love (2000), and Tung-Leong, Chau, and Ng (2004) studied a number of Feng Shui-related property attributes, including the bad Feng Shui of a cemetery view, to see what impact this has on prices. It was found in both Hong Kong and Penang, Malaysia where each study was conducted, that a view of a cemetery had a negative and pronounced impact on price. In fact, the study by Tung-Leong et al. found that the negative impact of a bad view (cemetery view) on condominium price is much more pronounced than a good view (sea view). They suggest that culture may have played a significant role in determining property prices.

Chau (2002) studied the effect of the bad Feng Shui associated with a murder has on the price of the property where the murder was committed. The results showed that not only were the property prices of the incident apartments negatively affected, but the negative impact also extended to nearby apartments. After the murder cases were revealed to the public, the price levels of all the units within the same building of the incident property declined. The magnitude of this negative effect is directly related to distance from the incident property. The effect diminishes as the distance, both horizontal and vertical, increases.

While limited in number these few studies reveal the importance of taking cultural considerations into account when valuing property for people from a different culture as well as for those people that appreciate the significance of these ancient cultural beliefs. This study investigates the affect of Feng Shui on residential property prices. It does this by first comparing prices of condominium units designed using Feng Shui principles to prices of comparable units within the same, or similar, location that do not feature Feng Shui design elements. Secondly, multiple regression analysis of sales transaction data in a hedonic pricing framework was used.

Data Collection and Analysis

Research Objectives and Methodology

In the valuation literature, several techniques are available to determine the magnitude of an adjustment to the sale price of a comparable property for differences in features between it and a subject property.² The technique adopted depends on the quality and quantity of the sales transaction data available. *Paired sales analysis* is considered to be one of the more theoretically

² For example, Appraisal Institute (2001). *The Appraisal of Real Estate* (12th Ed.). Chicago, IL., and Miller, N, G. and Geltner, D.M (2005). *Real Estate Principles for the New Economy*. Ohio: South-Western.

sound methods of analysis. This technique is based on the premise that when two properties are in all respects equivalent, a single difference can be measured to indicate the difference in price between them. However, this approach is sometimes impractical to use due to the limited availability of sufficiently similar properties. In some cases it may be possible to aggregate data and look at the relationship between price and a single variable (Miller and Geltner, 2005). This is akin to a *grouped sales analysis* where a group of almost equivalent properties can be compared to the subject property and the single difference can be measured to indicate the difference in price between them.

Statistical methods, such as multivariate regression analysis, can be applied to measure the magnitude of variances in property features but only if sufficient sales data is available. The literature dealing specifically with the measurement of the impact of housing characteristics on house price indicates the popularity of hedonic pricing models, as introduced by Court (1939) and later Griliches (1971) and further developed by Rosen (1974) and Freeman (1979). Due to the difficulty of identifying a sufficient number of properties that were designed using Feng Shui principles the validity and statistical reliability of the results from this approach may be limited. For this reason two approaches were adopted. The use of more than one approach provides the opportunity to compare the results from each and derive a more informed conclusion than would be the case from relying solely on one approach. Thus, the methods selected for this study include the hedonic house price approach together with the case study approach used by Bell (1999). This latter approach is discussed next.³ The data, methodology and results follow.

The Case Study

The Case Study selected for this research is a property development designed completely using Feng Shui principles. The property, known as “Kanaya”, is located close to downtown Sarasota, Florida (see Appendix I: Location Map). Construction began in January 2004 and was completed in late 2006. It is a \$36 million, 35-unit, 15-story condominium development designed with Feng Shui principles.

The location of Kanaya at 505 South Orange Avenue, while located a few blocks from Sarasota Bay and the downtown area, is located very close to the historic Burns Court district, named after Owen Burns who was influential in the development of Sarasota in the early 1900s. The district has become a cultural center with art galleries, salons, shops, theatres, and restaurants.

Kanaya, with condominiums selling for as high as \$1.6 million (excluding build-out), is the vision of Acupuncture Specialist Dr. Harvey Kaltsas.⁴ Kaltsas hired a local Feng Shui consultant to work with Kanaya’s project design team to bring the first condominium development in Sarasota that is fully devoted to the balanced well-being of its residents according to the time-honored principles of Feng Shui design.

In November 2004, an article about Feng Shui was featured in a Southwest Florida newspaper, the Herald-Tribune.⁵ The same weekend a full-feature article about Dr. Kaltsas and his proposed

³ The case study approach is similar to the grouped sales analysis used by appraisers.

⁴ Build out includes: kitchen appliances, cabinets and counter tops; flooring; painting and plumbing fixtures for the bathrooms and toilets. The cost of build out is \$87,000, on average, for a 3003 square foot unit.

⁵ Sadez Fridemann, R. (2004), “Feng Shui and its many variations”, Herald-Tribune, November 27.

Kanaya development also appeared providing wide media coverage of the project.⁶ All promotional material relating to Kanaya highlight the special design features of Feng Shui.

There are two end units per floor of 3,003 square feet, comprising three bedrooms, three and a half bathrooms and a study. Between the end units is a middle unit of 2,655 square feet, comprising three bedrooms and two and a half bathrooms. Units are sold as “designer ready” meaning that purchasers buy an unfinished unit and are able to finish out their units to meet their own requirements. The units are priced such that even after purchasers pay for the finishing they are paying below the prevailing market prices for similar sized units. Actual prices that purchasers have paid to complete the build-out are between \$26 and \$32 per square foot. A photo of the nearly completed building (dated March 2006) and floor plans are shown in Appendix II.

The property includes Feng Shui design features such as:

Rounded exposed wall corners (instead of sharp),

The kitchen sink and stove, representing fire and water energy, will be arranged so they are not directly opposite each other,

A shielded electrical course to keep electromagnetic radiation as far away as possible from the master bedroom,

An amenities level with Japanese garden (earth energy) and saltwater aquarium (water energy)

Outdoor parks with labyrinths for contemplation

Full spectrum lighting

Solid wood front entrance door

The front and verandah doors not in direct alignment

Additional features include:

Advanced air and water filtration systems

Fitness room with Pilates equipment

Infrared sauna

Rooftop garden and pavilion

Chlorine-free 60 ft. swimming pool

Most unit buyers were motivated by these special design features.

The Data and Methodology

Part I – Grouped Sales Analysis

For comparison, sales were required of condominiums (units) in the case study building together with units in other buildings designed without the use of Feng Shui principles to study the effect of Feng Shui on sales prices. The comparable sales were selected from developments in the same, or similar, location of a comparable standard and age and that provide similar amenity. The uniformity of locational and neighbourhood characteristics allowed the analysis to be simplified and focused on the properties’ physical attributes. The relative homogeneity of the housing, locational and neighborhood attributes were verified through field inspections.

The case study condominiums’ sales transaction prices were obtained from the Sarasota Clerk of the Circuit Court, Florida. Sales prices of units within the Kanaya project are shown in Table 1

⁶ Pollick, M. (2004), “Not a developer, but a dreamer. Harvey Kaltsas watches his Feng Shui condo take shape”, Herald-Tribune, November 28, 1A, 16A to 18A.

(refer Appendix III). There were a total of twenty sales in the Kanaya development. The average sale price per square foot, including build-out, for these units is \$352 per sq. ft.

Sales of comparable units that occurred between January 2006 and August 2007 were obtained from the Office of the Property Appraiser for Sarasota County, Florida, as reported to the Florida Department of Revenue. This relatively short time-frame was selected to avoid the need to allow for changes in market conditions over time that can be difficult to accurately measure. To confirm that the market had not changed significantly over that period, changes in median sales prices of existing condos were obtained from the National Association of Realtors. For the Sarasota-Bradenton-Venice Metropolitan Statistical Area (MSA) prices fell by 3.5% between the second quarter of 2006 and the second quarter of 2007. Prices rose 5% from the second quarter of 2005 to the second quarter of 2006. Overall, changes in median condo sales for the time period selected for the current study have been minimal.

The quarterly surveys by the National Association of Realtors® reported that in the first and second quarters of 2007 the national median existing condo price was up 1% in each quarter from the respective quarters in 2006. The second most expensive condo market reported was the Sarasota-Bradenton-Venice area of Florida, at \$413,900, behind the San Francisco-Oakland-Fremont area where median existing-condo prices were \$584,700.⁷

For ease of comparison, only sales of condominiums that have a similar floor area to the units in the subject property are included in Table 2, Appendix III. A total of seventy sales were found but only thirty-two of these had a similar floor area to the case study units that are included in the case study analysis (all seventy sales are included in the hedonic pricing model, together with the twenty sales of the Kanaya units). A map showing the location of the subject and comparable properties is shown in Appendix I.

Units in Plaza at Five Points and One Hundred Central are in a similar location to the subject property, away from the bay-front but close to the downtown area. The units within these developments of a comparable size to those in the Kanaya development sold for, on average, \$548.16 per sq. ft. and \$376.07 per sq. ft, respectively.

Plaza at Five Points is a centrally located high-rise on Main Street in the heart of Downtown. One Hundred Central is also on Main Street centrally located to Downtown and has retail development at ground level including Whole Foods Market®, the world's largest retailer of natural and organic foods.⁸

All other comparable units are located adjacent to the bay-front, with most obtaining 360 degree water views. In terms of size, the units that sold in the Residences, Tower Residences, Vista Bay Point, Beau de Ciel and Majestic Bay were most comparable to the subject property. These units sold for, on average, \$556/sq. ft., \$441.12/sq. ft., \$408.33/sq. ft, \$479.65/sq. ft. and \$637.85/sq. ft., respectively.

⁷ Source:

http://www.realtor.org/press_room/news_releases/2007/mhp_2007q1_first_quarter_metro_home_prices.html, accessed 26 October 2007.

⁸ Whole Foods market is the world's leading retailer of natural and organic foods. The Sarasota market is the first Whole Foods store to be located on Florida's west coast.

The approach involves a comparison of transacted sales prices of units within the Kanaya development, adjusted for the cost of build-out of \$29 per square foot, to similar “control units” within nearby developments that have sold recently to determine if Feng Shui designed units sell for more than conventionally designed units.⁹ The main property attributes known and suspected to influence price were floor area (sq. ft.), location, number of bedrooms and bathrooms, and water views. As the property sales were relatively recent and of units in near new complexes that provided similar utility, time (market changes) and building-age adjustments were not necessary.

Typically units sell for more per square foot the higher within a building they are located due to the better light and views they receive. For this reason, it was not possible to compare average selling prices within the case study building to average selling prices in the comparable buildings as the sales are of units on differing floor levels. Similarly, units tend to sell for more per square foot the smaller their size. Comparing units of a comparable size prevents the need to adjust for size differences. Sales prices of units at a similar floor level were analysed on a per square foot basis for ease of comparison.

Part II – Hedonic Housing Model

Our hypothesis is that units that are built using Feng Shui design principles it will be possible to observe that premiums are made to the selling price of units. Such a premium will be observed where buyers of Feng Shui units perceive Feng Shui in positive terms due to the auspicious nature of such design and the positive affects it is expected to have on their lives from living in the space.

Essentially, a hedonic price model is constructed by treating the price of a property as a function of its utility-bearing attributes. Independent variables used in the model to account for the property attributes are limited to those available in the data set and known, based on other well-tested models reported in the literature and from valuation theory, to be related to property price. The dependent variable is the property sale price. The data set includes 89 unit sales that occurred between January 2006 and August 2007. The Kanaya sales were adjusted for the cost of build-out (units were sold as “designer ready”) of \$29 per square foot, on average. The independent data set was limited to those available but includes variables that correspond to property attributes known and suspected to influence price. These variables are: floor area (sq. ft); Feng Shui (a dummy variable indicating whether the unit that sold was designed with Feng Shui principles or not); bedrooms; bathrooms; views (a dummy variable indicating whether the unit that sold had a water view or not), and level (the floor level within the building that the unit is located on).

The number of bathrooms and bedrooms was highly correlated with floor area. As such it was not surprising that when the initial analysis was run to find that these two variables were not statistically significant. However, a surprising result was that the independent variable Views was also not statistically significant. This was likely due to the difficulty in accurately measuring this variable. Inspections of each individual unit were not able to be made to verify the degree and extent of views received from each. It was felt that a better measure of view would be the location of each building to the bay front as most units within buildings located adjoining the Bay receive expansive water views and those further away, such as the subject building receive no or limited water views. Hence, a dummy variable indicating whether the unit that sold was located adjoining the bay front or not was included as an independent variable, as a proxy for views. When the analysis was run it was found that indeed the variable for views was insignificant but that for bay front was not. The variable descriptions are listed in Table 3, below:

⁹ Here “control units” means similar units to the subject property but that were not designed using feng-shui principles.

Table 3: Variable Descriptions	
Variable:	Definition:
Price ¹	Sale price of the Unit (US\$)
Area	Floor area (sq. ft.)
Level	The floor level the unit is on within the building
Feng Shui	An indicator variable: 0 if the building was not designed using Feng Shui principles, or 1 if it was.
Views	An indicator variable: 0 if the unit received no or limited water views, or 1 if it did.
Bedrooms	Number
Bathrooms	Number
Bay front	An indicator variable: 0 if the building is not located adjoining the bay front, or 1 if it is.

¹ Sales price is the dependent variable.

Basic descriptive statistics for selected quantitative variables are displayed in Appendix IV. The basic model used to analyse the impact on sale price of a unit designed with Feng Shui principles, is as follows:

$$P_i = f (X_{1,i}, X_{2,i}, \dots, X_{n,i})$$

Where:

P_i = property price at the i th location

$X_{1,i} - X_{n,i}$ = individual characteristics of each sold property (e.g., floor area, level within the building, views, number of bedrooms, Feng Shui design, etc.)

In hedonic housing models the linear and log-linear models are most popular. The linear model implies constant partial effects between house prices and housing characteristics, while the log-linear model allows for non-linear price effects and is shown in the following equation:

$$\ln P_i = b_0 + b_1 X_{1,i} + b_2 X_{2,i} + b_3 X_{3,i} + \dots + b_n X_{n,i} + a_0 D_0 + \dots + a_m D_m + \epsilon_0$$

In the above model the dependent variable $\ln P_i$ being the natural logarithm of sales price, b_0 is the intercept, and b_1 to b_n , and a_0 to a_m are the model parameters to be estimated, i.e., the implicit unit prices for increments in the property characteristics (X_1 to X_n – the continuous characteristics such as floor area, and D_0 to D_m – the categorical (dummy) variables such as whether the unit was designed with Feng Shui principles (1), or not (0)). Sometimes the natural logarithm of floor area is also used. The parameters are estimated by regressing property sales on the property characteristics and are interpreted as the households' implicit valuations of different property attributes. The null hypothesis states that the effect of Feng Shui design principles does not explain any variation in property sales price. The next section outlines the results from Part I and II of the research.

Results

Part I – Grouped Sales Analysis

Units within Kanaya are of two sizes: 3003 sq. ft. 3 bedrooms, 3.5 bathrooms and a study on the north or south ends of the building, and 2,655 sq. ft., 3 bedrooms, 2.5 bathrooms located between the north and south units. Sales prices of units, adjusted for build-out, range from \$677,000 to \$1,687,000. The \$677,000 sales price, or \$255/sq. ft., was for a middle unit on the fourth floor

comprising 2,655 sq. ft., three bedrooms and 2.5 bathrooms. The unit that sold for \$1,687,000 (\$562/sq. ft.) comprises a 3,003 sq. ft., three bedrooms, 3.5 bathrooms and a study unit on the northern end of the top floor of the building. The average price per square foot for units within the development was \$351.58.

The most comparable units in terms of location (away from the Bay) and size (Plaza at Five Points, One Hundred Central) sold for between \$741,000 and \$1,983,600, respectively. The unit that sold at the top of the price range for similarly located buildings (away from the bay front) is on the 17th penthouse floor of the Plaza at Five Points. The price of \$598.37 per square foot achieved for this unit reflects the sweeping views received of downtown and the bay. This premium of **6.5%** over the sales price of \$561.80 for the top floor unit in the subject building reflects the views achieved that the subject property does not benefit from. Further, Plaza at Five Points is more centrally located than the subject property next to the public library, Opera House, and Whole Foods market. However, smaller units in Plaza at Five Points (2,035 sq. ft to 2,117 sq. ft.) on the 12th, 14th and 15th floors sold on average for \$498.32 per square foot, or **12.7% less** than the 15th floor unit in the subject building, despite these receiving partial water views.

One Hundred Central receives partial water views at lower levels within the building. Similar sized units to those in the subject building that are located on the 5th floor sell, on average, for \$287.33 per square foot, or **3.8% less** than 5th floor units within the subject building (\$288.42 per square foot). Penthouse units in One Hundred Central that receive full views sold for, on average, \$464.80 per square foot, or **20.9% less** than the top floor unit in the subject building. These penthouses are 761 square feet larger than the subject unit and may explain the lower rate per square foot. Table 4, below, summarises these results:

Table 4: Comparison of Price Per Square Foot			
Floor Subject/Comparable	Subject \$/sq. ft	Comparable \$/sq. ft.	Difference
5 th /5 th 100 Central	\$288.42	\$287.33	+3.8%
15 th /12 th , 14 th , 15 th Plaza @ 5 Points	\$561.80	\$498.32	+12.7%
15 th /Penthouse, 100 Central	\$561.80	\$464.80	+20.9%
15 th /Penthouse, Plaza @ 5 Points	\$561.80	\$598.37	-6.5%

As can be seen from Table 4, the price differences vary depending on location within the building and also by size of the units. However, the general trend is that Feng Shui designed units in Kanaya sell at a premium (7.73%, on average) over similarly located units in other buildings.

The most comparable units on the Bay, in terms of size but not location, sold for between \$1.035 million to \$2.175 million. These units receive spectacular water views. The unit that sold at the top of this range is located on the 12th floor of Beau de Ciel comprising 3,100 sq. ft. (three bedrooms and three bathrooms) and receives spectacular water views. The 4th floor unit in the same building sold for \$1.035 million and comprises 3,135 sq. ft. (two bedrooms and three bathrooms) or \$300.14 per square foot. This represents a premium over a 4th floor unit in the subject building of **29.5%**. On average, these units sell for \$496.21 per square foot, or **41% more** than the units in the subject building.

It is difficult to separate out the effects of water views from the sales prices of the bay-front units to allow an adequate comparison to be made with units in the subject building. Further, as can be seen from this limited analysis that a number of factors affect price, such as the views received from the units, the level they are on in the building, and how far the building is from the Bay. This was evidenced by some units within the same building selling for more than similar sized units on a similar level within the subject building, while others sold for less. Multiple regression analysis was adopted to help separate out these varying affects. The results from this method are discussed next.

Part II – Results from the Hedonic Pricing Model

The second part of the study involving an econometric analysis of transaction data helped to confirm or improve on the grouped sales analysis results. In the analysis, sales of units that were designed using Feng Shui principles were compared to sales of units that excluded these features to determine any variance in price, after accounting for all the relevant independent variables. Due to the significant impact on price of water views and a bay front location, two models were derived. The first model included all 89 sales and the second model, comprising 59 sales, excluded sales of units on the Bay, to see whether the stability of the coefficients would be affected.

Empirical Results

The model of choice is one that best represents the relationships between the variables and has a small variance and unbiased parameters. Various models were tested. The following statistics were used to help select the most appropriate model: the adjusted coefficient of determination (adjusted R^2); the standard error of the regression equation; t-test of significance of the coefficients and F-statistic.

Significance of Variables and the Equation

As hedonic prices can vary significantly across different functional forms, various commonly used functional forms were examined to determine the model specification that best describes the relationship between price and the independent variables. Also, to test the belief that the relationship between Price and Floor Area is not a linear function of Price the variable Floor Area was transformed to reflect the correct relationship. Several transformations were tested including: linear of sales price and log of floor area; log of sales price and linear of floor area, and log of both sales price and floor area. All dummy variables remained in their linear form in each model.

It was found that the best result was obtained from using the log of sales price and linear of floor area, and the linear form of all the dummy variables. In the semi-logarithmic equation the interpretation of the independent variable coefficients involves the use of the formula: $100(e^{b_n} - 1)$, where b_n is the dummy variable coefficient (Halvorsen & Palmquist).¹⁰ This formula derives the percentage effect on price of the presence of the factor represented by the independent variable and is advocated over the alternative, and commonly misused, formula of $100 \cdot (b_n)$.

Preliminary tests of various models were executed to identify a model that provided the greatest number of statistically significant coefficients and the highest adjusted R-squared value (Fik, et al., p. 633). Model specifications were estimated first with a stepwise regression procedure to ensure that the potential for model misspecification due to multi-collinearity is minimized and that only the independent variables offering the greatest explanatory power are included and secondly with

¹⁰ Halvorsen, R. and Palmquist, R. "The Interpretation of Dummy Variables in Semi-logarithmic Equations," *American Economic Review*, (70:3, 1980): 474-475.

the enter regression procedure to test the overall effect of including all variables in the model. The assumption of homoskedasticity, alike the assumption of normality, has been satisfied.

The resulting model included the following variables:

$$\log(\text{Price}) = \alpha + \beta_1 \cdot \text{FengShui} + \beta_2 \cdot \text{Area} + \beta_3 \cdot \text{Level} + \beta_4 \cdot \text{Bay front} \\ + \beta_5 \cdot \text{Bedrooms} + \beta_6 \cdot \text{Bathrooms}$$

The table in Appendix V summarizes the results from both the stepwise and enter regression procedures. The F-statistic (283 and 139, respectively) shows that the estimated relationship in the model (stepwise and enter procedures) is statistically significant at the 95% confidence level and that at least one of the coefficients of the independent variables within the model is not zero.

The coefficient of determination (R^2) indicates that approximately 90.6% and 90.4%, respectively of the variation in sale price is explained by the variation in the independent variable set within the model.

In both the stepwise and enter regression procedures, all variable coefficients had the expected signs, except for *Feng Shui* and number of bedrooms which were both negative. The negative coefficient for *Feng Shui* shows that, when all the other variables are held constant, a unit that is designed with Feng Shui principles would sell for $e^{-0.043(-0.058)}$ (4.2% and 5.64% decrease, respectively). This variable was also insignificant in each model. While Bay Front was included in the model to account for views, it is possible that it also incorporated the effect of location on price as this was not separately allowed for. The variable Feng Shui may also be partially accounting for location. The location of the Feng Shui development is inferior to the bay front properties and the coefficient for Feng Shui may be reflecting this.

The coefficients for the variables Bedrooms and Bathrooms were also insignificant, likely due to their high correlation with floor area, as discussed previously. The most significant variables were Area (floor size) and Level (within the building) followed by Bay Front. All have a positive influence on price. In the Enter procedure, the regression coefficient for Area was 0.0003379, which indicates that, as floor area increases by 100 square feet price increases by 3.38%. The positive coefficient of 0.041 for Level indicates that, when all the other variables are held constant, each floor higher within a building a unit is situated adds 4.2% to the price. A unit located on the Bay will sell, on average, for 36.89% more than one located away from the Bay. The results for the Stepwise procedure indicate that Area increases price by 3.37% as floor area increases by 100 square feet, Level increases price by 4.4%, and a unit located on the Bay will sell for 41.48% more than a unit located away from the Bay.

To test whether location was affecting the results the model was rerun excluding all units located on the Bay. There were 59 sales included in the model and the Enter regression procedure was adopted. The F-statistic (45) shows that the estimated relationship in the model is statistically significant at the 95% confidence level and that at least one of the coefficients of the independent variables within the model is not zero. The coefficient of determination (R^2) indicates that approximately 82.1% of the variation in sale price is explained by the variation in the independent variable set within the model. A summary of the results are shown in Appendix VI.

All variable coefficients had the expected signs, except for number of bedrooms and views which were both negative. These variables were also insignificant in the model as was the number of bathrooms. As mentioned above, bedrooms and bathrooms are highly correlated with floor area.

As views were so difficult to accurately measure this variable may be a poor indicator of the actual views received. The positive coefficient for *Feng Shui* shows that, when all the other variables are held constant, a unit that is designed with Feng Shui principles would sell, on average, for $e^{0.062}$ (6.2% increase) more than a unit not designed using these principles. However, this variable was also insignificant in the model. The most significant variables were Area and Level. Each has a positive influence on price. The regression coefficient for Area was 0.0003933, which indicates that, as floor area increases by 100 square feet price increases by 3.93%. The positive coefficient of 0.044 for Level indicates that, when all the other variables are held constant, each floor higher within a building a unit is situated adds 4.5% to the price.

Limitations of the Research

Firstly, the units were sold as “designer ready”. Prices for these units exclude floor coverings, painting, kitchen and bathroom fittings, appliances, counter tops and plumbing fixtures. The cost of build out is \$87,000, on average, for a 3003 square foot unit. However, this cost varies between units depending on the quality of the build out that the purchaser selects. Prices that purchasers have paid to complete the build-out are between \$26 and \$35 per square foot, and an average of \$29 per square foot was adopted to adjust the unit selling prices by to allow for comparison with sales of build-out units in other buildings. A more precise adjustment was not able to be made as the actual build-out cost for each unit was not available. However, it was felt that the average rate was a reasonable proxy for the cost of a build-out.

Secondly, the case study includes sales of Feng Shui designed units in only one building. A more reliable result would have been achieved had the data set included several buildings constructed using the principles of Feng Shui. However, in the geographical location chosen for the case study additional data was not available. Further, as Feng Shui is not a property characteristic that is commonly recorded in property transaction databases sourcing this information is problematic.

Thirdly, due to the difficulty in measuring the views obtained from each unit, the Bay Front variable was included in the regression model as a proxy for water views. However, this variable may have additionally included the affects of location. The same issue may exist for the Feng Shui variable that, while it was included to address the affects of the Feng Shui design, may have included locational affects, as these were not separately addressed. To overcome this defect future research is warranted that could include Cartesian coordinates in the model. This would also increase the explanatory power of the estimated model, and reduce the likelihood of model misspecification (i.e. inaccurate estimates of the regression coefficients, false non-significant p-values, and degradation of the model predictability, etc.) by allowing the explanatory variables to vary spatially and by removing the spatial dependence observed in the error terms of aspatial, non-interactive models.

Lastly, only floor level was included in the regression model. As it has been shown in the literature review that addresses (unit numbers) are also important from a Feng Shui perspective, by including the unit number as a variable in the model lucky and unlucky numbers could be controlled for. These were not included as it was unclear from the transaction data available whether the unit number shown was the number recorded in the strata plan or was the actual unit number that would be shown in the building’s lobby foyer.

It must be kept in mind that these results are the product of only one case study carried out in a specific area (Sarasota, Florida) at a specific time (2007). Factors that could affect the results are the amount of media-attention given to the project that highlights Feng Shui as a desirable feature,

the knowledge and understanding of Feng Shui by potential purchasers and the cultural make-up of the investing population.

Summary and Conclusions

This paper uses a case study approach to investigate the impact of the ancient Chinese art-form, Feng Shui, on property prices in a Western setting. Ancient Chinese traditions are becoming increasingly evident in the West with the adoption of practices, such as Feng Shui. The study involved the analysis of market transaction data of condominium units that sold in Sarasota, Florida between January 2006 and August 2007 to investigate the affect of Feng Shui design on unit prices. Both a paired sales analysis and a multiple regression analysis of sales transaction data in a hedonic pricing framework were used. The results show that, in general, Feng Shui has a positive impact on price but this affect varies depending on the level within the building that the unit is on and the water views obtained (which appear to have a greater positive influence on price than Feng Shui).

The results from the paired sales analysis indicate, on average, that prices of Feng Shui designed units sell for 7.7% more than comparable units not designed using Feng Shui. The results from the regression analysis show that Feng Shui designed units sell for 6.2% more than similarly located units not designed using Feng Shui. While the coefficient of the Feng Shui variable was insignificant it does tend to generally confirm the results from the paired sales analysis when location differences are accounted for. More research is needed, involving sales of units in a larger number of Feng Shui designed buildings, to confirm these initial findings.

Each geographical location is unique. Residents' perceptions vary according to a wide range of processes including psychological, social, and **cultural**, in addition to the ethnic make-up of the population (Chinese are more likely to value these attributes than people of European descent). The results of this study may vary over time as market participant's perceptions change due to increased awareness of Feng Shui and the potential benefits of living in a Feng Shui designed unit. Further research into the Feng Shui design features that market participants demand most and the positive influences received from them could provide useful insights that help explain the affects on property price.

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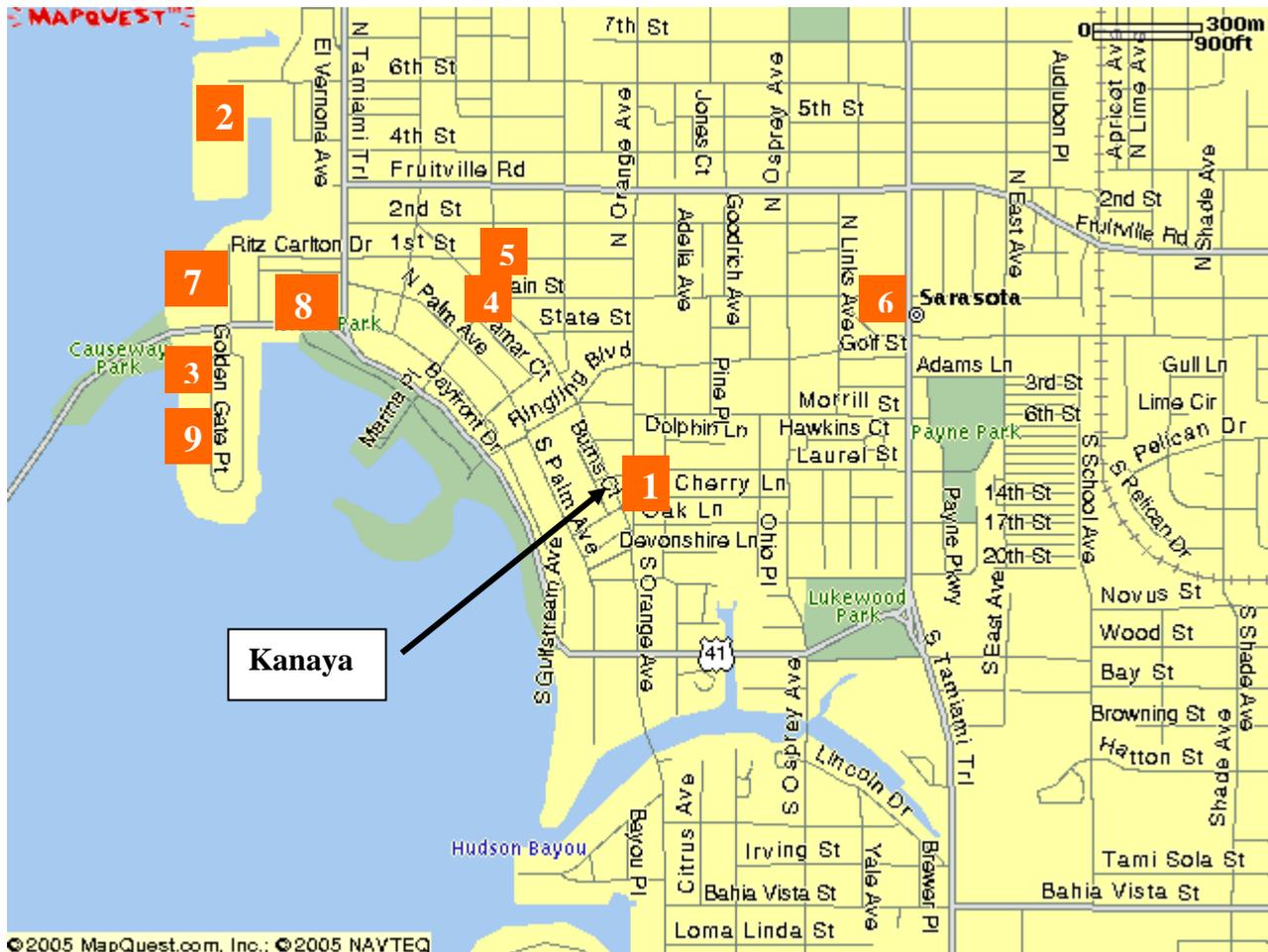
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Appendix I – Location Map of Property Sales



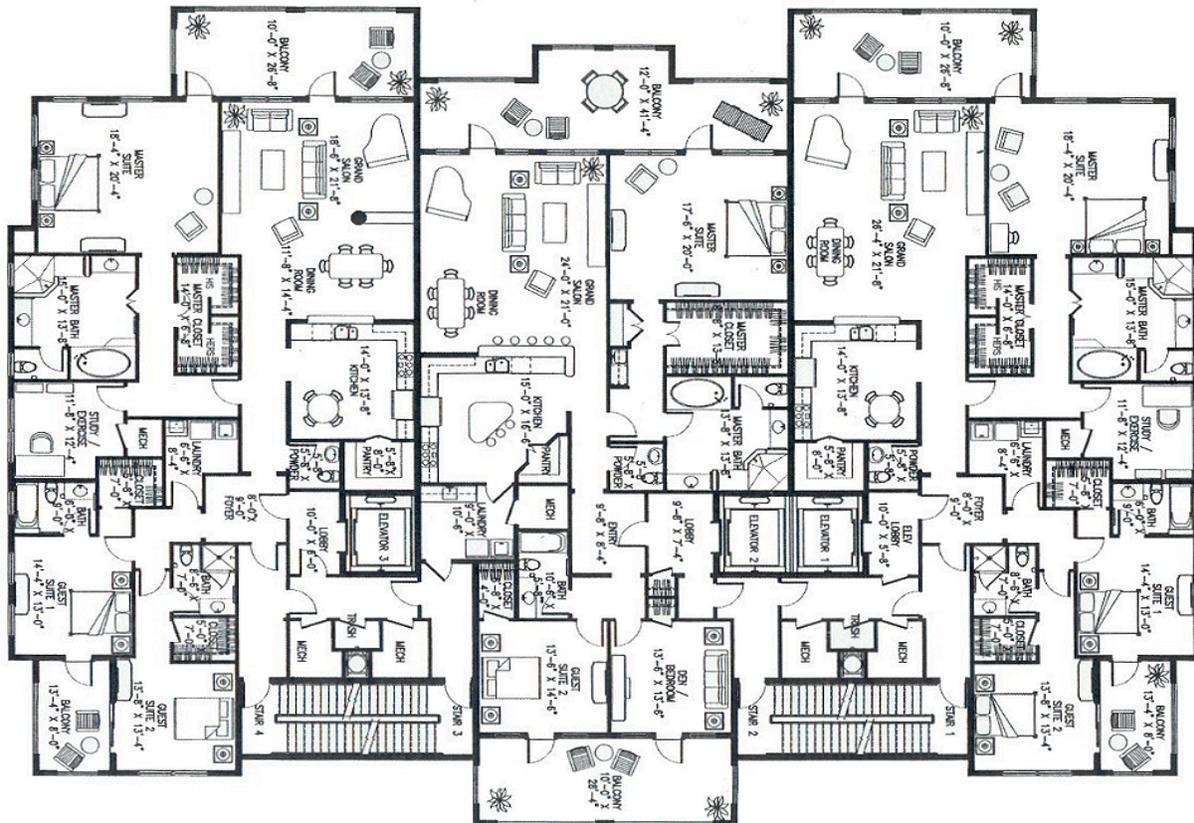
Key to Properties:

- (1) Kanaya**
- (2) Beau Ciel**
- (3) Vista Bay Point**
- (4) Plaza at 5 Points**
- (5) 100 Central Ave.**
- (6) Cityscape @ Courthouse Center**
- (7) The Residences**
- (8) The Tower Residences**
- (9) Golden Bay & Majestic Bay**

Appendix II – Kanaya Floor Plans



Use Your Browser's Back Button to Return



Appendix III – Property Sales

Table 1: Kanaya Transacted Sales Prices						
Floor/Unit #	Sales Date	Sales Price (\$)	Floor Area (Sq. ft)	Unit Name	\$/sq. ft.	Bed/Bath
3 rd /301	2/07	1,031,380	3,003	Bamboo N.	343.45	3/3.5 + study
3 rd /302	2/07	789,491	2,655	Laurel	297.36	3/2.5
4th/401	2/07	897,086	3,003	Bamboo N.	298.73	3/3.5 + study
4th/402	2/07	676,998	2,655	Laurel	254.99	3/2.5
4th/403	2/07	813,573	3,003	Bamboo S.	270.92	3/3.5 + study
5th/502	2/07	751,604	2,655	Laurel	283.09	3/2.5
5th/503	4/07	882,101	3,003	Bamboo S.	293.74	3/3.5 + study
6th/601	2/07	905,374	3,003	Bamboo N.	301.49	3/3.5 + study
6th/602	3/07	931,985	2,655	Laurel	351.03	3/2.5
6th/603	2/07	828,378	3,003	Bamboo S.	275.85	3/3.5 + study
7th/701	2/07	1,017,386	3,003	Bamboo N.	338.79	3/3.5 + study
7th/702	3/07	863,990	2,655	Laurel	325.42	3/2.5
8th/801	2/07	1,234,473	3,003	Bamboo N.	411.08	3/3.5 + study
8th/802	2/07	903,497	2,655	Laurel	340.3	3/2.5
9th/902	2/07	1,205,689	2,655	Laurel	454.12	3/2.5
9th/903	2/07	1,062,101	3,003	Bamboo S.	353.68	3/3.5 + study
10th/1001	2/07	1,432,191	3,003	Bamboo N.	476.92	3/3.5 + study
10th/1002	3/07	1,027,007	2,655	Laurel	386.82	3/2.5
10th/1003	3/07	1,237,086	3,003	Bamboo S.	411.95	3/3.5 + study
15th/1001	8/07	1,687,085	3,003	Bamboo N.	561.8	3/3.5 + study

Source:

Sarasota Clerk of the Circuit Court, <http://www.sarasotaclerk.com/>, accessed 19 October 2007

Table 2: Comparable Sales

Condo Name	Address	Year Built	Floor level/ Unit #	Sales Price \$	Sale Date	Size (s. ft.)	\$/sq.ft	No. Bed/Bath
Plaza at Five Points	50 Central Ave	2005	17th/17PHA	1,983,600	2/06	3,315	\$598.37	3/3
(Pool, Clubhouse, Exercise Rm.)	Restricted Bay Views		17th/17PHB	1,946,300	3/06	3,268	\$595.56	3/3
			17th/17PHC	2,435,200	3/06	4,174	\$583.42	3/3.5
			17th/17PHD	1,700,600	2/06	4,095	\$415.29	3/3.5
100 Central	100 Central Ave	2005	5th/507	910,000	5/06	2,873	\$316.74	3/2.5
(Pool, Clubhouse, Exercise Rm.)	No or restricted Bay Views		5th/509	741,000	1/06	2,873	\$257.92	3/2.5
			PH/PH01	1,654,000	2/06	3,764	\$439.43	3/3.5
			PH/PH04	1,845,000	4/06	3,764	\$490.17	3/3.5
The Residences	1111Ritz-Carlton D	2001	10th/1004	1,805,000	10/06	3,567	\$506.03	3/3
	306° Views		14th/1407	1,450,000	1/06	2,393	\$605.93	2/2.5
The Tower Residences	35 Watergate Dr.	2003	4th/404	1,500,000	5/07	2,985	\$502.51	3/3
(Pool, Tennis, Sauna)	306° Views		5th/504	1,330,000	6/07	2,985	\$445.56	3/3
			10th/1006	1,400,000	5/07	2,799	\$500.18	3/3
			14th/1404	1,604,600	11/06	2,985	\$537.55	3/3
			16th/1606	1,850,000	6/07	2,799	\$660.95	3/3
Vista Bay Point	128 Golden Gate Pt.	2004	5th/501	1,150,000	5/06	3,000	\$383.33	3/3
(Pool, Clubhouse, Exercise Rm.)	306° Views		8th/801	1,300,000	5/07	3,000	\$433.33	4/4
Beau de Ciel	990 Blvd. Of the Arts	2003	4th/404	1,035,000	1/07	3,135	\$330.14	2/3
(Pool, Clubhouse, Exercise Rm.)	306° Views		5th/501	1,375,000	5/06	3,100	\$443.55	3/3
			5th/503	1,200,000	3/07	2,335	\$513.92	2/2.5
			7th/701	1,700,000	2/06	3,100	\$548.39	3/3
			8th/802	1,000,000	12/06	2,335	\$428.27	2/2.5
			8th/803	1,200,000	2/07	2,335	\$513.92	2/2.5
			9th/901	1,550,000	10/06	3,100	\$500.00	3/3
			12th/1201	2,175,000	1/07	3,100	\$701.61	3/3
			14th/1402	2,020,000	1/07	3,412	\$592.03	3/3.5
Majestic Bay	258 Golden Gate Pt.	2004	4th/401	1,850,000	1/06	3,031	\$610.36	3/3.5
(Pool, Clubhouse, Fitness Rm.)	306° Views		7th/701	2,000,000	1/06	3,031	\$659.85	3/3.5
			8th/801	1,950,000	2/07	3,031	\$643.35	3/3.5
Golden Bay	166 Golden Gate Pt.	2002		1,979,500	5/06	4,200	\$471.31	4/3
(Pool, pull-in dock)	306° Views							

Appendix IV – Descriptive Statistics

Model 1: Includes Bay Front Properties					
Variables	N	Minimum	Maximum	Mean	Std. Deviation
Price	89	602000	4750000	1370638	808573.38
Area	89	1408	5275	2767	815.466
Beds	89	1	4	2.78	.764
Baths	89	1.5	4.5	2.91	.6339
Valid N (listwise)	89				

Model 2: Excludes Bay Front Properties					
Variables	N	Minimum	Maximum	Mean	Std. Deviation
Price	59	602000	2435200	1028173	394949.39628
Area	59	1408	4174	2467	687.538
Beds	59	1	4	2.66	.801
Baths	59	1.5	3.5	2.712	.5103
Valid N (listwise)	59				

Appendix V – Model 1: Regression Output

(i) Model Summary: Stepwise Procedure

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
3	(Constant)	12.559	0.062		202.666	0.000
	Area	0.0003369	0.000	0.582	14.666	0.000
	Level	0.043	0.004	0.362	10.683	0.000
	Bayfront	0.347	0.038	0.349	9.062	0.000

a. Dependent Variable: LogPrice

Excluded Variables(d)

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
3	Feng shui	-.043(c)	-1.004	.318	-.109	.594
	Beds	-.019(c)	-.382	.704	-.042	.438
	Baths	.009(c)	.162	.872	.018	.347

- a Predictors in the Model: (Constant), Area
 b Predictors in the Model: (Constant), Area, Level
 c Predictors in the Model: (Constant), Area, Level, Bayfront
 d Dependent Variable: LogPrice

(ii) Model Summary: Enter Procedure

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	12.537	.088		141.971	.000
	Area	.000	.000	.583	9.306	.000
	Level	.041	.005	.344	8.765	.000
	Feng shui	-.058	.063	-.051	-.916	.362
	Bayfront	.314	.049	.316	6.412	.000
	Beds	.004	.047	.007	.094	.925
	Baths	.017	.053	.022	.326	.745

a Dependent Variable: LogPrice

Appendix VI – Model 2: Regression Output

Model 2: Excluding Bay Front Properties

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	12.601	.115		109.817	.000
	Area	.000	.000	.826	7.969	.000
	Level	.044	.006	.524	7.404	.000
	Feng shui	.062	.079	.090	.777	.441
	Views	-.003	.048	-.004	-.060	.952
	Beds	-.105	.074	-.257	-1.412	.164
	Baths	.025	.065	.039	.386	.701

a. Dependent Variable: LogPrice