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Citation	
Issued Date	2010
URL	http://hdl.handle.net/10722/131043
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THE UNIVERSITY OF HONG KONG

THE IMPACT OF UNLUCKY NUMBER FLOOR ON PRIVATE RESIDENTIAL AND HOME OWNERSHIP SCHEME HOUSING PROPERTY PRICE IN HONG KONG

A DISSERTATION SUBMITTED TO THE

FACULTY OF ARCHITECTURE

IN CANDIDACY FOR THE DEGREE OF

BACHELOR OF SCIENCE IN SURVEYING

BY

LAI YEE SHAN ISABEL

HONG KONG

APRIL 2010

Declaration

I Declare that this dissertation represents my own works, where due acknowledgment is made, and that it has not been previously included in a thesis, dissertation or report submitted to this University or to any other institution for a degree, diploma or other qualification.

Signed: _____

Name: _____

Date: _____

ACKNOWLEDGEMENTS

I would like to take this opportunity to express my gratitude to all people I have owned for this dissertation.

I would like to express thanks to my supervisor, Professor F. F. Ng for patient guidance and valuable comments.

Special thanks are given to my studio group mates for technical support on application of computer software. Moreover, I would like to thank my friends of Joshua Fellowship. Thank you for every prayer they made for me and for my dissertation.

Last but not least, I would like to thank my family and my beloved for encouragement.

ABSTRACT

Chinese regard ‘4’ as an unlucky number. Chinese avoid using number ‘4’ in their daily life and business. Many newly developed residential buildings skip the -4th floors in their numbering system. This study first reviews the influences of numerology in Chinese culture and consumers’ preference. Then, the effect of unlucky number floor on property price in Hong Kong is investigated. Two types of residential housing, private residential housing and Home Ownership Scheme (HOS) housing, are examined. The effects of unlucky number floors on both types of housing are compared and contrasted.

In this study, transaction records of City One Shatin and Sui Wo Court are collected. The sources of data include Economic Property Research Centre, Hong Kong Property Review 2009, Population Census/ By-Census 2006, location maps and websites.

Hedonic price model is in use. Three models are established. By using the first model, different attributes of property price of City One Shatin are found. The unlucky number floor units of private residential housing are sold at a 4.2% discount when comparing with a similar unit on other floors. In the second model, the effects of unlucky number floor in private housing estate during different economic situations are studied. During economic boom period, the discount rate of price of unlucky

number floor units reaches 6.3%. However, the impact of unlucky number floor is statistically insignificant during stable and slump period. The unlucky number floor units behave like inferior goods. In the third model, the effects of unlucky number floor in HOS housing estate during different economic situations are studied. For HOS housing, the influence of unlucky number floor on property price is found insignificant in all economic situations. The results are explained by lower income level, less concern on intangible factors and less concern on resale prospect of HOS housing buyers.

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CHAPTER 1
OVERVIEW OF STUDY

1.1 Introduction

In Chinese culture, anything related to death is regarded as taboo. People avoiding taboo is mostly for psychological needs. The pronunciation of number '4' sounds like death. 4 is regarded an unlucky number in Chinese culture. Some people have bias on number 4. The traditional belief may affect the selection of residential apartment and influence the market price of the unlucky number floor units. 4th floors and -4th blocks in many newly constructed buildings are eliminated.

In this study, the effect of unlucky number floor is being investigated. Also, the effect of unlucky number floor on price during different economic periods will be examined. The influence of unlucky number floor on Home Ownership Scheme housing and private residential development will be compared.

Hedonic Price Models will be used to investigate the effect of unlucky number floor. Data will be collected at recession time, stable period and inflation time. The data is collected from a Chinese community in Hong Kong.

1.2 Objectives

The goal of this research is to investigate if there is any relationship between unlucky number and property price in private residential properties and HOS housing in Hong

Kong. The major objectives are defined as follows:

i. To review the influences of numbers in Chinese culture and consumers' preference
ii. To identify and examine the main determinants of property price
iii. To analysis if unlucky numbers floor lower the property price
iv. To investigate if unlucky number floors behave like inferior goods
v. To compare the effects of unlucky numbers floor in private housing and HOS housing

1.3 Importance of the Study

Many newly built residential developments skip the -4th floors and -4th blocks in their numbering system. The necessity of skipping unlucky number floor will be investigated. This study is going to find out the actual effects of the unlucky number floor on property price. The effect of unlucky number floor in different kinds of housing, private residential and HOS housing, and in different economic situations will be studied. If the unlucky number floor is found to be a significant attribute in property price, this study will assist property appraisal and further studies on Chinese individuals' choice in property.

The nature of unlucky number floor as inferior good is studied. The different effects on higher and lower income group are compared. This study would also assist further studies on the relationship between individuals' income level and their choice of property.

1.4 Structure of the Study

In Chapter 2, literatures about hedonic price model will be reviewed. The researches about different attributes of hedonic price model will be studied.

In Chapter 3, the nature of numerology in Chinese culture will be explored. Secondly, the reasons of having lucky and unlucky numbers in Chinese culture will be explained. The practical examples will be used to demonstrate that numbers are considered in consumers' preference. Finally, Chinese customer behaviour will be studied.

In Chapter 4, the relationship between numerology and property price will be explored. On the other hand, the clues of dis-amenity effect of unlucky number floor will be gathered. The nature of unlucky number floors and inferior good will be compared. Finally, the effect of unlucky number floors on different kinds of housing will be considered. The postulate of unlucky number floors influences more on private residential housing than on Home Ownership Scheme (HOS) housing will be established based on the literature reviews.

In Chapter 5, hypotheses of this research will be established according to the findings in Chapter 4.

In Chapter 6, the research design and methodology will be introduced. The methodology for testing the hypotheses is hedonic price model and regression. The reasons of using hedonic price model will be explained. The assumptions and limitations of hedonic price model and various ways to overcome the limitations will be introduced. In research design part, the hedonic price models will be developed. The function form and variables of the model will be introduced.

In Chapter 7, the methods of collecting empirical data will be introduced. The sources of data will be presented.

In Chapter 8, the regression analysis will be carried out. The results will be presented and interpretations will be made. Details of the implication will also be discussed.

In Chapter 9, the conclusion of this research will be drawn. The findings will be summarized. The limitations of this study will be discussed. Moreover, recommendations for future studies will be made.

CHAPTER 2
LITERATURE REVIEW ON HOUSING ATTRIBUTES

This chapter reviews the literatures related hedonic price model and regression analysis in residential property. The literatures cover some determinants of real estate value.

2.1 Housing Attributes

The most conventional approach to estimate property value is to use hedonic price function to account for the implicit partial value attributed to the property. As Can (1992) [1] illustrated, structural variables, neighbourhood variables and location variables as partial components of hedonic model in determining residential property value. Structural variables include building age, area, storey height, etc. Neighbourhood variables include availability of facilities in the district, transportation, view of the property, etc. Location variables include distance to central business district, distance to shopping mall, etc. Every small part of a dwelling unit is accounted for its price.

There are many studies supporting the hypothesis: Kain and Quigley (1975)[2] proved that some of the structural characteristics which affect property price, such as unit size

[1] Can (1992) Specification and Estination of Hedonic Housing Price Models, Regional Science Urban Economics, 22, 453-474

[2] Kain and Quigley (1975) Housing Markets and Radical Discrimination, New York: National Bureau of Economic and Research

and quality of the unit.

Pollakowski (1982)[3] suggested that the property price is determined by both accessibility and location. Rodriguez and Sirmans (1994)[4] revealed the effect of view on market price of residential property. MacKmin (1994) suggested that

'Roads, particularly motorways and main commuter routes, railways, rivers, lakes, village greens, sport field, parks .... Proximity to one or another may give rise to higher or lower relative values depending upon the desirability or otherwise of being close to such a feature. ...Proximity to the right schools, shops, ... leisure facilities, may add to value. ...Proximity to anything likely to cause a nuisance ... may give rise to rowdyism and general misbehavior will tend to depress values.' [5]

Some attributes may change in a short time. Millington (1994)[6] introduced the problem of scarcity which gives rise to property value. Therefore, the attribute varies with the demand of a particular type of housing. If the supply of a particular type of housing units is not sufficient to satisfy the demand, value of that type of housing units will rise. Tse and Love (2000)[7] supported the finding that property prices are determined by the demand, the location as well as the units themselves.

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[3] Pollakowski (1982) Urban Housing Markets and Residential Location, DC Health and Company, Lexington, MA

[4] Rodriguez, M. and C. F. Sirmans (1994) Quantifying the Value of a View in Single-Family Housing Markets, Appraisal Journal, 62, 600–603

[5] MacKmin (1994) The valuation and Sale of Residential Property

[6] Millington A. F. (1994) An Introduction to Property Valuation

[7] Tse and Love (2000) Measuring Residential Property Values in Hong Kong, Property Management, Vol 18

Sirpal (1994)[8] proposed that there were other factors, which were known as 'source of externalities', positively and negatively affecting property price. The positive externalities are known as amenities. The negative externalities are known as dis-amenities.

2.1.1 Dis-Amenity Effect

There are lots of researches done on particular factors which would decrease the residential property value.

Smolen, Moore and Conway (1992)[9] studied the effect of hazardous chemical and proposed radioactive waste landfills on surrounding property values. The investigation showed that both factors had adverse economic impact on the property value.

Ridker and Henning (1967)[10]; Harrison and Rubinfeld (1978)[11]; Nelson (1976)[12] investigated the impact of air quality and concluded that poor air quality had a negative effect on property price.

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[8] Sirpal R. (1994)Empirical Modeling of the Relative Impacts of Various Sizes of Shopping Centers on the Values of Surrounding Residential Properties, Journal of Real Estate Research

[9] Smolen, G., Moore, G., and L. Conway (1992). Economic effects of hazardous chemical and proposed radioactive waste landfills on surrounding real estate values, Journal of Real Estate Research, 7, 3, 283-296

[10] Ridker and Henning (1967) The determinants of residential property values with special reference to air pollution, Review of Economics and Statistics, 49, pp. 246–257.

[11] Harrison, David, and Daniel L. Rubinfeld (1978) "Hedonic Housing Prices and the Demand for Clean Air," *Journal of Environmental Economics and Management*, Volume 5, p. 81-102

[12] Nelson, J. P. (1978) Residential Choice, Hedonic Prices, and the Demand for Urban Air Quality, Journal of Urban Economics, 5, 375-369

2.1.2 Amenity Effect

Many researchers used hedonic price model to study the amenity of dwelling units. Spiral (1994) proposed that the size of externalities, such as an existing shopping mall, has a positive effect on values. Voith (1991)[13] evaluated that suburban area property with good rail access to CBD would have higher value. Hammer, Coughlin and Horn (1974)[14]; Peiser and Schwann (1993)[15] revealed that having a nearby open space had a positive effect on adjacent land value. Moreover, Hansen, Schwartz and Smersh (1998)[16]; Rinehart and Pompe (1999)[17] found that that people were willing to pay premium for a particular view.

Psychological factors, such as neighbourhood relationship, can also be reflected in market price. Tse and Love (2000) indicated good social neighbourhood contributed a positive effective on property price.

2.2 Concluding Remarks

In conclusion, hedonic price model can be used to find out the effects between a factor and market price of a dwelling unit. The attributes include structural

[13] Voith (1991) Transportation, Sorting and Housing Values, Journal of American Real Estate and Urban Economics Association

[14] Hammer, T. R., R. E. Coughlin,and E. T. Horn(1974)The effect of a large urban park on real estate value, Journal of the American Institute of Planners 40(4): 274–277

[15] Peiser, R. B. and G. M. Schwann (1993) The Private Value of Public Open Space within Subdivisions, Journal of Architectural and Planning Research 10, 91-104

[16] Hansen, J. L., Schwartz A. L., and Smersh G. T. (1998) Pricing Residential Amenities: The Value of a View, *The Journal of Real Estate Finance and Economics*, Vol. 16, No. 1,

[17] Rinehart and Pompe (1999) Estimating the Effect of a View on Undeveloped Property Values, The Appraisal Journal

characteristics, neighbourhood characteristics, location characteristics, demand and psychological factors.

CHAPTER 3
CHINESE CULTURE TOWARDS NUMEROLOGY

'Numbers from part of every language, not only for counting purposes, but also as metaphors, in songs and rhymes; numbers become symbols in belief systems and enter social and political disclosure as indicators of status and ideology. So while numbers may be universal in some senses, that may be as culturally specific as food as clothes or iconology.' (Pellatt, 2007)[18]

Everyone knows that numbers are important in mathematics calculation. However, it is more than that. From the quotation above, we noted that numerology is incorporated in our lives and our culture.

3.1 Numbers in Chinese Culture

In ancient China, numerology embodied and expressed in the spirit. It played a great part in conceptual thinking. For example, Confucian advocated 'three obedience and four virtues' of women. During the 'Warring States' period (453-211 BC), the soothsayers' systems of classifying signs and portents found in nature and environment were systematized in a body of theories based largely on the complementarities of yin and yang principles and the five elements (wu xing). The written work most closely associated with numerology and divination is *I Ching* (易

[18] Pellatt V. (2007) Number and Numeracy in Chinese Culture, Language, and Education: The Social Substratum of the Development of Mathematical Thinking, pp 49

經), which dates from 3rd century BC. Calculation of calendar was thought to have been based on *I Ching*. By the 1st century AD, a complex system of number mysticism had developed in philosophical schools such as the naturalists; haven was equivalent to the number 1, earth equivalent to 2, men equivalent to 3 and sun to 10.

The discipline of mathematics was supported and encouraged by its position within an ideological system, which may have helped to make number as important as it is in China, and motivation to learn mathematics as strong as it is. Chinese culture today is still imbued with these notions.[19]

In modern China, numerology has fed into Chinese culture in many ways, not least in the naming of things and people. It was very common for member of the same generations to be labeled by their numerical order in the generation as well as by their names. The novel *Jia* (Family) by Ba Jin describes a typical Chinese family in early 20th century. All of members in the same generation are labeled by numbers according to the order of age. For example, they would call themselves second young gentleman, third young miss, etc. Nowadays, family size is smaller. However, the system is still in use in some families. In China, since 1949, schools and factories have also been numbered.[20]

Nowadays, people do also concern about numbers. Phone numbers, car registration

[19] Ibid, pp 7-9
[20] ibid, pp 71-72

numbers, stock numbers, floor numbers are incorporated in our daily life. Mathematics is also an important subject in education.

Numerology is embedded in Chinese culture. It contributes in philosophy, education, family relationship and daily use.

3.2 Lucky and Unlucky Numbers

Many Chinese believe each number carried its meaning. They pay extra attention in choosing numbers.

The number 1 is popular among Chinese society because of the hope of winning in a competition by coming first.

Number 2 is an auspicious number denoting a pair or a couple.

Number 3 is universally popular in Chinese, especially in the business world. There are brands named San Yang and San Shang, which contain 3. Rhyming indeed decides the popularity of numbers among the Chinese. The word rhymes with or sounds like the Chinese word meaning life and growth. Number 13 which regarded as unlucky number in the Western world, has no significance to the Chinese. In the business world in Hong Kong, 13 rhymes with two words, which together mean ’certain to live’ or ‘definite to grow’, and is therefore a lucky number.[21]

[21] Ho P. Y. (2005) Chinese Number Mysticism, Mathematics and the Divine: a Historical Study, Elsevier B. V., pp 57

The number four is easily the most shunned number by the Chinese. This probably is considered a taboo that 'four', when pronounced in Mandarin, Cantonese or Hokkien, is homophonic with 'death'. Chinese tend to avoid anything that has 'death' connotations. The number four is, therefore, regarded as highly inauspicious and unlucky.[22] Most of the combinations of number containing 4 are perceived as unlucky too.

Rhyming is dictated by the dialect of a language. The number 8 rhymes with the word for prosperity, 18 with 'definitely prosper' ,28 with 'easily prosper', 38 with 'life and prosperity' and 48 with "prosperity to the extreme". On the other hand, 58 sounds like 'do not prosper' and has no appeal to the Chinese. The number 138 may be read by some as 'prosperity throughout one's life'. The number 168 rhymed with 'prosperity all the way' in the Hong Kong Cantonese dialect.

The number 9 is found popularity among the Chinese because it rhymes with the word that conveys the sense of 'long lasting' and 'longevity'. There is also special significance attached to some double-digit or even multi-digit numbers, some of which have already been referred to in the above paragraph.

The number 10 is favoured by the Chinese because it conveys the sense of wholeness and completeness. Twenty is sometimes expressed as double-ten, where both the

[22] Bee C. G. (1999) Culture: the silent negotiator, ADR Bulletin, Volume 2, Number 2, Art. 3

numbers 2 and 10 have an auspicious meaning. The number 60 is significant on account of the 60-year cycle in the Chinese calendar.

However, there are variations. One example is the number 6, which rhymes with the word meaning emolument, civil appointment or good job. It is also an auspicious astrological number like 1 and 8. However, some Hong Kong Cantonese-speaking people find it rhyming with the word meaning 'falling down'. Even with respect to the unlucky number 4 we can find some exceptions, especially in the case of established terms, such as four seasons and four seas. For example, Sihai (four seas) is a popular Chinese name for the tourist trade, implying welcome to customers from all the four quarters of the Earth.[23]

3.3 Behaviour of Chinese Customer and Its Influence by Culture

Marketing theorists consider culture is one of the determinants of consumers' behaviour. Culture was found an external factor affecting consumers' behaviour.[24] Herny (1976)[25] was among the first to examine the correlation between culture and consumers' behaviour. Engel (1995)[26] incorporate culture as an environmental determinant of customers' behaviour in his model. The relation is further elaborated

[23] Ho P. Y. (2005) Chinese Number Mysticism, Mathematics and the Divine: a Historical Study, Elsevier B. V., pp 58
[24] Howard, Sheth (1969) The Theory of Buyer Behavior, New York, John Wiley & Sons
[25] Herny W. A. (1976) Cultural Values Do Correlated with Consumer Behaviour, Journal of Marketing Research, 8 (May), pp121-127
[26] Engel, Blackwell (1995) Consumer Behavior, Forth Worth, Dryden Press

by Mont and Pleplys (2003)[27].

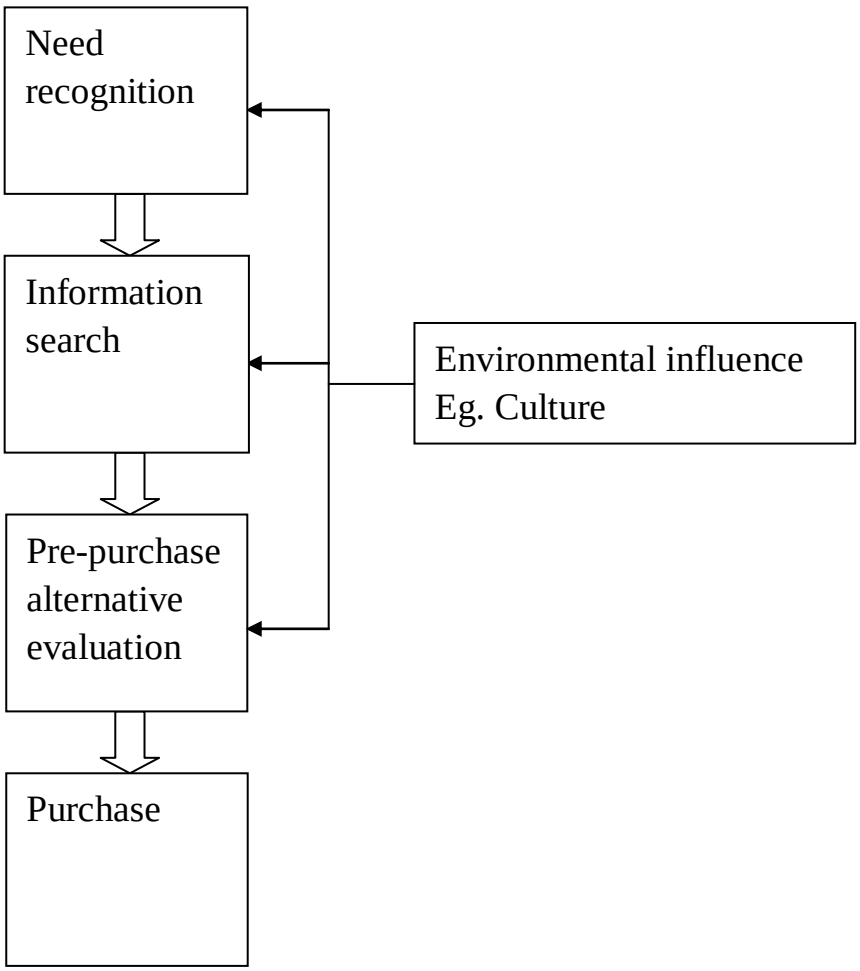

Figure 1 Extracted Part of the Model of Customer Satisfaction Process (Adopted from Mont and Pleplys, 2003, p15)

The model shows that environmental factors, such as culture, exert influences on customers' selection in various stages before purchase.

Yau (1994)[28] concluded that Chinese cultural values affected consumer's satisfaction. He suggested that Chinese consumers pay much attention on 'face' when they are

[27] Mont and Plepys (2003) Customer Satisfaction: Review of literature and Application to the Product-service Systems
[28] Yau O. H. M. (1994) Consumer Behaviour in China: Customer Satisfaction and Cultural Values

purchasing. 'Face' is regarded as one's own status or image, public acceptance and relationships between individuals. Chinese would purchase something which enhance their 'face' in order to get satisfaction. Wang, Zhang and Goodfellow (2003) agreed that Chinese would strongly concern how to protect and enhance their 'face' in dealings.[29] On the other hand, the traditional belief in good fortune and feng shui would also affect people's preference.[30] Bee (1999) suggested that '*Culture does play a significant role in a negotiation. Its role, particularly in a cross-cultural negotiation, cannot be ignored. ...This is not an uncommon phenomenon in cross-cultural negotiations; because our decision-making is often governed by our accustomed habits (or culture) in subtle and subconscious ways… Feng shui, and its relationship with numbers, which can play a powerful but subtle role in a negotiation. In many senses, numbers can make or break a negotiation.*'[31]

The two characteristics of Chinese's customer behavior are inter-related. Schutter and Ciarlante (1998)[32] pointed out that other than superstition, status and face-saving can explain why Chinese are keen on purchasing lucky numbers. Chinese regard good-fortune-bring commodities are superior. Recognition from ones' peers and family is attained by owning those superior goods. Their 'face' is boosted. Therefore,

[29] Wang Y, Zhang X S and Goodfellow R (2003) China Business Culture Strategies for Success, Thorogood, Ch2, pp25-27
[30] Ibid, pp 54
[31] Bee (1999) Culture: the silent negotiator, ADR Bullrtin, Vol 2 Number 2, Article 3, pp 1-2
[32] Schutter and Ciarlante (1998) Consumer Behaviour in Asia, New York University Press, Washington Square, New York, 62-63, 101

Chinese tends to buy good-fortune-bring products. The phenomenon and real life examples are discussed in the following section.

3.4 Customers' Preference towards Numbers

As mentioned, numbers are important in Chinese culture. It is also believed that numbers can bring good fortune or bad fortune to the owners or users. This belief plays important role on customer's preference. Chinese regarded good-fortune-bringing commodities are more superior. When they buy it, they would get higher satisfaction by showing off and psychologically contented. Examples are extracted in real life.

The car registration numbers or phone numbers with combination, which carry lucky meanings, are more popular in Hong Kong. Some people are willing to pay premium to get the lucky numbers. For example, in China, the selling price of lucky phone numbers is higher than the normal one. In 2003, a telephone number 87888 was sold at RMB 129,000 at an auction in Hangchou. The 'special' car registration numbers are auctioned off by the government. Lucky numbers like 8 or other combinations of 8 cost extremely high price.

In Malaysia, second-hand cars with popular numbers fetch higher prices and sell better than those with less popular numbers, while those with unlucky numbers do not

enjoy a good market. Commercial and residential properties are similarly affected by numbers. Ho (2005) provides practical examples of the application of Chinese number mysticism to modern economics. He proposed that number mysticism is not all myth after all.[33]

On the other hand, people avoid using numbers which carry unlucky meanings. In the middle of the 20th century, a well-established European car carrying the name '404' was on the market in Malaysia. It was quite popular with the connoisseur, but a large section of the Chinese community avoided it, because in their dialect the numbers rhymed with 'four people die' ,and if one of them had to take a ride in a 404 he would make sure that there were not exactly four people in the car.[34]

In fact, many researchers record their observations on the effects of number. In commercial transactions, this cultural influence is illustrated by the following examples. Some years ago, Alfa Romeo launched their new model 164 in Taiwan. The company was shocked by the lack of interest from buyers. It then discovered that the problem was due to the presence of 'four' in the model series number. It changed the model number to '168' and relaunched it. The car sold well not only in Taiwan but in Hong Kong as well.

A banker of the National Australia Bank pointed out that her Chinese clients declined

[33] Ho P. Y. (2005) Chinese Number Mysticism, Mathematics and the Divine: a Historical Study, Elsevier B. V., pp 58
[34] Ibid, pp59

term deposits at the bank when the account numbers had fours in them. The bank avoided a potential conflict by responding in a culturally sensitive way with new account numbers.

Real estate agents have reported that it was a waste of time for them to show houses with a street number of four to potential Chinese buyers. To accommodate this, the Brisbane City Council announced in late May 1994 that new streets would not carry house numbers ending in 'four'.[35]

Furthermore, Brown et al (2002) find out that there is influence of Chinese culture and superstition on year-round number preferences of traders in the Hong Kong market. The study shows increased avoidance of the number 4 during the auspicious Chinese New Year, Dragon Boat and Mid-Autumn festivals.[36]

3.5 Concluding Remarks

From the ancient time to nowadays, numerology is important and embedded in the Chinese culture. It contributes in philosophy, education, family relationship and daily use. People regard '8' as a lucky number but deem '4' as an unlucky number. The main reason is that those numbers are homophonic with 'prosperity' and 'death' respectively.

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[35] Bee C. G. (1999) Culture: the silent negotiator, ADR Bulletin, Volume 2, Number 2, Art. 3

[36] Brown P., Chua A. and Mitchell J. (2002) The influence of Cultural Factors on Price Clustering Evidence from Asia-Pacific Stock Markets, Pacific –Basin Finance Journal, Vol 10, Issue 3, pp 307-332

Culture affects consumers' behaviour. People would like to purchase on something which can enhance their 'face' in order to get satisfaction. Also, traditional belief of good fortune and feng shui would affect their choice of goods. Relevant studies summarized that Chinese are keen on purchasing commodities with lucky numbers. Chinese do also avoid unlucky number. In conclusion, lucky or unlucky numbers affect consumers' choices.

CHAPTER 4
EFFECT OF NUMEROLOGY ON PROPERTY PRICE AND NATURE OF GOODS

Some studies on the attitude of Chinese towards luckiness of numbers are reviewed in the previous chapter. In Chinese culture, 4 is regarded as unlucky number and 8 is a lucky number. The previous studies mainly focus on these two numbers and their effects on different commodities. In this chapter, literature of the effect of numbering on residential price will be reviewed.

Unlucky number floors are postulated as a dis-amenity in hedonic price. The nature of inferior goods will then be introduced.

Finally, the postulate of unlucky number floors influences more on private residential housing than on Home Ownership Scheme (HOS) housing is set based on the literature reviews.

4.1 Premium for Lucky Number Floors

Developers have deep-rooted belief on that units on lucky number floors would be sold at a higher price while those located at unlucky floors would be sold at a lower price. One recent example is selected from Hong Kong. Henderson Land Development sparked a debate over developers' ethical standards with its latest project, 39 Conduit Road, when it numbered the two highest levels of the building 68

and 88. The supposed 68th floor of the luxury duplex which is actually located at a combination of the 43rd and 44th floors, was sold for what Henderson said was a world record 88,000 Hong Kong dollars (US $11,300) per square foot. That translated into a price tag of 439 million Hong Kong dollars. Henderson said they were hoping to charge HK$100,000 per square foot for the 88th floor duplex which is actually located on the 45th and 46th floors. According to reports, those flats has not yet been placed on the market.[37] Henderson's chairman, Lee Shau-kee, stated that buyers liked those numbers and they were not cheating them. He claimed that Henderson was not the only developer using this marketing ploy. Known from the case, the postulate that lucky number floor are sold at premium is widely believed by the developers. The message may spread to the consumers. Therefore, the consumers may regard lucky number floor units as superior products. Some consumers are willing to pay premium even they are not superstition.

Ma and Chau (1998)[38] were among the first who found that apartment units on lucky floor levels are sold at higher prices. Bourassa and Peng (1999) researched on house values and house number. Their scope of the study was an area with a relatively high percentage of Chinese households in Auckland, New Zealand. They used hedonic pricing method to analysis if the house values are affected by luckiness of numbers.

[37] Agence France Press (2009) Legislators slam Hong Kong Developer's Tall Storeys, 21 Oct 2009
[38] Ma S. M. and Chau K. W. (1998) How Do Superstition and Taboo Affect the Pricing of Apartment Unit, Paper presented in the American Real Estate Society Meeting, California, USA

The results demonstrate that lucky house numbers are capitalized into the sale prices of houses. According to their study, the premiums for lucky numbers are noticeable in areas with high percentages of Chinese households. Due to the stigma associated with an unlucky number, it appears that Chinese households may avoid purchasing houses with such numbers. These findings confirm anecdotal evidence that Chinese house-buying behaviour is influenced in a significant way by the beliefs in the power of numbers to affect wellbeing.[39]

Another finding was that the lucky house numbers were not only meaningful to feng shui believers but also to other buyers. A survey done in Auckland by Boyer (1995)[40] revealed that Chinese buyers who do not believe in feng shui still prefer lucky house numbers and avoid unlucky numbers because of their concern about resale prospects.

Chau, Ma and Ho (2001) found out that a lucky floor number has been shown to be a valuable attribute. They explained that the address of an apartment units located on lucky number floor has an extra selling point in Hong Kong. Although not all Cantonese are superstitious about the luckiness of number 8, this is an added benefit that nobody will reject. Also, many people believe that there is always a demand from a group of superstitious people for 'lucky' units. Chau et al revealed that lucky floor

[39] Bourassa and Peng (1999) Hedonic Prices and House Numbers: The Influence of Feng Shui, International Real Estate Review, pp79-94

[40] Boyer T. M. (1995) Home Sweet Home? An Analysis of Taiwanese Immigration Since 1986 and the Present Status of the Taiwanese Community in Auckland, in: An Ethno-Geography of Taiwanese, Japanese and Filipino Immigrants in Auckland, Occasional Paper 28, Yoon, H. (ed.). Department of Geography, University of Auckland, New Zealand

numbers units are sold at a significantly higher price during property booms than during property slumps. They explained that the demand for such attribute during property booms is high due to the superstition and show-off effects. During these periods, people are more willing to pay a higher premium for lucky floor number. On the other hand, during the slump periods, the demand for such an intangible attribute of property declines. [41]

Chau, Ma and Ho (2001) compared the nature of lucky number floor with luxury goods. Lucky number floors behave similarly with luxury goods. When income increases, consumption increases, and vice versa. Therefore, they concluded that the market for lucky number floors is more volatile and it is more risky to invest in.

They further explained that the difference in boom periods and slump periods is due to superstitious people may attribute their success to lucky units they live in and will not sell unless the buyers offer a high enough premium. This group of people will certainly be smaller during slump periods leading to a higher premium during boom periods. They also used 'show-off-consumption' effect to explain for the premiums of lucky number floor.[42] In summary, several researches showed that lucky numbers do exert positive impact on property price in Chinese community. The premiums are paid for show-off reason, superstition and better market for resale. The nature of lucky

[41] Chau, Ma and Ho (2001) The Pricing of 'Luckiness' in the Apartment Market, Journal of Real Estate Literature, 9, 1, pp31-40
[42] Ibid

number floors resembles luxury goods.

On the other hand, a research found that the influence of lucky numbers is not significant. According to Choy, Mak and Ho (2007), '*an apartment located on an unlucky number floor is associated with negative relationship between real estate price, while an apartment located on a lucky number floor has been found to be statistically insignificant in explaining price variations.*'[43]

4.2 Dis-amenity Effect of Unlucky Number Floors and Blocks

Some studies found that unlucky numbers have a negative effect on property price. Choy, Mak and Ho (2007) proved that an apartment located on an unlucky number floor is not preferred by homebuyers and is usually transacted at a price discount.

In predominantly Chinese parts of Asia outside mainland China, buildings and hotels often have floors numbered in the sequence of 1st, 2nd, 3rd and 5th.

Due to the unlucky number floor, it is already common in Hong Kong for -4th floors and -4th blocks not to exist. The phenomenon is common for private residential buildings which were built in last 10 years. Henderson, a Hong Kong developer, sold an apartment for a world record price was condemned for selectively numbering the floors on a 46-storey building, 39 Conduit Road, to attract Chinese buyers. A total of

[43] Choy, Mak and Ho (2007) Modeling Hong Kong Real Estate Prices, J Hous and the Built Environ, 22, p367

42 intermediate floor numbers are omitted from 39 Conduit Road. All unlucky number floors are omitted. Those missing numbers include 14, 24, 34, 64, all floors between 40 and 59. The floor number following 68 is 88.

The Building Department only requires for the floor number to be made in logical order. This made the skipping of number very common in private residential property in Hong Kong.

From the phenomenon in Hong Kong, the hypothesis of 'unlucky number floor is a negative attribute in hedonic price' is established. Hedonic model is implemented to test whether such skipping is necessary or not.

On the other hand, there is no study on the relationship between unlucky number blocks and property price. Test on this attribute is difficult because there is always correlation between location attributes and block numbers. The effect of block number can hardly be extracted.

4.3 Unlucky Number Floor as Inferior goods

A good which a change in income causes an opposite change in demand is an inferior good. An inferior good is one that reacts negatively to changes in buyers' income. If buyers have more income, then they purchase less of an inferior good. If they have less income, then they increase their purchases of an inferior good.

An inferior good is neither a defective good nor made with inferior materials. It is so named because it tends to be cheaper than other more desirable goods. As such, when buyers have more income and can afford to buy the more desirable products, they tend to reduce their purchases of the inferior goods.

Turnbull (1991) defined that in certainty models, the non-inferiority of a good is sufficient to establish decreasing demand with increasing price. The negative price-quantity relationship is usually presumed to be the case for inferior goods as well.[44] Green and Hendershott (1996)[45] gave example that some attributes in hedonic price is inferior, such as age of the property.

From the data above, unlucky number floor is expected to be a negative impact on property value. The consumption pattern may be different when people having different levels of income. Chau, Ma and Ho (2001) proposed that the nature of lucky floor numbers resembles luxury good. Then, would unlucky number floor behave like an inferior good?

4.3.1 Income Elasticity

Classifying a good as inferior is accomplished in a precise manner using the income elasticity of demand. The income elasticity of demand is the relative response of

[44] Turnbull G. K. (1991) The Spatial Demand for Housing with Uncertain Quality, Journal of Real Estate Finance and Economics, 4: 5-17

[45] Green and Hendershott (1996) Age, Housing Demand and Real House Prices, Regional Science and Urban Economics, 46, 465-480

demand to changes in income. More specifically, it is the percentage change in demand due to a percentage change in buyers' income. An inferior good is then one with an income elasticity that is negative, or less than zero. In comparison, a normal good has a positive income elasticity, or greater than zero.[46] During economic booms, most people will normally have higher income. During economic slumps, most people will have lower income. Therefore, by comparing the property prices of unlucky number floors and other floor numbers during different economics situations, inferiority can be proved if the price discount rate increases in period of economic booms.

4.3.2 A Normal Alternative – Other Floors

An alternative to an inferior good is a normal good. A normal good exists if buyers are inclined to buy more of the good when they have more income. A normal good is so named because it represents the typical or normal situation for most goods. As such, when buyers have more income, then they tend to increase their purchases of normal goods and luxury good. If unlucky number floor units are proven to be inferior good, other floor number units can act as the normal alternatives of unlucky number floors.

[46] AmosWEB LLC, 2000-2009, Inferior Good, AmosWEB Encyclonomic WEB*pedia, http://www.AmosWEB.com

4.4 Different Nature of Goods across Different Income Groups

Studies show that income elasticity varies across different income groups. The nature of a particular good, which varies from inferior good, normal good and luxury good, depends on the income or richness of the consumer. In China, dietary fat was a luxury good and an inferior good for low income group and high income group respectively in 1991.[47] In Japan, education and tutorial class were inferior goods for high income group while were normal goods and luxury goods for low to middle income group.[48] In the United States, cigarette is a normal good to low and medium income group where it is an inferior good to high income group.[49]

However, there is no literature studying the income elasticity of lucky number floor or unlucky number floor of different income groups. This study is trying to find out if there is any relationship between unlucky number floor residential units and income groups.

4.5 Concluding Remarks

In conclusion, culture may be a factor that attributes to the hedonic price. Several studies show that there is correlation between the property price and floor number of 8

[47] Guo & Zhai (2000)Structural Change in the Impact of Income on Food Consumption in China, 1989–1993, Economic Development and Cultural Change, 48:737-760

[48] Hashimoto K & Heath J A (1995) Income Elasticities of Educational Expenditure by Income Class: The Case of Japanese Households, Economics of Education Review, Vol. 14, No. I, pp. 63-71

[49] Huang, Yang, and Hwang (2004) International Journal of Applied Economics, 1(1), September 2004, 81-97

and 4, which are traditional Chinese lucky number and unlucky number respectively. On the other hand, a study shows that the effect of lucky number is insignificant.

A good which a change in income causes an opposite change in demand is an inferior good. Studies show that some attributes, such as age, of property price behave as inferior good. However, no research examine if unlucky number floor units are inferior good. Studies show that nature of good would change across income groups. The nature of good of unlucky number floor across different income groups is unknown.

CHAPTER 5
DEVELOPMENT OF HYPOTHESIS

The hypothesis is developed based on the relevant literature reviews. Studies show that Chinese consumer's behaviour is strongly influenced by culture. '4' is always regarded as unlucky number. Some Chinese would show reluctance to purchase or use car registration numbers, bank account numbers and phone numbers containing '4'. In real estate industry, developers try to skip -4th floors in residential buildings. Some previous studies have also shown that '4' has a discount effect on residential property price. On the other hand, some studies found that the effect of unlucky number floors is insignificant.

First, this study would examine the validity of unlucky number floor attribute in residential property price. In this study, City One Shatin is chosen as source of dataset. Then, Hypothesis 1 is developed.

Hypothesis 1:

'4' is an unlucky number in Chinese traditional belief. People are reluctant to purchase goods with number '4'. Therefore, unlucky number floor, such as 4, 14, 24 and 34, has a negative effect on private residential property price. Those units are sold at a discounted price.

Secondly, many studies show that lucky floor number positively correlates with

residential property price. People are willing to pay premium for the luck number floor attribute. Lucky floor number units also show the characteristics of luxury good. The lucky floor units are more volatile than the other units. The fluctuation of price of those units in different economic situations is larger. The second hypothesis considers the nature of unlucky number floor. The nature of unlucky number floor units is unknown since there is no prior study on this topic. If Hypothesis 1 stands, unlucky number floor would be sold at a discounted price. During different economic situations, the discount rate may vary. Unlucky number floor units may behave as an inferior good. Hypothesis 2 is established.

Hypothesis 2:

Unlucky number floor units are inferior good. The discount of unlucky number floor units in boom period is larger than that of slump period.

Finally, the changing of nature of good across different income groups is going to be investigated. Studies show that income elasticities of some commodities vary across different income groups. In Hong Kong, the household income of high-rise private housing estate owners is generally higher than that of Home Ownership Scheme (HOS) housing owners. In City One Shatin, the average monthly income is $17,000 per working adult in 2006. In Sui Wo Court, the average monthly income is $12,000

per working adult.[50] Therefore, the discount rate for unlucky number floor may vary in those types of housing due to different income levels of owners. This research will consider the effect of unlucky number floors in both types of housing in different economic situations.

Boyer (1995)[51] revealed that Chinese buyers who do not believe in feng shui still prefer lucky house numbers and avoid unlucky numbers because of their concern in resale prospects. HOS is not a good tool for speculation because of low liquidity. People may pay less concern on resale purpose. Therefore, less influence of unlucky number floor on price may be observed. Hypothesis 3 is established.

Hypothesis 3:

Unlucky number floor attribute has less influence on HOS housing in any economic periods than that in private high-rise residential housing estate.

[50] 2006 Population By-census, Census and Statistics Department

[51] Boyer T M (1995) Home Sweet Home? An Analysis of Taiwanese Immigration Since 1986 and the Present Status of the Taiwanese Community in Auckland, in: An Ethno-Geography of Taiwanese, Japanese and Filipino Immigrants in Auckland, Occasional Paper 28, Yoon, H. (ed.). Department of Geography, University of Auckland, New Zealand

CHAPTER 6
METHODOLOGY AND RESEARCH DESIGN

In this chapter, the methodology and research design are discussed. The methodology of this study is Hedonic Pricing Method. Firstly, the method is introduced. Secondly, the reasons of selection and the limitations of the model are explained. In the research design part, outline of the models is established. All the variables of the models are defined.

6.1 Hedonic Price Model

Hedonic pricing model has been used for estimating the value of amenities that affect prices of marketed goods. Most applications use the value of amenities to estimate the residential housing prices. The model is based on the assumption that people value the characteristics of commodity, or the services it provides, rather than the value of the commodity itself. Thus, the price will reflect the value of a set of characteristics that people consider valuable when purchasing the good.[52]

[52] King D and Mazzotta M (2000) Ecosystem Valuation, Hedonic Price Method, US Department of Agriculture, available at http://www.ecosystemvaluation.org/hedonic_pricing.htm, accessed on 1st March 2010

6.1.1 Literature Review on Hedonic Price Model

The hedonic regression analysis was first introduced by Court (1939)[53]. Then, the hedonic price approach was further developed by Griliches (1961, 1971)[54]. The hedonic price model describes the relationship between the observed prices of commodities and the characteristics accompanied with the commodities. He estimated the hedonic price indices of consumer goods in respect with quality change.

The hedonic prices were then investigated by Rosen (1974). He postulated that 'goods are valued for their utility-bearing attributes or characteristic where hedonic price is the summation of implicit price of each attribute associated with that good.'[55] He also assumed that a hedonic price for housing attributes exists.

6.1.2 Regression Analysis

The implicit prices are calculated by regression analysis in constructing a hedonic price. The data are analyzed by using regression analysis which is a statistical process for fitting a line through a set of data points. It gives the intercept and slopes of the "best fitting" line. Thus, it shows how much the variable (the dependent variable) will

[53] Court, A. T. (1939) Hedonic Price Indexed with Automotive Examples, In The Dynamics of Automobile Demand, New York: General Motors

[54] Griliches, Z.(1961) Hedonic Price Indexes for Automobiles: An Econometric Analysis of Quality Change, in: The Price Statistics of the Federal Government, General Series, No. 73, New York: National Bureau of Economic Research, 137-196 ;Griliches, Z (1971) Price Indexes and Quality Change, Cambridge, Massachusetts: Harvard University Press.

[55] Rosen, S (1974) Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition, *Journal of Political Economy*, Vol. 82, pp 34-35

change when other variables (the independent, or explanatory, variables) change. The effects of different characteristics on price can be estimated. The regression results indicate how much property values will change for a small change in each characteristic, holding all other characteristics constant.

The analysis may be complicated by a number of factors. For example, the relationship between price and characteristics of the property may not be linear. The prices may increase at an increasing or decreasing rate when the characteristic change. In addition, many of the variables are likely to be correlated, so that their values change in similar ways. This can lead to understating the significance of some variables in the analysis. To solve the problem, different functional forms for the analysis must be considered.[56]

In use of empirical model, hedonic price model would be established. An equation would be formed.

$$\mathbf{P(Z) = p(Z_1, Z_2, \ldots, Z_i, Z_n)}$$

where **P(Z)** is the price of a residential unit

$Z_1, Z_2, \ldots, Z_i, Z_n$ are the factors affecting price

The factors affecting price are the variations in the equation. At this stage, the variations are not yet investigated.

[56] King D and Mazzotta M (2000) Ecosystem Valuation, Hedonic Price Method, US Department of Agriculture, available at http://www.ecosystemvaluation.org/hedonic_pricing.htm, accessed on 1st March 2010

Regression analysis is for calculating the constant, coefficients and determining the significance of the attributes in the hedonic price equation. Hedonic price equation is usually a linear equation as below:

Hedonic Price = B_0 + $B_1(Z_1)$ +$B_2(Z_2)$ + $B_3(Z_3)$ + … + $B_i(Z_i)$+ … + $B_n(Z_n)$

where **B_0** is a constant

B_i is the regression coefficients

Z_i is value-bearing attributes

6.1.3 Coefficient of Determination

The coefficient of determination (R^2) measures the proportion of variation in the dependent variable explained by the variation in the independent variables. R^2 ranges from 0 to 1. The larger the R^2, the larger the predictive power does the regression model has. R^2 increases as more independent variables are added to the equation.

Adjusted R^2 represents the proportion of variance of the dependent variable explained by the variance of independent variables. With smaller degree of freedom, R^2 would decrease.

6.1.4 Test for Significance

The data collected should be a normal distribution. T-test is used to check for the

significance of the parameter estimates. The t-value is calculated by dividing the regression estimate by its standard error. The larger the magnitude of the value, the more significant is the effect of the independent variable to the dependent variable. If the magnitude of t-value is close to or large than 2.0, the value-bearing attributes are statistically significant at 95% level. Therefore, that attribute has implicit value in the determination of price of the property.

6.2 Reasons of Choosing Hedonic Price Model

There are several advantages of hedonic price model. The main strength is that the model can be used to estimate values based on actual choices. Moreover, the hedonic pricing model is relatively straightforward and uncontroversial to apply, because it is based on actual market prices and fairly easily measured data. If data are readily available, it can be relatively inexpensive to apply.

Hedonic price model is especially suitable for estimating the value of amenities and the dis-amenities that affect property prices because property markets are relatively efficient in responding to information. Property records are typically very reliable. Data on property sales and characteristics are readily available through many sources, such as EPRC. Descriptive variables for the analysis can also be obtained through real

estate agencies' websites and EPRC. The method is also versatile, as it can be adapted to consider several possible interactions between market goods and attributes.[57]

6.3 Limitations and Ways to Improve Accuracy

The hedonic price model has been a commonly used method for modeling the price of complex commodities, such as real estate. The theoretical basis of the model is appealing and sound. However, there are some potential problems of the model, such as multi-collinearity, heterogeneity of data and inappropriate function form.

The first potential problem is multi-collinearity which occurs when two or more independent variables are correlated, so that their values change in similar ways. It brings an undesirable effect which is understating the significance of some variables in the analysis. When a serious multi-collinearity exists, one of the common symptoms is a highly adjusted R^2 with many insignificant coefficients. In this case, the results should be checked for correlation. A correlation matrix can be employed in case of finding out the existence of collinear relationship among independent variables.

Although Lusht (1997)[58] revealed that the presence of multi-collinearity was not the

[57] King D and Mazzotta M (2000) Ecosystem Valuation, Hedonic Price Method, US Department of Agriculture, available at http://www.ecosystemvaluation.org/hedonic_pricing.htm, accessed on 1st March 2010

most critical issue for real estate applications, the extent of multi-collinearity should be considered.

Secondly, the predictive power of the equation would be affected by heterogeneity of data. Heterogeneity of data is that the data samples are from different markets and may have different characteristics. Chau and Ng (1998)[59] suggested that relatively homogenous samples should be selected. Minimizing effects of attributes which are not in consideration for hedonic price model is desirable. The heterogeneity effect is minimized by using a whole set of data samples which are collected from the same housing estate with similar nature of units. Then the data samples are relatively homogenous in term of structure, location and neighbourhood.

Moreover, hedonic price model requires a large amount of information as sample to improve the predictive power. In Hong Kong, the property market is very active. There are plenty of transaction data of the selected housing estate provided. The problem is minimized in this study.

The third problem is on the functional form. The regression result is determined by the functional form and its analysis is critically influenced by the selection of the

[58] Lusht K. M. (1997) Real Estate Valuation: Principles and Applications, Chicago: Irwin

[59] Chau K. W. & Ng F. F. (1998) The Effects of Improvement in Public Transportation Capacity on Residential Price Gradient in Hong Kong, Journal of Property Valuation and Investment, 16, 397-410

functional form. Mason and Quigley (1996)[60] commented on the hedonic models that the results depend on inclusion of the right independent variables and the correct specification of the functional form. The functional form assumption is particularly difficult in the housing context because the hedonic price function summarizes not only consumer preferences and production technology, but also various quantities which are historically determined, difficult to measure, and not approachable by theory. According to Mason and Quigley, there is no perfect functional from. Therefore, applications of hedonic price model often encounter some potential difficulties.

6.4 Research Design

The research design includes the procedures of selection of function form, the definition of variables, the outline of models and the expected results.

6.4.1 Selection of Function Form

As mentioned before, the results of the hedonic models depend on inclusion of the right independent variables and the correct specification of the functional form. Therefore, careful selection of function form is essential for the model. Since there is

[60] Mason C. & Quigley J. (1996) Non-Parametric Hedonic Prices, Housing Studies, Vol 11, Issue 3, pp 373-385

no perfect function form, the appropriate functional form has to be deduced according to the prior knowledge of the nature of the relationship between the dependent and the independent variables. However, prior information is not always available. In case of no prior information, the function form would be the one which assumes the already established relationship. The choice of function form would be taken on trial and error mechanism. First, linear or log-linear function is used in the first attempt. If the first attempt fails, other function forms, such as Box-Cox transformation, polynomial function, would be taken to trial. Linear function form is adopted in the analysis of this study.

6.4.2 Choice of Variables

There are two types of variables in the model. One type is dependent variable and the other one is independent variable.

6.4.2.1 Dependent Variable

Real Price (Real P)

Real Price is the dependent variable in this study. Transaction price of every data sample is readily available in the EPRC database. However, the transaction price is the dealing price of the property but not the real price. There is a time effect on the

transaction price. Transaction prices are always affected by the changing economic situations. Neglecting the time effect would cause overestimation or underestimation of the real housing prices. This problem can be solved by adjusting the data. The transaction price is deflated by the Private Domestic Price Indices published by the Rating and Valuation Department with respect to transaction months and size of the apartment. The indices are compared based on the year 1999. After adjustment, the real price, which is free from inflation and time effect, would be obtained.

6.4.2.2 Independent Variables

Gross Floor Area (GFA) and Square of Gross Floor Area (GFA^2)

Gross Floor Area (GFA) is one of the common independent variables in hedonic price study of real estate. GFA is measured in square feet. The variable measures the willingness of people to pay for additional gross floor area. The real price is expected to increase with GFA.

Square of GFA indicates the rate of change of real price with respect to change of size. Increase in size of small to medium size apartments may lead to larger increase in real price. Further increase in size of large apartments may lead to smaller increase in real price. The expected coefficient for square of GFA is negative sign due to diminishing effect.

Floor Level (FL) and Square of Floor Level (FL^2)

Chau et al (2008) suggested higher floor levels have better views, less noise and fresher air. Premium is paid for higher floor level.[61] Therefore, a positive sign of coefficient is expected.

Square of floor level is introduced to capture any potential non-linear effect of the rate of change. The effect of the benefits enjoying by higher floor level is expected to diminish while there is further increase in floor level. The anticipated sign of the coefficient of square of floor level is negative.

Age (AGE) and Square of Age (AGE^2)

The age of the building is counted from the date of issuance of occupation permit to the date of transaction. Age is related to the physical condition of the property. The older buildings usually have more physical depreciation and poor condition of the building facilities. Therefore, a negative sign of coefficient is expected.

Square of age is introduced to capture any potential non-linear effect of the rate of change. The dis-amenity effect caused by poor physical condition is expected to diminish while there is further increase in age.

[61] Chau, Wong, Yau & Cheung (2008) The pattern of floor level premium in apartment building. Keynote paper, 13th International Symposium on Advancement of Construction Management and Real Estate, 31st Oct – 3rd Nov, Beijing, China

Transportation (Trans)

The distance between means of public transportation and the residential block is taken into account. The distance is measured in meters. So et al (1997)[62] found that the proximity to public transportation has significant effect on property price in Hong Kong. It is expected that the shorter the distance, the higher the property price.

River View (RV)

River view is a discontinuous factor. Therefore, RV is a dummy variable. 0 or 1 is used to represent the availability of the factor. Both estates chosen are near to Shing Mun River. Some of the units of each estate enjoy river view. The river view may give the occupants a more spacious and pleasant feeling. Previous researches show that people is likely to pay premium for a better view. A positive coefficient for river view is expected.

Unlucky Number Floor (UFLOOR)

The unlucky number floor is another dummy variable. The floor number which contains '4' is regarded as unlucky number floor. The availability of unlucky number floor of a particular unit is shown by 0 or 1.

[62] So, Tse & Ganesan (1997) Estimating the influence of transport on house prices: evidence from Hong Kong, Journal of Property Valuation and Investment, 15(1), pp 40-47

Choy and Mak (2007)[63] found out that an apartment located on an unlucky number floor is on average sold at a discount. Therefore, a negative coefficient for unlucky number floor is expected.

Boom Period (B), Stable Period (G) and Slump Period (S)

In this study, boom period is defined as the period from February to July 2008 where the slump period is from April to September 2003. The stable period is chosen to be July to December 2006. The selection of period is based on the average monthly price indices published by the Rating and Valuation Department (see Figure 2). During the boom period, the average market price index reached 126.6. That means the market price is 126.6% of the market price of the base year, 1999. The boom period chosen is the period before the Lehman Brothers Holdings Inc. declared bankruptcy.

During the slump period, the lowest average market price index is 58.4, which is less than a half of the boom period. The slump period is caused by the outbreak of SARS.

In the stable period, the market price of the property varies little. The means of market price across the period changes from 91.9% to 93.8% of the base year.

[63] Choy L H T & Mak S W K and W K O Ho (2007) Modeling Hong Kong Real Estate Price, J Hous and the Built Environ (2007) 22: 395-369

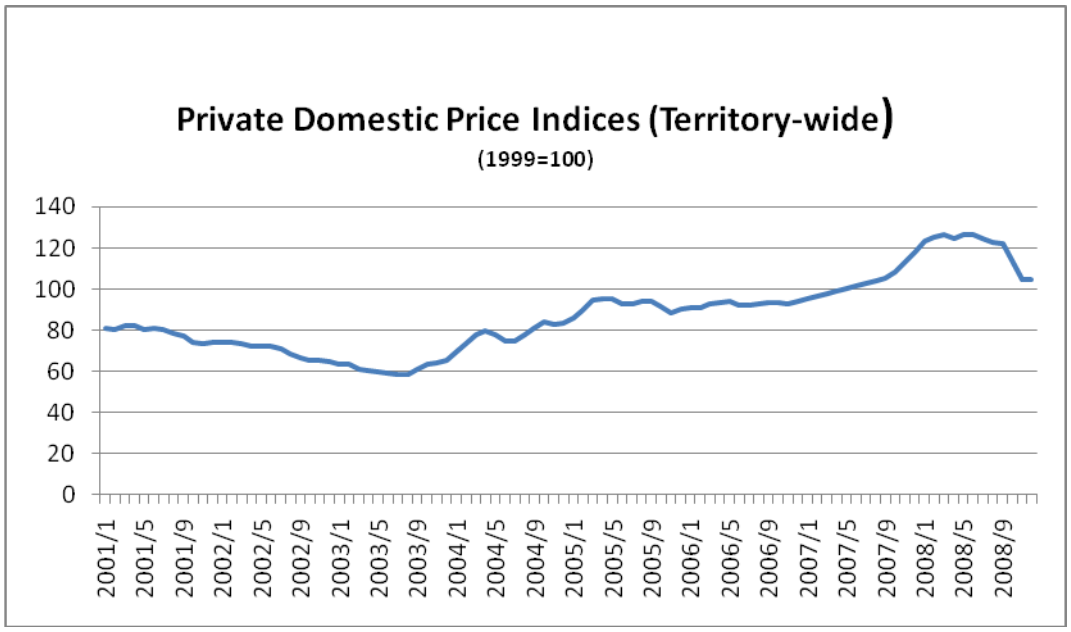


Figure 2 Private Domestic Price Indices from 2001 to 2008

Source: Rating and Valuation Department, HKSAR government

To test the discount of unlucky number floor during the boom, stable and slump period, interaction terms, B*UFLOOR, G*UFLOOR and S*UFLOOR are added to Model (2) and Model (3).

6.4.3 Outline of Models

Three models are set up to test the three hypotheses. Data are obtained from the transaction records of City One Shatin and Sui Wo Court. The data of the two residential estates cannot be analysis in the same model as they have very different structural and neighbourhood traits. The effect of unlucky number floor on private residential property is assessed in Model (1). The effect of unlucky number floor on

private residential property during boom, stable and slump period is assessed in Model (2). The effect of unlucky number floor on Home Ownership Scheme property during boom, stable and slump period is assessed in Model (3).

6.4.3.1 To Test the Validity of the Effect of Unlucky Number Floor on Private Residential Property Price

Model (1):

$$P = a_0 + a_1GFA + a_2GFA^2 + a_3AGE + a_4AGE^2 + a_5FL + a_6FL^2 + a_7Trans + a_8UFLOOR + a_9RV$$

Model (1) is a commonly adopted hedonic price equation for residential housing prices. The transaction data of City One Shatin is collected for Model (1). The unlucky number floor (UFLOOR) attribute is examined. City One Shatin is next to Shing Mun River. Premium is often paid for better view in residential property in Hong Kong. River view may be an attribute in property price, so it is added as neighbourhood trait to enhance the predictive power of the equation. Distance between the residential blocks and public transport is added as location trait.

6.4.3.2 To Test the Effect of Unlucky Number Floor on Private Residential Property Price during Boom and Slump Period

Model (2):

$$P = a_0 + a_1GFA + a_2GFA^2 + a_3AGE + a_4AGE^2 + a_5FL + a_6FL^2 + a_7Trans + a_8RV + a_9B*UFLOOR + a_{10}G*UFLOOR + a_{11}S*UFLOOR$$

The transaction data of City One Shatin is obtained for Model (2). The effect of unlucky number floor on private residential property during boom, stable and slump period is assessed. The different effects can be shown by $a_9B*UFLOOR$, $a_{10}G*UFLOOR$ and $a_{11}S*UFLOOR$ respectively. The inferior good nature of unlucky number floor unit can be studied.

6.4.3.3 To Test the Effect of Unlucky Number Floor on Home Ownership Scheme (HOS) Housing Property Price during Boom and Slump Period

Model (3):

$$P = a_0 + a_1GFA + a_2GFA^2 + a_3AGE + a_4AGE^2 + a_5FL + a_6FL^2 + a_7Trans + a_8RV + a_9B*UFLOOR + a_{10}G*UFLOOR + a_{11}S*UFLOOR$$

The transaction data of Sui Wo Court is obtained for Model (3). The effect of unlucky

number floor on HOS property during boom, stable and slump period is assessed. The different effects can be shown by a_9 B*UFLOOR, a_{10}G*UFLOOR and a_{11}S*UFLOOR respectively. The nature of good of unlucky number floor units in HOS housing can be studied.

6.4.4 Expected Results of Variables

The expected signs of coefficient of the independent variables are summarized in the following table.

Variables	Expected Sign	
	Model 1	Model 2 and Model 3
GFA	+	+
GFA^2	-	-
FL	+	+
FL^2	-	-
AGE	-	-
AGE^2	+	+
Trans	-	-
RV	+	+
UFLOOR	-	N/A
B*UFLOOR	N/A	-
G*UFLOOR	N/A	-
S*UFLLOR	N/A	-

+: Positive

-: Negative

Table 1 Table of Expected Sign of Independent Variables

CHAPTER 7
DATA AND SOURCE

7.1 Scope of Study

This study is carried out in Hong Kong where it has a large population of Chinese and most of them are Chinese speaking. The target properties for the dataset in this study are City One Shatin and Sui Wo Court. The effect of unlucky number floor is examined in both housing estates. The transaction data from the period of 2003 to 2008 is used.

City One Shatin represents private housing and Sui Wo Court represents HOS housing. The effects of the unlucky numbers floor factor on both types of housing are compared and contrasted. Sui Wo Court is of similar age with City One Shatin. The unit size of both estates is also comparable. Both estates are large-scale residential developments which located in Shatin. Both estates have their own estate facilities. Therefore, these two estates are chosen for comparison as the equation of Model (2) and Model (3) can be kept the same and the two models would be comparable.

In each model of this study, the data used is from the same estate. It would reduce number of independent variables and relieve the effect of heterogeneity of data in the hedonic price model. Difference of the properties such as quality of management, neighbourhood facilities, transportation and distance from CBD can be minimized.

7.1.1 City One Shatin

City One Shatin is located in Shatin near Shing Mum River. Appendix I shows the exact location of City One Shatin. City One Shatin is a large scale of private housing estate. The construction of the City One Shatin was completed in seven stages from 1981 to 1988.

There are totally 52 blocks of residential buildings. There are 10,643 domestic households. Due to the vigorous transaction activity of City One Shatin, there is an adequate amount of transaction records available for this study. The large number of transactions also ensures that more data samples can be taken into account to improve the accuracy.

There are 27 to 34 storeys in a block. The floor numbers and block numbers are orderly arranged without skipping any -4th floor. Therefore, both the transaction data of unlucky number floor units can be gathered.

96.5% of the population of occupants use Chinese as their usual language.[64] Since the unlucky number 4 is related to Chinese culture, a high proportion of Chinese speaking population is required for reflecting the effect.

[64] Population By-Census 2006, Census and Statistics Department, HKSAR

7.1.2 Sui Wo Court

Sui Wo Court is located on the hill side above Wo Che and in the northwest of Shatin. It is on the opposite side of City One Shatin (see Appendix II). It is a Home Ownership Scheme project. The buildings are completed in 1980.

There are 9 blocks of residential building in the estate. The total number of household is 3,501. There are plenty of transaction records for the dataset in regression analysis.

In Sui Wo Court, all residential buildings are 36-storey high. The floor numbers are orderly arranged without skipping any -4th floor. 93.0% of the residential use Chinese as their usual language.[65]

7.2 Sources of Data

Different data is in use in this study. The sources of data including the followings:

i. Economic Property Research Centre (EPRC)

ii. Hong Kong Property Review 2009

iii. Population Census / By-Census 2006

vi. Location Maps

v. Websites

[65] Ibid

7.2.1 Economic Property Research Centre (EPRC)

Economic Property Research Centre (EPRC) database contains transaction records of City One Shatin and Sui Wo Court registered in Land Registry. The database is reliable. It also contains other transaction-related information, for example, date of transaction, floor number, GFA, etc.

7.2.2 Hong Kong Property Review 2009

Hong Kong Property Review contains quite substantial information and statistical data, compiled on a calendar year basis, including the stock, completions, take-up, vacancy and forecast completions (for 2 years) by main property types; average rents, prices and indices are also analyzed by main property types. It reviews the state of the property market in the previous calendar year.[66] The Price Indices is used for inflating or deflating the transaction price to real price.

7.2.3 Population Census / By-Census 2006

Population Census and By-census are issued by Census and Statistics Department, Hong Kong SAR government. It is an established practice in Hong Kong to conduct a population census every ten years and a by-census in the middle of the inter-censal

[66] Hong Kong Property Reviews 2009, Rating and Valuation Department, Hong Kong SAR government

period. According to the Census and Statistics Department, Population Censuses and By-censuses contain up-to-date benchmark information on the socio-economic characteristics of the population and on its geographical distribution. They provide benchmark data for studying the direction and trend of population changes. The data are key inputs for making projections concerning population, household, labour force and employment. Population Censuses and By-censuses differ from other general household sample surveys in their sizable scale which enable them to provide statistics of high precision, even for population sub-groups and small geographical areas. The size and characteristics of the entire population are inferred from the sample results in accordance with appropriate statistical theory.[67]

The information of the percentage of Chinese in the population, the monthly income per working person and the monthly household income is used.

7.2.4 Location Maps

Location maps provide the information of view of the property, exact location of each block, distance between the property and facilities or CBD.

[67] 2006 Population By- Census, Census and Statistics Department, HKSAR, http://www.bycensus2006.gov.hk/tc/index_tc.htm [accessed on 15 Dec 2009]

7.2.5 Websites

The information of the housing estate can be found in the official websites of the estate, such as Sui Wo Court's website. Supplementary information about the housing estate can be found in Centaline Property's website.

CHAPTER 8
EMPIRICAL RESULTS AND INTERPRETATION

8.1 Introduction

The results of regression models are generated by using the software, SPSS. The results will be discussed in this chapter.

8.2 Data Descriptions

The following tables show the descriptive statistics of the 3 models.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Real P	477	0.80385	4.59317	1.603961	6.44904452E1
FL	477	1	36	15.21	8.554
AGE	477	204	336	283.6	2.972
GFA	477	389	1018	478.96	145.732
Trans	477	32	260	122.78	59.725
RV	477	0	1	.24	.427
Ufloor	477	0	1	.25	.436
Valid N (listwise)	477	-	-	-	-

Table 2 Descriptive Statistics of Model (1)

In Model (1), 477 data samples of City One Shatin are used. The mean real price is $1.60M. The average age is 283.6 months, which is 23.6 years old. The size of the property ranges from 389 to 1018 square feet. The average distance between public transportation and the development is 122.78m. About 24% and 25% of the data

samples enjoy river view and located at unlucky floor respectively.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Real P	372	8.038585209003E1	4.279569892473E2	1.59131034387162E2	6.086381393084163E1
Floor level	372	1	36	15.46	8.816
Age	372	204	336	276	2.925
GFA	372	389	1018	475.84	139.452
Trans	372	32	260	120.52	58.495
RV	372	0	1	.21	.406
B*UFLOOR	372	0	1	.11	.310
G*UFLOOR	372	0	1	.14	.350
S*FLOOR	372	0	1	.03	.162
Valid N (listwise)	372	-	-	-	-

Table 3 Descriptive Statistics of Model (2)

In Model (2), 372 data samples of City One Shatin are used. The mean real price is $1.59M. The average age is 276 months, which is 23 years old. The size of the property ranges from 389 to 1,018 square feet. The average distance between public transportation and the development is 120.52m. 21% of the data samples enjoy river view. 11%, 14% and 3% of the sample are located at unlucky number floors in boom period, stable period and slump period respectively.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Real P	301	3.839590443686E-1	2.052545155993E0	1.09533480385507E0	.244455221253827
Floor level	301	0	34	16.76	9.350
Age	301	269	337	313.41	22.585
GFA	301	468	703	549.95	66.626
Trans	301	100	450	284.09	113.203
RV	301	0	1	.33	.472
B*FLOOR	301	0	1	.07	.255
G*FLOOR	301	0	1	.03	.161
S*FLOOR	301	0	1	.03	.180
Valid N (listwise)	301	-	-	-	-

Table 4 Descriptive Statistics of Model (3)

In Model (3), 301 data samples of Sui Wo Court are observed. The mean real price is $1.10M. The average age is 313.4 months, which is 26.1 years old. The size of the property ranges from 468 to 703 square feet. The average distance between public transportation and the development is 284m. About 33% of the data sample enjoys river view. 7%, 3% and 3% of sample are located at unlucky number floors in boom period, stable period and slump period respectively.

8.3 Empirical Result of Models and Interpretations

8.3.1 Testing the Validity of the Effect of Unlucky Number Floor on Private Residential Property Price

Model (1):

$$P = a_0 + a_1GFA + a_2GFA^2 + a_3AGE + a_4AGE^2 + a_5FL + a_6FL^2 + a_7Trans + a_8UFLOOR + a_9RV$$

The result of the regression is shown in Table 5 and 6.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.974[a]	.950	.949	1.461290957464074E1

a. Predictors: (Constant), UFLOOR, GFA^2, AGE, FL^2, RV, Trans, FL, GFA, AGE^2

Table 5 Model Summary of Model (1)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.291	39.697		.184	.854
	FL***	2.144	.325	.284	6.597	.000
	FL^2***	-.039	.010	-.167	-3.896	.000
	AGE**	-7.137	3.309	-.329	-2.157	.032
	AGE^2**	.184	.071	.394	2.569	.011
	GFA***	.410	.031	.926	13.038	.000
	GFA^2	2.435E-6	.000	.007	.101	.919
	Trans	.014	.013	.013	1.072	.284
	RV	-2.292	1.691	-.015	-1.355	.176
	UFLOOR**	-4.248	1.656	-.029	-2.566	.011

a. Dependent Variable: Real P

* Significant at the 10% level; ** Significant at the 5% level; ***Significant at the 1% level

Table 6 Coefficients of Model (1)

Model (1) illustrated the effect of unlucky number floor on residential property price. Attributes of property price, such as floor level, age and GFA are included in the model. The main focus of the model is that the sign of coefficient and significant level of unlucky number floor (UFLOOR).

In the regression model, the attributes of FL, FL^2 and GFA are found significant at the 1% level. The attributes of UFLOOR, AGE and AGE^2 are significant at the 5% level. The coefficient of determination is 94.9% which is very satisfactory. That means the

variables selected for the model can explain 94.9% of the property price.

The unlucky number floor attribute is at the 5% significant level. The sign of coefficient of UFLOOR is negative. The result shows that property price of the unlucky number floor flats is transacted at a discounted price. The finding is in line with the previous studies that people are less willing to purchase a flat on unlucky number floor. The finding also shows that people concern about intangible factor in purchasing a flat.

The signs of coefficient of FL and GFA are positive. The results are the same as expected. People are willing to pay a premium for a higher floor level and a bigger flat. For the FL^2, the sign of coefficient is negative. It means that the effect of the advantage of higher floor level diminish when further increase the floor level.

The sign of AGE are negative which is same as expected. Generally, buildings would deteriorate in its physical conditions when the age of building increases. People are willing to pay more for a newer flat. The effect of age diminishes. It is shown by positive coefficient of AGE^2.

The effects of square of GFA (GFA^2), Transportation (Trans) and River View (RV) are not significant. Also, the sign of coefficient of them are not the same as expected.

The sign of GFA^2 is positive. Therefore, there is no diminishing effect on further increasing of GFA. In the data samples, people are always willing to pay more for a

bigger flat.

The sign of Trans is positive. Therefore, people are willing to live further away from the public transport. The result may reflect the concern of air pollution and noise from the public transport. Also, the longest distance between the residential block and the bus terminus is only 260m. Such a short distance away from public transportation may not be a concern of buyers.

The sign of RV is negative. Therefore, people are not willing to have river view. Shing Mun River had once been heavily polluted. Its unpleasant odour is created by polluted sediment. The Environmental Protection Department (EPD) has carried out on-going improvement work in Shing Mun River since early 1990s. Although the EPD carried out improvement work in the area, the pollution problem has not been completely solved. This may be one of the reasons that the flat with river view are sold at a lower price.

8.3.2 Testing the Effect of Unlucky Number Floor on Private Residential Property during Boom and Slump Period

Model (2):

$$P = a_0 + a_1GFA + a_2GFA^2 + a_3AGE + a_4AGE^2 + a_5FL + a_6FL^2 + a_7Trans + a_8RV + a_9B*UFLOOR + a_{10}G*UFLOOR + a_{11}S*UFLOOR$$

The result of regression is shown in Table 7 and 8.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.971[a]	.943	.941	1.476477811373860E1

a. Predictors: (Constant), S*UFLOOR, AGE^2, GFA^2, FL^2, RV, G*UFLOOR, B*UFLOOR, Trans, FL, GFA, AGE

Table 7 Model Summary of Model (2)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.650	46.737		.121	.904
	FL***	2.166	.373	.314	5.803	.000
	FL^2***	-.039	.011	-.186	-3.467	.001
	AGE*	-7.365	3.941	-.354	-1.869	.062
	AGE^2**	.191	.086	.420	2.221	.027
	GFA***	.429	.037	.982	11.739	.000
	GFA^2	-1.809E-5	.000	-.053	-.642	.521
	Trans	.011	.015	.011	.744	.458
	RV	-1.786	2.023	-.012	-.883	.378
	B*UFLOOR**	-6.289	2.705	-.032	-2.325	.021
	G*UFLOOR	-3.893	2.425	-.022	-1.606	.109
	S*UFLOOR	-3.415	4.885	-.009	-.699	.485

a. Dependent Variable: Real P

* Significant at the 10% level; ** Significant at the 5% level; ***Significant at the 1% level

Table 8 Coefficients of Model (2)

Model (2) explored the effect of unlucky number floor on private residential property price during different economic situations. Attributes of property price, such as floor level, age and GFA are included in the model. The main focus of the model is that the sign of coefficient and significant level of unlucky number floor during boom period (B*UFLOOR), stable period (G*UFLOOR) and slump period (S*UFLOOR).

In the regression model, the attributes of floor level (FL), square of floor level (FL^2) and GFA are found significant at the 1% level. The attributes of unlucky number floor during boom period (B*UFLOOR) and square of age (AGE^2) are significant at the 5% level. The attribute of age is significant at the 10% level. The coefficient of determination is 94.1% which is very satisfactory. That means the variables selected for the model can explain 94.1% of the property price.

Same as Model (1), the signs of coefficient of FL, GFA and AGE^2 are positive where the signs of coefficient of FL^2 and AGE are negative. The results are same as expected.

The effects of square of GFA (GFA^2), river view (RV) and Transportation (Trans) are insignificant. The sign of coefficient of GFA^2 is same as expected. The reasons for the unexpected signs of coefficient of RV and Trans are explained in Model (1).

The different influences of unlucky number floor in different economic situations are observed. According to the coefficients table, all the signs of coefficient of unlucky

number floor are negative. Therefore, in all economic situations, the property price of private residential development which located at unlucky number floor is more likely to be sold at a discounted price. The effect of unlucky number floor attribute is more significant during the boom period. It is significant at the 5% level. The unlucky number floor attribute is insignificant on property price during stable period and slump period. The coefficient of unlucky number floor of boom period is larger than that of the stable period and slump period. Therefore, the discount of property price of unlucky number floor is the largest in boom period.

People would generally have lower income during slump period and higher income during boom period. However, the unlucky number floor units are sold at a larger discount during boom period. According to the finding, people are not willing to purchase unlucky number floor flat when they have higher income. An inferior good is one that reacts negatively to changes in buyers' income. In conclusion, unlucky number floor units are inferior goods.

8.3.3 Testing the Effect of Unlucky Number Floor on Home Ownership Scheme (HOS) Housing Property Price during Boom and Slump Period

Model (3):

$$P = a_0 + a_1GFA + a_2GFA^2 + a_3AGE + a_4AGE^2 + a_5FL + a_6FL^2 + a_7Trans + a_8RV +$$

a_9B*UFLOOR + a_{10}G*UFLOOR + a_{11}S*UFLOOR

The result is shown in Table 9 and 10.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.847[a]	.718	.707	.132367083143135

a. Predictors: (Constant), S*FLOOR, Trans, G*FLOOR, GFA, FLl^2, B*FLOOR, RV, AGE, FL, GFA^2, AGE^2

Table 9 Model Summary of Model (3)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.915	2.153		3.212	.001
	FL***	.013	.003	.482	3.824	.000
	FL^2**	.000	.000	-.272	-2.169	.031
	AGE***	-.038	.014	-3.491	-2.702	.007
	AGE^2***	6.285E-5	.000	3.520	2.722	.007
	GFA**	-.004	.002	-1.066	-2.214	.028
	GFA^2***	5.909E-6	.000	1.880	3.905	.000
	Trans	-1.127E-5	.000	-.005	-.161	.872
	RV***	.074	.016	.142	4.476	.000
	B*FLOOR	-.005	.031	-.005	-.149	.881
	G*FLOOR	.011	.049	.007	.230	.819
	S*FLOOR	.020	.046	.015	.442	.659

a. Dependent Variable: Real P

* Significant at the 10% level; ** Significant at the 5% level; ***Significant at the 1% level

Table 10 Coefficients of Model (3)

Model (3) illustrated the effect of unlucky number floor on HOS residential property price during different economic situations. Attributes of property price, such as floor level, age and GFA are included in the model. The main focus of the model is that the signs of coefficient and significant level of unlucky number floor during boom period (B*UFLOOR), stable period (G*UFLOOR) and slump period (S*UFLOOR).

In the regression model, the attributes of floor level (FL), age, square of age (AGE^2), river view (RV) and square of GFA (GFA^2) are found significant at 1% level. The attributes of GFA and square of floor level (FL^2) are significant at the 5% level. The coefficient of determination is 70.7% which is satisfactory. That means the variables selected for the model can explain 70.7% of the property price.

The sign of coefficient of FL is positive. The results are same as expected. People are willing to pay premium for a higher floor level. For the FL^2, the coefficient is zero. Therefore, the effect of floor level and property price is in linear relationship.

The sign of AGE are negative which is same as expected. The newer the property, the higher price is the property. Buildings would deteriorate in its physical conditions when the age of building increases. People are willing to pay more for a newer flat. The effect diminishes when further increase in age. It is shown by positive coefficient of AGE^2.

It is out of expectation that the coefficient of GFA is negative and of GFA^2 is positive.

That means people pay more for a smaller flats. The unexpected effect may be due to the inappropriate inflator or deflator of property price. The price indices obtained from the Hong Kong Property Review are used as the inflator or deflator of property price. The indices are the averages in each particular districts and sizes of residential property. They are not specifically designed for Sui Wo Court.

The river view is found to be an amenity factor. The coefficient of RV is positive. The effect is very significant. The result is contrary to that of City One Shatin. The reason is that some of the units in Sui Wo Court can enjoy both Shing Mun River view and also Sha Tin Hoi (沙田海) view. The view is more spacious than that of City One Shatin. Sui Wo Court is located at the hill side and about 500m away from the Shing Mun River. Those units would not be disturbed by the odour or improvement work.

Transportation (Trans) is an insignificant factor. The distance between the bus terminus and each block ranges from 100m to 450m. All residential blocks, the bus terminus and the Sui Wo Commercial Complex are linked up by covered walkways. The covered walkways may overcome the dis-amenity effect of far away from public transport.

The different effects of unlucky number floor in different economic situations are observed. According to the coefficients table, the effect of unlucky number floor is insignificant. The sign of coefficient of unlucky number floor during boom period is

negative while during stable period and slump period is positive. However, the standard error is high enough to reverse the sign of coefficient. According to the results, the unlucky number floor units are sold at a normal price during any economic situations. The inferior nature of unlucky number floor does not exist. However, it can show no proof on the other natures of good of unlucky number floor in HOS housing.

8.3.4 Different Nature of Good of Unlucky Number Floor in Private Residential and HOS Housing

Unlucky number floor is found to be a dis-amenity factor in private residential housing. The discounted effect is more significant during boom period which people have higher income. The discount rate is also higher in boom period than in other economic situations. The unlucky number floor unit is an inferior good. The discount rate reflects the demand of such product. People purchase less on unlucky number floor flat during boom period. The price of those flats would go down to attract buyers. Therefore, the lower the demand, the higher the discounted rate is.

People usually with tighter budget during slump period and may put less concern on intangible attribute. On the other hand, when people have higher income, they are willing to pay more for a 'better' or a more desirable flat and avoid purchasing an unlucky number floor flat. The finding is in line with that of Chau, Ma and

Ho(2001)[68]. They found that during property booms, the demand for lucky number floor is high due to the superstition and show-off effects. During these periods, people are more willing to pay a higher premium for lucky floor number. However, during the slump periods, the demand for such an intangible attribute of property declines quickly.

Unlucky number floor is found insignificant or even has no effect on property price of HOS housing. The inferior good nature therefore does not exist in unlucky number floor units in HOS housing. As mentioned before, Boyer (1995)[69] revealed that Chinese buyers who do not believe in feng shui still prefer lucky house numbers and avoid unlucky numbers because they concern about resale prospects. Speculation of HOS housing is seldom been seen. Most of the buyers are users of the property. The situation is reflected by the relatively stable price of HOS housing. Moreover, the liquidity of HOS housing is generally lower than that of the similar scale private housing estate. Therefore, HOS housing buyers may concern less on the resale prospects. People who do not belief in traditional fortune belief and do not concern about resale prospects would regard the unlucky number floor unit as a normal one. This can explain the different effects of unlucky number floor between private

[68] Chau, Ma and Ho (2001) The Pricing of 'Luckiness' in the Apartment Market, Journal of Real Estate Literature, Vol 9, No. 1, pp31-40

[69] Boyer T M (1995) Home Sweet Home? An Analysis of Taiwanese Immigration Since 1986 and the Present Status of the Taiwanese Community in Auckland, in: An Ethno-Geography of Taiwanese, Japanese and Filipino Immigrants in Auckland, Occasional Paper 28, Yoon, H. (ed.). Department of Geography, University of Auckland, New Zealand

housing and HOS housing.

From the view point of income level, the difference in the results of HOS housing units and private housing units may also be explained. The average income per working adult of occupants of City One Shatin is 42% more than that of Sui Wo Court. It is assumed that most of the occupants are the owners of the dwelling units. Generally, people who have higher income can support a more flexible budget. Contrarily, people who have less income may have a tighter budget. Therefore, people who have higher income are more willing to pay premium for the desirable factors. They may also consider more factors besides physical and location factors of the property. On the other hand, people who have lower income may pay more attention on physical and location factors of the property rather than something intangible. Their preference priority towards luckiness of floor number may be lower than that of the high income group. It results in insignificant effect of unlucky number floor on property price of HOS housing.

Difference in income level and different considerations of the owners may lead to the different results of unlucky number floor attribute in City One Shatin and Sui Wo Court.

CHAPTER 9

CONCULSIONS AND RECOMMENDATIONS

9.1 Summary of Findings

This study looks into the effect of an intangible factor, which is the unlucky number floor, on property price in a Chinese community.

Chinese regard '8' as a lucky number but deem '4' as an unlucky number. The main reason is that those numbers are homophonic with 'prosperity' and 'death' respectively. Previous studies suggested that Chinese would purchase good-fortune-bringing and good feng shui commodities due to superstition, show-off effect and 'face'. Relevant examples are summarized to illustrate that Chinese are keen on purchasing commodities with lucky numbers and avoiding unlucky numbers. They are willing to pay premium for good-fortune-bringing commodities. The phenomenon appears in real estate industry.

Transaction data of City One Shatin and Sui Wo Court from 2003 to 2008 are collected. By using hedonic price model, the effect of unlucky number floor is found statistically significant in private residential development. The unlucky number floor units are generally 4.2% cheaper than other floors. Moreover, empirical results suggest that while a private residential property of a larger size, higher floor level and lower age commands a higher transaction price. The nonlinear effects of age and floor

level do also influence the prices.

The effect of unlucky number floor on private residential property varies in different economic situations. During boom period, the discount rate of price of unlucky number floor units reaches 6.3%. During stable period and slump period, the effect of unlucky number floor is statistically insignificant. The results are explained by change of preference which incurred by change of income. When income increases, people would choose a more desirable flat and avoid unlucky number floor units. The unlucky number floor units of private residential property behave like an inferior good.

The effect of unlucky number floor on HOS housing property price is different from that of the private residential property. In all economic situations, the influence of unlucky number floor on property price is insignificant. The postulated causes include lower income level, less concern on intangible factors and less concern on resale prospect of HOS housing buyers.

9.2 Limitations of Study

In this study, there are two proposed explanations for the different results in Model (2) and Model (3). One is the effect of different types of housing. Another one is the difference in income level of buyers. This study cannot deduce which explanation

accounts for the results.

Moreover, the income difference between two groups is not significant. Both groups may not truly represent high income group and low income group respectively. Therefore, the nature of good of unlucky number floor among low income group and high income group is not addressed.

This study is the comparison between two estates in order to find out the difference between the effect of unlucky number floor in private residential property and HOS housing. However, City One Shatin cannot represent all private residential estates as well as Sui Wo Court cannot represent all HOS housing estates. Each development may have its own characteristics towards unlucky number floor. The results may not universally reflect the difference between the effect of unlucky number floor in private residential property and HOS housing.

9.3 Areas for Further Studies

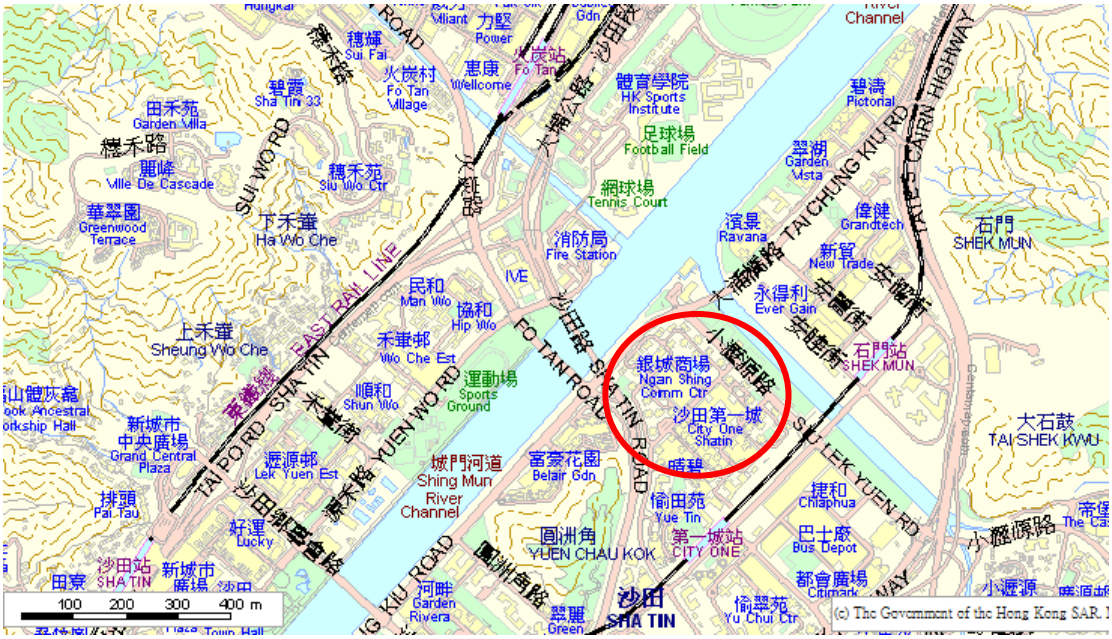
In this study, there are two proposed explanations for the different results between Model (2) and Model (3). Further studies can be done to investigate whether the factor of housing type or the factor of income level difference would affect buyers' selection on unlucky number floor units. Control experiments should be added to keep one factor constant.

Further studies can also be done by using data samples from different developments. By establishing more regression models, more general comparison between HOS housing and private residential property can be done.

Besides unlucky number floor, property price attributes among different housing types and different income levels of buyers can also be investigated in the further studies.

APPENDIX

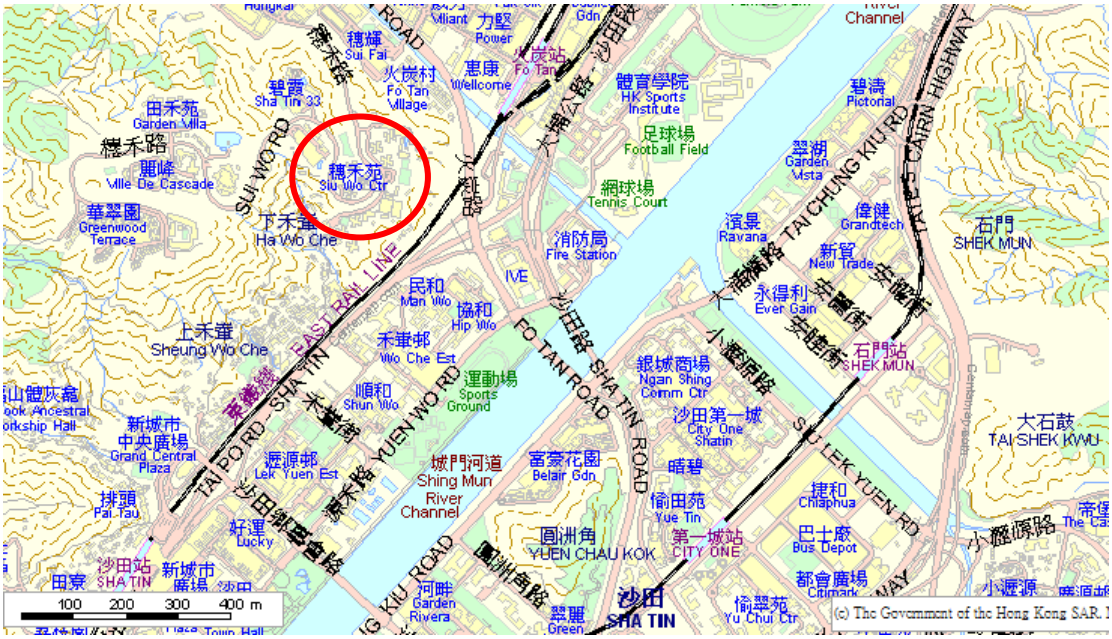
Appendix I



Map showing the location of City One Shatin

Source: Centamap, http://www.centamap.com/gc/home.aspx

Appendix II



Map showing the location of Sui Wo Court

Source: Centamap, http://www.centamap.com/gc/home.aspx

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