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Value of scenic views: Hedonic assessment of private housing in Hong Kong

C.Y. Jim*, Wendy Y. Chen

Department of Geography, The University of Hong Kong, Pokfulam Road, Hong Kong, China

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ABSTRACT

Diverse landscape elements in cities are valued differently by residents. People are willing to pay a premium for attractive views. This study assessed the amenity value of two major types of natural landscape in Hong Kong: harbor and mountain. The study was based on 1474 transactions in 2005 and 2006 in 18 private housing estates in a residential district. The high-rise and high-density blocks were typical for middle-income housing in the city. The hedonic pricing method was employed to estimate the proportional share of various views and factors on transaction prices. Only harbor view was preferred and reflected in housing value. A broad harbor view could increase the value of an apartment by 2.97%, equivalent to US$ 15,173. Even a confined harbor view could lift price by 2.18% or US$ 11,137. On the contrary, a broad mountain view would depress apartment price by 6.7%, whereas a confined mountain view was statistically insignificant. Increasing distance between an apartment and a preferred natural landscape would lower transaction price. The negative perception of street view induced a price reduction by 3.7%. Building views were tolerated as an inevitable feature of the compact and vertical city. Quantifying the value of nature and scenic endowments in cities could inform policies and strategies on urban planning, development, nature conservation, and property appraisal.

1. Introduction

Many people display a preference for natural over built environments (Kaplan and Kaplan, 1989; Hartig and Evans, 1993). This affinity with nature is often manifested by consumer home-buying behaviors in the residential housing market. A house represents not only a bundle of structural characteristics (internal attributes), but also a set of locational and environmental qualities (external attributes) (Rosen, 1974; Freeman, 1979; Cheshire and Sheppard, 1995). Amongst the external traits, views from the domestic unit could supply amenities or disamenities to residents. People are willing to pay extra for a pleasant view bestowed by natural elements around a home (Rodriguez and Sirmans, 1994; Benson et al., 1998).

For instance, a house in the Netherlands with scenic sight of water bodies could attract a premium of 8–10%, and open space 6–12% (Luttik, 2000). In USA, the appraised values of homes adjacent to naturalistic parks and open spaces are typically 8–20% higher than comparable properties without such amenities (Crompton, 2001). Similar findings in Guangzhou, China, demonstrated that apartments with river view commanded 7.8% higher price than comparable units in the old town centre, and 13.7% higher in new towns. A garden vista was strongly preferred, attracting a 23.1% premium (Jim and Chen, 2007). In the hotel market of Zürich, Switzerland, rooms with beautiful views such as Lake Zürich and the Alps cost more than those with normal views (Lange and Schaeffer, 2001). On the contrary, unappealing views weaken housing price. In Hong Kong, cemetery view would depress home value, as traditional Chinese culture would associate graveyard with ill fortune (Tse and Love, 2000). Sanitary landfills could bring disamenity to residents and decrease housing price (Hite et al., 2001).

The quality and quantity of natural landscapes affects the amenity value (the portion of value that results from people's appreciation of an asset's pleasantness, aesthetic coherence, and cultural and recreational attributes, as defined by New Zealand's Resource Management Act, 1991, Part 1). In Bellingham, Washington, a full ocean view increased the market price of an otherwise comparable single-family house by almost 60%, but dropping to only about 8% for low-quality confined ocean view (Benson et al., 1998). The distance of a house from natural landscapes could correspondingly suppress the quality and quantity of views, hence their amenity value. In Salo, 100 km northwest of Helsinki, Finland, an increase of 1 km distance would reduce dwelling price by 5.9% (Tyrväinen and Miettinen, 2000).

Assessing the economic benefits of different landscapes allows policy makers to compare implications of different land use options and social gains of competing policy proposals (Luttik, 2000; Tyrväinen, 1997; Johnston et al., 2001; Gao and Asami, 2007). Unlike the market for tangible goods, natural landscapes and views do not yield an evident quantifiable price. In the last two decades, the development of transdisciplinary ecological economics has inte-

* Corresponding author. Tel.: +852 2859 7020; fax: +852 2559 8994.
E-mail address: hragjcy@hkucc.hku.hk (C.Y. Jim).

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Table 1
Residential housing characteristics in Hong Kong in 2006.

Housing attribute	Public permanent housing	Private permanent housing	Total
Number of dwelling (unit)	1,114,000	1,346,000	2,460,000
Home ownership rate (%)	35	76	58
Population share (%)	49.2	50.2	99.4
Household share (%)	46.7	52.3	99.0
Average household size (person)	3.1	2.9	3.1
Domestic space (m^2/person)	11.3	12.3	
2007 residential property price (US$/$m^2$)	5,182–7,271	7,579–26,842	

Source: Hong Kong Housing Authority (http://www.housingauthority.gov.hk/en, accessed on December 1, 2007).

grated the relevant theoretical basis of ecology and economics (Daly and Farley, 2004), and nurtured empirical tools to assess ecosystem service values (Pearce, 1993). Two broad categories of valuation approaches could assess the non-market value of landscapes and nature. The revealed preference methods, mainly hedonic pricing models, employed information on house transaction behavior to infer values of different housing attributes including scenic views. The stated preference methods, mainly contingent valuation, used questionnaire survey to ask individuals directly about their preferences or willingness to pay for carefully defined ecosystem services, such as the preservation of green patches in residential areas.

Hitherto, most research on the value of landscape views focused on the single-family house market in western countries. Few studies covered the effect of natural views on housing price in compact Asian cities. Many such cities have degraded or eradicated most natural landscape components due to high population-land ratio and fast urbanization. Such prevalence of nature deficit affects many millions urban inhabitants, with widespread implications on the quality of the living environment and quality of life. Moreover, humanity has become increasingly urbanized, presenting acute challenges including the common detachment of people from nature (Turner et al., 2004). The widespread problem could be partly tackled by balancing growth and nature conservation in the course of city growth.

In Hong Kong, hedonic pricing models have traditionally been applied to compute real estate price indices (e.g., Mok et al., 1995; Chau and Ng, 1998; Tse and Love, 2000; Bao and Wan, 2004; Mak and Liu, 2007). Few studies investigated the neighboring and environmental effects on residential property (e.g., Hui et al., 2007). In most case studies, views from homes (such as harbor or greenbelt) were sometimes embedded in the price functions as an independent variable, with limited analysis on the value of scenic views.

We investigated home-buyers' willingness-to-pay for views of natural landscapes in Hong Kong. Two key natural landscapes, harbor and mountain, are widely coveted in the residential property market. Green mountain and harbor views are routinely highlighted as key features to attract tenants and buyers in the local property market, as indicated by the higher asking prices attached to such attributes in advertisements, printed literature and websites produced by developers and property agents. The studies by Franklin and Waddell (2003) and Boxall et al. (2005) found an increase in property value due to mountain view. The value of scenic views associated with mountain and harbor were assessed in a hedonic pricing analysis of private residential units by a three-category ordinal classification: nil, confined, and broad natural view. The study thus evaluated both the type and quality of the scenic views, in assessing the premium offered by residents for home purchase, in the context of an exceptionally compact and high-rise city. In light of fast urbanization trends worldwide, it is important to understand how natural features are valued in dense urban contexts.

2. Study area and methods

2.1. Hong Kong and its residential properties

Hong Kong is situated on the south-eastern coast of mainland China, adjoining the Shenzhen Special Economic Zone. It has three main parts: Hong Kong Island, Kowloon Peninsula, and the New Territories. The land area of 1092 km^2 has 80% above 100 m with steep hill slopes and rugged topography. The population 6.96 million in 2007 is accommodated in only 22% of the land, pushing the average population density to 6317 persons/km^2 (Census and Statistics Department, 2008), which is one of the highest in the world (Wendell Cox Consultancy, 2005). Urban residential housing occupies merely 3.7% of the land area, and average residential land provision is merely 9.9 m^2/person. The mean residential population density attains about 100,000 persons/km^2, and maximum urban spot density 116,000 persons/km^2. To meet the community's pressing housing need, high-rise buildings have been pervasively constructed to maximize the use of the scarce easily developable land resources.

Two broad categories of residential units are provided in Hong Kong, private and public (Table 1). This study focused on the private sector, which represents around 50% of the market share. The public sector has been excluded, because its property value is distorted by heavy government subsidies. In the private sector, the government policy attracts investment in property development by providing sufficient land through the leasehold system, supporting infrastructure and a facilitating financial environment (Tse, 2002). Private housing units could be transacted in a free market system with minimum official control. Private housing value in Hong Kong is amongst the highest in the world, and notably higher than other large Chinese cities. At the end of 2007 in the study area, the average price reached US$ 7580/m^2 (about US$ 729/ft^2) for small units (<40 m^2 gross area), US$ 12,700/m^2 (about US$ 1180/ft^2) for medium units (70–100 m^2), and US$ 26,800/m^2 (about US$ 2490/ft^2) for large units (>160 m^2) (Housing Authority, 2008; Rating and Valuation Department, 2008). Meanwhile, average housing price in large Chinese cities across the border was significantly lower at about US$ 593/m^2 (US$ 55/ft^2) in Shenzhen, US$ 614/m^2 (US$ 57/ft^2) in Beijing, and US$ 619/m^2 (US$ 57.5/ft^2) in Shanghai (National Bureau of Statistics of China and China Institute of Index, 2006).

Most housing units in the private sector in Hong Kong are accommodated in high-rise building in the form of condominiums. Housing blocks are typically composed of multi-storey buildings with 20–40 (maximum up to 70) floors, each containing a number of dwelling units. A typical household occupies a self-contained apartment and shares the elevators, stairs, and for some developments, communal recreation facilities.

Undeveloped mountains (outside urbanized areas) with woodland, shrubland or grassland vegetation constitute a major terrestrial natural landscape in Hong Kong, covering about 67% of the land area. In addition, the long and indented coastline with half

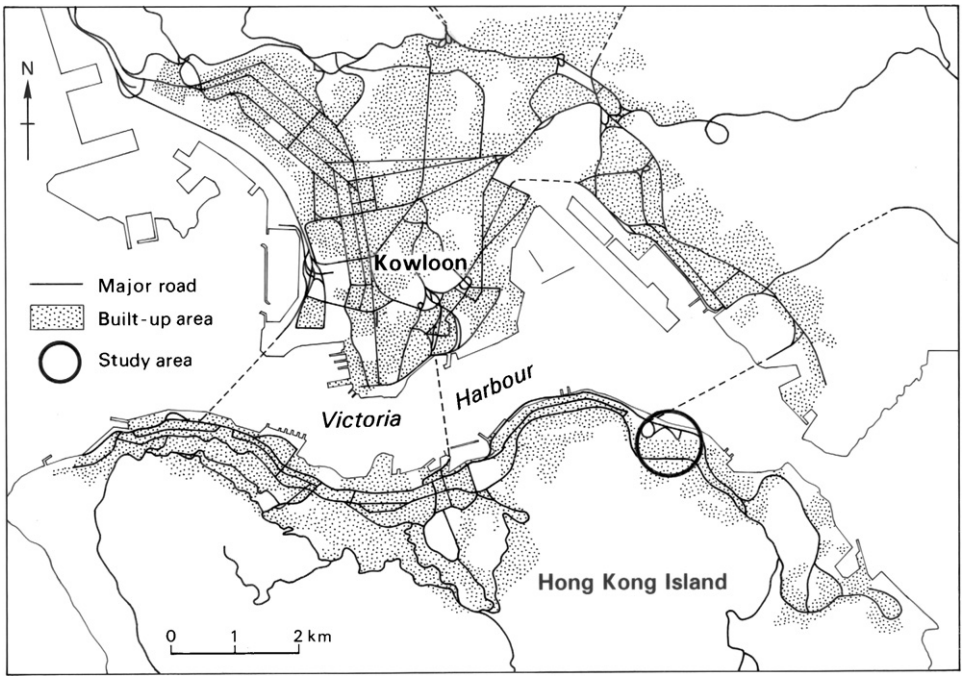

Fig. 1. Map of the study area at the east side of the Victoria Harbor on Hong Kong Island.

of the population living around the main harbor (Victoria Harbor) offer some residential units with ocean or harbor views (Fig. 1). In some large housing development, internal communal green spaces provided additional landscape amenity. However, the amount of formal green spaces in the neighborhoods is very limited (Chau et al., 2006). Such views are enjoyed mainly by a limited number of units on low floors. For most residential properties, the typical view out of the windows is the built-up landscape composed of tall buildings and roads. The limited availability of natural views could command a premium reflected in the transaction price.

2.2. Hedonic pricing method

The hedonic pricing method is a revealed preference method to evaluate the benefits and services provided by natural and environmental goods, which commonly use the real estate market as a surrogate. The notion could be traced back to David Ricardo and Adam Smith (Bartik and Smith, 1987; Gatto and De Leo, 2000). Rosen (1974) firstly provided a unified rendition to model implicit markets. Since then, the method has been widely applied to judge the contribution of environmental qualities on property selling price (Boyle and Kiel, 2001; Haab and McConnell, 2002). Recent environmental applications included amenity valuation of urban forest in Finland (Tyrväinen and Miettinen, 2000), air pollution (Beron et al., 2001), and the impact of water quality (Leggett and Bockstael, 2000) and hazardous waste site (Hite et al., 2001) on house price.

The technique assumes that a property is sold (or bought) as a package of inherent attributes (Freeman, 1979). Usually, four broad categories of variables are tackled in the hedonic model, including structural characteristics (such as age of the house, type of construction materials, size and number of bedrooms), locational characteristics (such as distance to the central business district), neighborhood characteristics (such as income and education levels in a block), and environmental characteristics (such as air and landscape quality). Each characteristic has its own implicit price, which could be estimated by the hedonic equation

$$R = S\alpha + L\beta + N\gamma + E\tau + \varepsilon$$

where R is an $(n \times l)$ vector of housing prices; S is an $(n \times k)$ matrix of structural variables; L is an $(n \times l)$ matrix of locational variables; N is an $(n \times m)$ matrix of neighborhood characteristics; E is an $(n \times j)$ matrix of environmental variables; α, β, γ, τ are associated parameter vectors; and ε is an $(n \times l)$ vector of random error terms. In an equilibrium housing market, buyers would maximize their utility subject to a budget constraint, which implies optimal conditions for each attribute. The partial derivative with respect to any of its arguments gives the marginal implicit value of that characteristic (Haab and McConnell, 2002; Jim and Chen, 2007).

The theoretical considerations do not dictate the functional form for the hedonic equation (Palmquist, 1991). Its choice presents an important strategic research decision, usually determined empirically (Palmquist, 1991; Haab and McConnell, 2002). Different functional forms have been used in empirical studies, including parametric (such as linear, semilogarithmic, inverse semilogarithmic, and log-linear) and non-parametric (such as cubic splines, nearest neighbors, series approximators, and kernel estimates) (Anglin and Gencay, 1998). Thus far, no evidence showed the superiority of any functional forms. It was suggested that the estimates of the environmental-variable coefficient may be more reliable with simple functional forms (Cassel and Mendelsohn, 1985). As the environmental variable plays a minor role in determining housing price, complex mathematical transformation might result in less accurate parameter estimates (Palmquist, 1991). Parametric hedonic model estimated with ordinary least squares (OLS) is demonstrated to be inexpensive and effective (Laurice and Bhattacharya, 2005), and the OLS estimates of the linear models would be adequate (So et al., 1997; Chau and Ng, 1998). In the present study, we adopted the semilogarithmic equation.

2.3. Data acquisition

This study chose 18 private residential estates in the Quarry Bay District, consisting of units with different views. The district is located in the north-eastern part of Hong Kong Island (Fig. 1). An estate in the local context is a residential development composed of a cluster of high-rise buildings, in which communal facilities are

Table 2
Definition and summary of variables in the hedonic pricing model.

Variable	Definition	Minimum	Maximum	Mean	Standard deviation
P	Gross price, transaction price of the apartment (HK$'000)	737	16,980	3984.86	2234.77
AGE	Duration between occupation permit and transaction date (year)	1	30	17.71	9.76
FLOOR	Floor level on which the apartment is situated	1	71	19.41	14.09
AREA	Total floor area of the apartment (square feet)[a]	279	1,532	753.04	206.72
NBEDROOM	Number of bedroom in the apartment	1	4	2.48	0.55
POOL	Availability of swimming pool within the development	0	1	0.57	0.50
CLUB	Availability of clubhouse within the development	0	1	0.40	0.49
MTR	Accessibility by public transport	0	1	0.65	0.48
FSEA	Panoramic sea view	0	1	0.15	0.36
PSEA	Partially obstructed sea view	0	1	0.10	0.30
DSEA	Distance to the nearest seashore (m)	50	1,250	480.69	346.48
FMOUNTAIN	Panoramic mountain view	0	1	0.08	0.26
PMOUNTAIN	Partially obstructed mountain view	0	1	0.17	0.38
DMOUNTAIN	Distance to the nearest mountain (m)	20	1,950	583.58	696.49
STREETVIEW	View of streets	0	1	0.23	0.42
BUILDINGVIEW	View of buildings	0	1	0.31	0.46

[a] Indoor space of residential properties in Hong Kong is reckoned in square feet of gross floor area.

usually provided, such as landscaped gardens, clubhouse, car parking spaces, shopping centre, and 24-h security guard service. The households are dominantly middle-income, and the buildings have comparable qualities. The buildings are relatively young, at an average of 17.7 years (ranging from 1 to 30 years). The tallest building reaches 71 storeys, and the average gross area of the apartment units is 75 m^2. The estates are well managed and maintained. For comparison, the key parameters of residential properties in Hong Kong are summarized in Table 2.

The period October 2005 to September 2006 with active property trading recorded 1474 property transactions. Data were collected from the property department of a major newspaper and a large property agent, including transaction price and key structural characteristics of individual apartments. The definitions and basic descriptive statistics of all variables were given in Table 2. Four internal structural characteristics were considered: apartment age (*AGE*), unit gross area (*AREA*), floor level (*FLOOR*), and bedroom count (*NBEDROOM*). Two external structural variable, communal swimming pool and sports-recreational club, were coded as dummy variables. As all units came from one district, they share similar neighborhood and locational characteristics to be considered as locationally insensitive. Proximity to the most important public transport facility, the Mass Transit Railway (*MTR*, the underground system), was the only locational attribute assessed as a dichotomous variable. An apartment situated within 500 m (construed as walking distance) of an *MTR* entrance would be recorded as 1, and otherwise 0. The distance was estimated using Arcview on a 1:5000 digital map.

Four variables characterizing natural landscape views of apartments were constructed:

FSEA: a dummy variable which is coded as 1 when the apartment possesses a broad sea view and 0 otherwise;
PSEA: a dummy variable which is coded as 1 when the apartment possesses a confined sea view and 0 otherwise;
FMOUNTAIN: a dummy variable which is encoded as 1 when the apartment possesses a broad mountain view and 0 otherwise;
PMOUNTAIN: a dummy variable which is encoded as 1 when the apartment possesses a confined mountain view and 0 otherwise.

To estimate the effect of distance from natural landscapes on housing price, two continuous variables were constructed, namely *DSEA* (distance between apartment and nearest harbor front in meter) and *DMOUNTAIN* (distance between apartment and nearest mountain in meter).

Two variables evaluated the built-up views of the apartments. Street view (*STREETVIEW*) referred to an external street view, usually beset by noise and air-pollution. Building view (*BUILDINGVIEW*) indicated the presence of buildings in close proximity. View data were collected with the help of property agents, and verified by field work and digital map analysis.

We applied the semi-log functional form with log dependent variable and a linear combination of independent variables. It has been demonstrated to provide a good statistical fit (Bender et al., 1980; Garrod and Willis, 1992) and widely adopted in empirical studies (e.g., Ready et al., 1997; Jim and Chen, 2007). Using this semilog form, the coefficients could be interpreted as the percentage change in property price

$$\begin{aligned}\ln P = {} & \beta_0 + \beta_1 \ln AGE + \beta_2 \ln FLOOR + \beta_3 \ln AREA \\ & + \beta_4 \ln NBEDROOM + \beta_5 POOL + \beta_6 CLUB + \beta_7 MTR \\ & + \beta_8 FSEA + \beta_9 PSEA + \beta_{10} \ln DSEA + \beta_{11} FMOUNTAIN \\ & + \beta_{12} PMOUNTAIN + \beta_{13} \ln DMOUNTAIN + \beta_{14} STREETVIEW \\ & + \beta_{15} BUILDINGVIEW\end{aligned}$$

in which β_0 is the stochastic term and $\beta_1,\ldots,\beta_{15}$ are the coefficients to be estimated which could capture the effects of housing attributes.

3. Results

The results of the hedonic regression analysis were summarized in Table 3. With 1474 observations, the model offered a representative profile of housing transactions in the study area, explaining 94.4% of variations in the prices (adjusted $R^2 = 0.944$). Except for *PMOUNTAIN* and *BUILDINGVIEW*, the variables were statistically significant.

Two structural attributes, namely gross floor area and floor height, had a positive relationship with apartment price. Floor area was the major determinant in the equation (t-ratio at 70.01). The two internal structural variables, apartment age and bedroom count, had negative impacts on apartment price. An old apartment would fetch a lower price than a new but similar one. Properties with more bedrooms were worth less, and an increase from one to two bedrooms would decrease the selling price by about 3.6%. Flats on higher floors commanded a higher sale price.

Private club and swimming pool in a housing estate raised sale price notably by 5.3% and 13.0%, respectively. The internalization and extreme localization of active and passive recreational activities was evidently expressed. The private clubs commonly include

Table 3
Results of regression analysis of hedonic pricing model of private housing in Quarry Bay, Hong Kong.

Variable	Coefficient	*t*-Ratio	*P*-Value	Impact (%)[a]
(Constant)	−2.175	−13.690	0.000	–
(ln)*AGE*	−0.013	−1.799	0.072	−0.872
(ln)*FLOOR*	0.067	16.353	0.000	4.772
(ln)*AREA*	1.494	71.014	0.000	181.616
(ln)*NBEDROOM*	−0.053	−2.799	0.005	−3.580
POOL	0.052	5.707	0.000	5.348
CLUB	0.123	9.039	0.000	13.039
MTR	0.045	4.563	0.000	4.629
FSEA	0.029	2.683	0.007	2.975
PSEA	0.022	2.052	0.040	2.179
(ln)*DSEA*	−0.015	−1.762	0.078	−1.067
FMOUNTAIN	−0.069	−5.688	0.000	−6.684
PMOUNTAIN	−0.011	−1.345	0.179	–
(ln)*DMOUNTAIN*	0.060	9.098	0.000	4.248
STREETVIEW	−0.037	−5.016	0.000	−3.680
BUILDINGVIEW	−0.001	−0.141	0.888	–
Adjusted R^2 = 0.944				
F-Value = 1667.646				
n = 1474				

[a] For continuous variables, the impacts were calculated based on a double increase ($2^{\text{coefficient}} - 1$); for dummy variables, the impacts based on 0 and 1 ($e^{\text{coefficient}} - 1$).

gymnasium, children play area, tennis court, spa, sauna, and banquet hall. Residents could use these facilities conveniently in their free time. A swimming pool is a highly cherished asset as it could meet exercise needs and provide a desirable landscape feature.

The accessibility to MTR had significant positive impacts on apartment price (Table 3). A unit situated within 500 m of an MTR entrance can add 4.6% to property value. Although other public transport modes are available in the study area, such as buses and minibuses, MTR is preferred due to high frequency, reliable service, and short commuting time.

Amongst the landscape scenes, only harbor was positively related to apartment price (Table 3). Both broad and confined sea views could lift property value. Full sea view added 2.97% and a confined one trailing closely at 2.18%. The results suggested that consumers were willing to pay for sea view which is an important natural landscape in Hong Kong. Contrary to expectation, mountain view had negative effect on housing prices (the coefficients of both broad and confined mountain views were negative). The broad mountain view decreased price by 6.7%, and the confined one was statistically insignificant ($P = 0.179$). Intuitively, mountain view offers nature content, ecosystem services, and direct recreational use value, yet it was accorded less weight than sea view in home purchase behavior. The distance to the nearest seashore had a significant negative effect on apartment price (at the 10% level, Table 3). The hedonic model indicated that increasing distance from the sea would reduce housing price. On the contrary, increasing distance to the nearest mountain would raise housing price. These results reinforced the attractiveness of sea view and the negative effects induced by mountain views in Hong Kong. As for the other two dominant urban landscapes, both street and building views suppressed housing price, with street effect more significant than building (Table 3). Street scene would reduce the price by 3.7%, and building views were insignificant.

4. Discussion

4.1. Effects of scenic views

Our findings largely correspond to those in the literature in assigning a value to housing with sea view, but mountain view surprisingly has attracted negative responses. Sea view is usually accompanied by a bundle of collateral benefits, such as lower development density, less obstructed perspective, fresh air, better ventilation, sunshine access, brightness, and in general better and prestigious residential location. Empirical findings from western countries indicated that a good view could attract a premium of 5–12% above less attractive environmental settings in The Netherlands (Luttik, 2000). A high quality ocean view could raise the price of an otherwise comparable home by almost 60% in single-family residential real estate market of Bellingham, Washington (Benson et al., 1998). A study conducted in Auckland, New Zealand, indicated that people would pay 18.5% more for sea view (Kask and Maani, 1992). However, a case study of residential housing in Haifa, Israel, found that sea views did not significantly raise housing price (Portnov et al., 2005). In a case study in Guangzhou, river views could raise the price 7.3–13.7%, depending on location and environs (Jim and Chen, 2006). The magnitude of the premium attributed to sea view in our study was lower. It falls within the empirical findings in Hong Kong, where the effect of sea view on housing sale price could range between 1.1% (Hui et al., 2007) and 9.3% (Tse, 2002).

The exceptionally high real estate value in Hong Kong, amongst the highest in the world, coupled with the comparatively small apartment size, would focus if not capture people's attention on usable living space. In the study area, sea view is a part of the harbor surrounded by congested high-density developments on both sides. Its natural quality, environmental benefits and scenic quality cannot be equated with a full ocean view or sea views associated with natural coastal landform. There is no sandy beach or natural coast left on both sides of the harbor, and the neighborhood park near the shore was separated from residential areas by a major highway with a heavy traffic flow. Thus the landscape quality and recreational functions of the harbor were depressed. The busy harbor with heavy marine traffic, including ferries and cargo ships, could generate noise nuisance to reduce the attractiveness of sea view. Whereas the scenic qualities of the harbor remains desirable, the intrinsic value (referring to the value of an object in its own sake; Vilkka, 1997) and use values (referring to the values derived from direct or indirect use of a resource; Cavuta, 2003) have been reduced by unsympathetic developments. Furthermore, the harbor is located in the north of the study area, thus apartments with a harbor view would face north. The north side is usually not considered as a desirable orientation in the subtropical city, where the southern aspect is traditionally preferred to tap the benefits of less sunshine (hence less hot) and more cooling breeze in summer, and vice versa, more sunshine (hence warmer) and less cold Monsoon wind in winter.

Mountain views commonly imply natural vegetated landscape that carry important ecosystem services, such as outdoor recreational opportunity, fresh air, visual amenity and ecological functions. The negative impact of mountain on apartment price in Hong Kong indicated inadequate understanding of the ecological-environmental benefits to nearby residential areas, which is consistent with the findings in the neighbor city of Guangzhou (Jim and Chen, 2006). In a study of single-family residential properties in Bellingham, Washington, the positive impacts of mountain view was statistically insignificant (Benson et al., 1998). In Bellingham, the distance between houses and the mountain was not as close as our study area, hence the mountain effect would be correspondingly trimmed.

The dislike of the mountain for homeowners in Hong Kong might suggest limited awareness of associated ecosystem services and their importance to environmental quality. Apparently, the health benefits of natural and public green spaces near residences (Groenewegen et al., 2006; Maas et al., 2006) have not been actively pursued. In another study, the green belt in the vicinity of a property did not influence apartment price (Hui et al., 2007). The mountain view in the study area means a rather steep upslope area out of the window, hence the perspective will be obstructed due to proximity

to the slope face. The closer the mountain, the more severe will be the visual confinement. In the study area, most apartments with a mountain view face south, hence desirable winter sunshine access will be partly blocked.

Despite the well wooded landscape of the mountains, the homeowners did not seem to appreciate the multiple benefits, an attitude that contrasted the high degree of community satisfaction and preference associated with forested land in a rural fringe residential development in Hamburg Township (MI) (Kaplan and Austin, 2004). As the mountains in our study area are public lands, the residents' lack of ownership and direct involvement in natural area management could nurture a sense of detachment from the mountain view. Living in high-rise block would also increase the physical and mental distance between homes and nearby nature. Living in a compact city would have muffled resident's desire to be close to nature and their expectation of nature.

The avoidance of mountains could be linked to the general perception of natural vegetation as a potential mosquito breeding ground, and a source of ants, termites and other insect pests. Although malaria is not endemic in Hong Kong, the recent invasion by exotic dengue fever and fire ant could have fuelled the negative attitude towards nature at close quarters. The heightened sense of insecurity, related to the higher incidence of burglary in residences near hills, could have reinforced the negative feeling towards living near naturally vegetated areas. Fear associated with insecurity and crime could discourage use of green spaces (Solecki and Welch, 1995). The noise associated with wildlife, hikers and countryside visitors is sometimes regarded as a chronic source of nuisance. The fear of hill fire threatening homes is also a concern, as the countryside is regularly ravaged by this scourge. The finding that a confined mountain view did not influence housing price suggests that people felt shielded or buffered from the perceived undesirable features of natural hill slopes.

It is perhaps paradoxical to note the rising patronage of country parks in Hong Kong, many of which are situated adjacent to built-up areas (Jim and Wong, 2006). In recent years, the annual visitorship reached 12.2 million, indicating the increasing popularity of the healthful countryside recreation and a desire to be in the company of high quality nature. Nature seems to be warmly welcomed by a large segment of the population. Whereas nature is relished, people do not want nature to be situated too close to their homes. The home buying behavior implied that nature is not preferred in people's backyard in Hong Kong.

4.2. Effect of distance to natural landscapes

The results suggested that greater distance could significantly lower the value of harbor view, and dilute the negative value of mountain view. It implied that harbor was an attractive landscape and mountain was not warmly embraced by Hong Kong people. This finding corroborated the mountain aversion phenomenon explained in the last section. Residents in our study would assess the merits or demerits of nature near their homes, rather than the largely positive attitude towards nature nearby (Kaplan and Austin, 2004). Sea view was considered to be more positive, whereas the value of mountain view was weighed down by the perceived negative connotations.

The different attitudes towards scenic views brought by nature might underline cultural variations, implying that dissimilar values could be attached to the same natural landscapes. According to subjectivist theories, appreciation of a natural landscape is legitimized by its reference to a cultural domain of value (Bourassa, 1991). In the time-honored Chinese cultural context, water is associated with fortune but mountain wilderness. In addition, high rise buildings symbolize modern life which contrasts with rurality and cognate agrarian hardship and poverty. Thus the results of this case study may reflect a deeply rooted and probably subliminal influence of traditional Chinese culture towards nature.

4.3. Effect of building and street views

To compare the influence of natural and unnatural features on home price, building and street views were assessed. Many streets in the compact city are associated with heavy traffic noise and air pollution, which are chronic sources of environmental nuisance (Tang and Chan, 2003; Lu and Wang, 2008). Residential units with a view of streets, particularly those in the lower floors, would receive the brunt of such negative impacts. Like people in other places, the homeowners in Hong Kong were willing to pay for clean and quiet living environment (Martin et al., 2006; European Commission's Environment Directorate-General, 2007). Our findings contrasted with a previous study indicating that local people would sacrifice serenity for convenience of access to shopping and dining facilities near homes (Hui et al., 2007). That study was conducted in an area where the facilities were not easily accessible, forcing residents to tolerate air pollution and noise, and trade locational convenience for environmental quality. In our study, major shopping centres are situated nearby, in which case people would be willing to pay for better air quality and quiet ambience.

The high cost of developable land in Hong Kong has resulted in a vertical city with most people living in high-density and high-rise residential developments (Peng and Wheaton, 1994). Most apartments in densely packed neighborhoods are invariably dominated by building views. Only a small number of buildings could be exonerated from this almost ubiquitous spatial bondage. They are situated at the interfaces with open areas, such as water front, urban fringe facing the mountain, urban parks, and exceptionally high floors that shoot above surrounding buildings. For old districts, the main open areas or breathing spaces are the streets which carry negative environmental impacts. Proximity to surrounding buildings was tolerated although such views might be considered as undesirable. The prevalence of small separation distance between buildings means the lack of choice for most home-buyers to avoid building scenes out of their windows. The resigned attitude towards this otherwise negative impact has been expressed in the home bidding price. This domain of the community psyche has been conditioned if not fatigued by the preponderantly cramped development mode, contributing to the subconscious watering down of its negative impact in home acquisition decisions.

4.4. Effects of building structural elements

In addition to the view of an apartment, home-buyers usually pay much attention to building structural attributes. In the compact city, high floor height would notably favor housing price, due to enjoyment of wider views, more sunshine access, and less noise and air pollution emanated by road transport. High floor means greater distance from the source of nuisance, resulting in better the environmental quality, and less chance of suffering from blocked views. With tightly packed buildings which are common in the city, flats on the low floors tend to face each other with short intervening distance, resulting in an undesirable cloistered ambience. Thus flats on high floors with good and open view could command a notably higher value. This result is consistent with empirical findings from Guangzhou, another major city in South China (Jim and Chen, 2006). In recent years, Guangzhou's development has partly followed Hong Kong's high-density and high-rise mode. In contrast, in overseas countries, floor height might not have significant effect on housing prices, such as in The Netherlands (Bengochea-Morancho, 2003). For widely dispersed single-family houses in overseas cities, floor height would be less important. For building age effect, older properties are generally inferior in quality in Hong

Kong (So et al., 1997), which might not be true in western cities (Gallimore et al., 1996).

The negative effect of *NBEDROOM* on price is related to a reduction of usable area in the apartment unit. Housing units in Hong Kong are typically small, with over 90% of the units <100 m^2 in gross area (Rating and Valuation Department, 2008). City-wide average flat size is only about 70 m^2 gross. Moreover, the usable (carpetable) area is usually about 80% of the gross area. The middle-income buyer who could afford the relatively small unit would prefer fewer bedrooms each of a reasonable size. The corollary is that more small-sized bedrooms are not desired, reflecting a conscious attempt to avoid spatial constraint and claustrophobic confinement. This result suggested preference for more open and less partitioned indoor space.

5. Conclusion

Sustainability is the central theme for urban planning. Planners face tough decisions on where they stand in protecting nature in city, promoting economic growth, and advocating social justice (Campbell, 1996). The major failure of twentieth-century town planning has been partly attributed to the insensitive attitude towards nature in the city (Rogers, 2000). Ignorance about the multiple ecological, environmental, social and economic benefits of nature did not help the cause of nature protection and enhancement in the course of urban growth, particularly in developing countries. A lingering stumbling block is the difficulty of assigning a market value to natural landscapes so as to raise awareness and popularize knowledge of nature's multiple contributions to human lives. For citizens, human intuition and appreciation of nature in the environs, including the vicinity of residences, has exerted influence on home-buying decision. Different types and qualities of views and their associated values can be reflected in the transaction price of properties. Reliable estimates of the worth of natural elements could inform the planners, landscape professionals and decision makers, so that they could give due consideration to natural ingredients in urban planning and development (Goode, 1998; Wittig, 1998).

This study yielded results about Hong Kong people's evaluation of scenic views brought by natural landscapes. The findings could be used by planners in their attempts to minimize negatively perceived landscapes and maximize positive views in directing the development of residential areas. The location, size, shape, orientation or alignment of land parcels zoned for residential use could take into account the view or nature preferences. At the more detailed planning level, the positioning, footprint and geometry of building envelopes, and the application of the step height concept, could be refined to bring an optimal configuration of buildings and hence the views from the constituent apartments. The earnest desire to maximize preferred views, however, must not be carried to the extreme of sacrificing environmental quality or even introducing blights, such as creating a wall effect of massive blocks facing the harbor to obstruct air movement and sunshine access to the neighborhood.

Our finding of the aversion towards mountain views suggested that people in Hong Kong seem to relish an inward-looking perception of the environment and manifest the preference for a cloistered domestic existence. Long-term exposure to an inordinately high-rise and high-density living, and the corollary of deprivation of daily contacts with nature, might have partly muffled people's innate desire to be in the company of nature, or have failed to kindle or rekindle such a desire. This topic deserves to be explored by further research. In urban planning, whether to cater to the negative feeling towards mountain view presents a paradox. On the one hand, there is the urge to dispel this somewhat mild dislike. Formal and public education programs could be launched to convince people of the multiple benefits of the mountains, including their views out of domestic windows. Planning could then continue to provide chances to reap the benefits of the mountain views. On the other hand, this local cultural preference could be satisfied by designing the city accordingly. For example, placing low-rise recreational, car parking or shopping blocks between the mountain and high-rise residential blocks could establish a buffer distance to partly offset the mild aversion towards this natural view.

The specific guidelines could be incorporated into the explanatory notes of zoning plans and associated planning briefs to help developers to optimize the match between housing attributes and user expectations. It is high time that the planning process should include the pertinent quality of life and livability considerations that are increasingly demanded by the community, so as to dilute the excessive and single-minded emphasis on maximizing the use of limited land resource.

In the meanwhile, the adjustment for views in the appraisal of real estates (Rodriguez and Sirmans, 1994) would benefit from systematic hedonic studies. Information and hints on the value of natural and other urban landscapes could help both sellers and buyers to find an appropriate transaction price. If nature is accorded its due value, it will have a better chance of gaining respect and protection. It will have a better chance to resist the aggressive development pressure.

It is acknowledged that the intrinsic value of nature was not assessed in this study. Only the amenity value of natural landscapes was evaluated. Whether the findings of this case study imply that nature would be appreciated and valuated just for its existence alone demands further investigations. In addition, this study alone could not meet the complex information needs of city planners and managers. An integration of concepts and methods satisfying natural and social scientists and urban planners could be developed (Pickett et al., 1997; Niemelä, 1999). Furthermore, why residents dislike their mountain views, how they value nature, and what they want in their neighborhoods, should be explored in future studies. The qualified antipathy towards nature that apparently contradicts the common human biophilia attitude (Wilson, 1984), which could be subject to distance decay, also deserves to be investigated. The ambivalent biophilia (Ulrich, 1993) or negativistic attitude towards nature (Kellert, 1993), apparently nurtured in an excessively compact urban milieu, could be evaluated. Further evidence could provide useful directions to inform local land use and planning policies, such as integrating nature into developments to accommodate the diversified needs of urban dwellers (Jorgensen et al., 2007).

In this study, small patches of gardens embedded within housing estates were not included, because the units in the study area did not offer such an inner green view. This exclusion does not mean that this landscape feature has no market value or people would not recognize the value associated with these emulated natural areas. Further research could use hedonic pricing methodology to investigate the amenity value that residents attach to such communal gardens included within housing estates, in the context of a high-rise and high-density milieu. An overall evaluation of the plethora of landscape elements vis-à-vis the residential domain could be formally integrated into urban landscape design and property appraisal in Hong Kong.

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