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THE UNIVERSITY OF HONG KONG

AN EMPIRICAL STUDY OF
THE IMPACT OF CHURCH VIEW
ON RESIDENTIAL PROPERTY PRICES
IN HONG KONG

A DISSERTATION SUBMITTED TO THE
DEPARTMENT OF REAL ESTATE AND CONSTRUCTION
IN CANDIDACY FOR THE DEGREE OF
BACHELOR OF SCIENCE IN SURVEYING

By
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Hong Kong
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Declaration

I declare that this dissertation represents my own work, except where due acknowledgement 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.

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ABSTRACT

This dissertation aims at discover the impact of church view on the residential property prices in Hong Kong. Although church view is not a tangible variable on property prices, the empirical result generated by the model in this research indicates that church view has a positive impact to the property prices in Hong Kong. The residential units which have a church view will be more expensive than other views mentioned in this study. Based on the empirical result, the author further explains that the neighborhood churches are not a nuisance that reduce the value of neighborhood residential property.

This study is first address the people will pay a premium for the enjoyment of a building with graceful external appearance, such as churches. This hypothesis is tested with the Hedonic Pricing Model, using a simple of 1,502 transaction data drawn from a residential estate that can have direct church view. Data from the residential estate that can enjoy a church view in Hong Kong during the period from 1991 to 2004 were collected. View information is collected from site inspection, floor plan and site plan analysis. After the collection of data, the Hedonic Pricing Model was carried out to test the impact of church view.

This study provides us with more understanding of the residential choice in Hong Kong. The purchasers will consider the church view as it can increase the resale power of a residential unit with church view. The result implies that town planners in Hong Kong have a take the positive impact of church view into the account when designing the zoning of churches in Hong Kong. On the other hand, the developers need to consider the church view when designing the layout of the residential estates.

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Chapter 1

<u>Introduction</u>

1.1.   Background

Real estate sector is the most important element in the world economic as it involves large amount of resources from different other sectors. They include banking sector, construction sector, and financial sector etc. Real estate is enormously important especially in Hong Kong. Hong Kong as a small and congested place with continually rapid population growth, the population increases the demand for land and public services. According to the statistics released by the Census and Statistic Department, the population of Hong Kong has reached 7 millions at end-2008[1]. The Hong Kong population has experienced a positive growth in each year. With population density has reached 6,699 persons per sq. km. in 2008, which is the place with the third highest population density around the world[2]. With such a huge population, the overall stock of permanent residential flats in 2008 is 2,486, which increased for about 24% within ten years, and there were only 2,004 permanent resident flats in Hong Kong in 1998[3]. It shows that the demand of residential housing in Hong Kong is increasing continually.

Within the real estate sector, it can separate into different types of uses, such as residential, commercial, and industrial, etc. The residential use is the major part among them. It is because the residential housing is an essential component for every people.

[1] Year-ended population for 2008, Press Releases on Statistics (Monday, February 16, 2009), Census and Statistics Department, HKSAR
[2] CIA World Factbook 2008
[3] Housing in Figures 2008, Hong Kong Housing Authority

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It becomes very important as Hong Kong population is having the third highest density among the world. Therefore, many researchers have investigated the reasons of the residential choice of citizens in Hong Kong. The factors behind the residential choice have been grouped into three traits, namely structural, locational, and neighborhood traits. Previous studies have been carried out to prove that different views from residential units will have different impact on the residential property prices. This study aims to find out the impact of the church view on the residential property prices.

According to Leung, Tam et al. (2007), Hong Kong Christian and Catholic churches both under the British and Chinese culture, at various stages have been playing a role to stabilize the chaos, or play a decisive role in the transitional stage of the development of chaos. The role of them helped to offer service to the needed starting from the development at Hong Kong's early stage. The services include educational, medical, and social services. But whether providing such services would positively or negatively affect nearby residential property value is undetermined.

There have been numerous studies found significant effects on residential properties values from a variety of external sources. However, there has not been much research in the past to investigate the neighborhood churches create impact that affecting neighboring properties and causes a change in their values except Do, Wilbur et al. (1994) and Carroll, Clauretire et al. (1996). Previous studies on the impact of neighborhood churches on residential property values have shown that the churches would cause the neighboring properties a change in their values. However, whether the changes are

positive or negative cannot be ensure since the two studies shown that the nature of the changes would be different in different communities.

This study aims to follow the footsteps of Do, Wilbur et al. (1994) and Carroll, Clauretire et al. (1996) in order to find out whether there are any impact on property prices due to view on the neighboring church. Furthermore, it studies whether the impact from the neighboring church is positive or negative in the community of Hong Kong.

However, modification will be made since the previous studies are focus on the relationship between distance of the church and the residential properties. As the different nature in types of residential properties in Hong Kong, which are usually high rise buildings, comparing with residential properties in foreign countries, which are usually single-family homes, used in previous studies, the focus of this study would change to the impact of having a view of church on residential properties values instead of the distance. According to the result from this study, the impact of church view can prove that the impact from the neighborhood churches is positive or negative in the community of Hong Kong. The impact on residential properties values will be investigated objectively in this dissertation by using scientific approaches instead of results obtained from questionnaires which are subjective.

1.2.   Objectives

The major objectives of this study include:

- To test whether church view brings positive or negative impact on residential property prices in Hong Kong

- To explain the relationship between neighborhood churches and property values in community of Hong Kong

- To discuss the implications of the results obtained

1.3.   Methodology

The establishment of churches in residential neighborhoods have examined that will have impact on the property prices of the surroundings residential areas. Previous studies have proved that a church can constitute a negative externality on residential property values. (Do, Wilbur et al. (1994) However, there also have previous studies proved that churches can also be viewed as amenities, much like shopping centres and quality schools, which are desirable neighborhood amenities. Carroll, Clauretire et al. (1996)

Conclusion has been drawn that the relationship between neighborhood churches and property values will be different in their respective communities. Therefore, the existence

of this impact on property price needs to be proved and quantified in the case of community in Hong Kong by empirical models such as hedonic pricing model developed by Rosen (1974).

Modification will be made based on the previous studies by Do, Wilbur et al. (1994) and Carroll, Clauretire et al. (1996). The variable for distance of property from the perimeter of the nearest neighborhood church in feet will modify to the variable for the residential properties having church view. It is because the different nature and types of residential properties in Hong Kong and other countries examined in the previous studies by Do, Wilbur et al. (1994) and Carroll, Clauretire et al. (1996). According to Do, Wilbur et al. (1994) and Carroll, Clauretire et al. (1996), they are testing the effects of neighboring churches on surrounding single-family housing prices in foreign cities, such as California, Nevada, and Green Valley. Those single-family residential properties in foreign cities are different from Hong Kong. In Hong Kong, people are living in high-rise residential buildings, which is not the same as foreign cities. Therefore, it is not suitable to adopt the variable for distance of neighborhood churches for the research in Hong Kong. Instead of distance, modification will be made to change the variable for distance to variable for church view.

The impact on residential property prices by the church view will be analyzed by studying the changes in the implicit prices of the residential properties. The residential property selected in this study is the Tsing Yi Garden, and the church is located at the northwest which next to the Tsing Yi Garden. The views of the properties in Tsing Yi

Garden can be separated into three types, and they are church view, open view, and building view.

In collection of data, the transaction data of Tsing Yi Garden will be collected from EPRC database. The view of the residential units will be examined by conducting site visits and analyzing the floor plan of the residential units. A hedonic pricing model will be formed and the required data will be collected and inputted into the hedonic pricing model. The statistical program E-views will be used to generate the statistics result for examine. As a result, the impact of the church view on residential property prices can be found out.

1.4.   Structure of study

The framework of this study is divided into six chapters. This chapter is the introduction of the whole study. A brief introduction of the background, objectives and methodology of this study will be made in order to give a better understanding in the following chapters for the reader about this study.

Chapter 2 is literature review, which gives a review on previous academic studies and researches related to this study. Based on the previous relevant literature, a better understanding on the research model and the hedonic price theory can be achieved. Besides, the hypothesis and methodology can be derived from the past literature. It will

be the foundation of this study and strengthen the reliability of the result that will be generated in this study.

Chapter 3 is background information. The background information will be separated into two parts. The first part will give a background study of the target church St. Thomas the Apostle Catholic Church. The history, location, land use zoning, architectural design, services provided, and the reasons for choose the church will be introduced in order to have a better understanding for the case study.

The second part of Chapter 3 is the background study of the target residential estate Tsing Yi Garden. The profile of Tsing Yi will be introduced in order to give a brief picture about the Tsing Yi Island for the reader. After that, the characteristics, location, and interaction between the St, Thomas the Apostle Catholic Church will be presented to give a better understanding for the reader.

Chapter 4 is methodology. The concept and details of the hedonic price model will be introduced. The study target, hypothesis, and source of data of this study will be presented. Also, the criteria and selected variables, functional form, structure of equation, and the model interpretation after generate the result from the hedonic pricing model will be discussed in details in order to give a full picture for the reader on the methodology of this study.

Chapter 5 is the empirical result. This chapter is used to present the result from the model used in this study. The statistical results from the model will be present and compare with the expected results estimated in previous chapter. Based on the empirical result, the explanation on the relationship between the neighborhood churches and property values in the community of Hong Kong will be derived. Besides, the implications of this study will also be discussed in this chapter.

Chapter 6 is the conclusion. This is the last chapter of this study. This chapter will conclude the whole study. It will include the whole process of the study, hypothesis, and the conclusion of findings. Limitation of the study and the areas of this study which need to be further study will be mentioned at last.

Chapter 2

<u>Literature Review</u>

2.1.   Introduction

Hong Kong as a high density of population city, residential property are usually comprise of high-rise large scale residential property developments, which is different from detached or semi-detached house in other countries. Also, real estate development has been an important component in Hong Kong finance and banking sector. About half of the loans in bank are from real estate sector[1]. Therefore, residential property development has been the most valuable asset in Hong Kong. As being the most valuable asset in Hong Kong, different types of researches have been carried out to analysis the relationship between residential property prices with different kinds of factors.

This dissertation aims at analysis the impact of having a view of church on nearby residential property value in Hong Kong. Literatures of different aspects would be reviewed in this chapter, and they included nature of residential property, amenities concept, hedonic pricing model, determinants of residential property price. Most of them will be used as reference in this study.

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[1] Residential Mortgage Survey Results, Hong Kong Monetary Authority, HKSAR

2.2.   Residents living concept in Hong Kong

In order to discover the concept behind the living choices that residents' made, we need to discover the attributes that influence the buyers' willingness to pay a certain amount of money for a property. Studies related to the objectives of the dissertation will be reviewed as to analysis the impact of having a view of church on nearby residential property values.

2.2.1. Large scale development of residential estate

Living style and quality have been changed continuously time to time in the world, especially in Hong Kong. The concept of large scale of residential development projects was a brand new idea in the late 1960s. Under this new concept, developers started to construct residential developments that consist of numerous residential blocks to provide accommodation for numbers of population.

According to Lee (1987), the numbers of middle class people start to growth in Hong Kong society is the reason for the new concept of large scale of residential development. Starting from late 1950s, economic transformation has been successfully carried out in Hong Kong. The increase in numbers of traders, professionals, and wage rates of workers has potential a foundation for the growth of middle class people. From the middle class people that generated from the economic transformation, the new living style and quality

begin to emerge from the demand of those people. They seek for better and more community, recreational, transportation facilities.

On the other hand, according to Yu (2007), developers in order to generate maximum profit from the sale of residential units, they would maximum the number of flat that they can sell. However, the height limit restricted the maximum height of buildings, and they cannot just build a higher tower to achieve maximum numbers of flat they can sell. Therefore, the only way is to place many towers within the site.

From the study by Huang (1996), the unit prices of large scale residential developments are different from single block developments. The result of his study concluded that housing estate flats are paid a premium which is not found in single block developments. Besides, the large scale residential developments provide a great control for developer on the overall layout of the estate which will suit the increased living style and quality of the middle class.

2.2.2.   Amenities concept

According to Edward (1954), amenities are something contributing to pleasant living conditions. Although it cannot be directly traded in the market and has fixed location which unlike other commodities, it is still an important element which can affect people's choice of living location. Therefore, Diamond and George (1982) defined amenities as a location-specific good with no observable prices. It will affect in different aspects like

personal security, leisure activities, housing quality and child quality. It has the similar nature of other goods, the marginal willingness for consumers to pay for them is depends on similar factors, such as consumers' income, tastes of consumers, household formation, size, or any other substitutes.

For amenities, its consumption is generally non-excludable, such as good air quality, views or local public services. The enjoyment of such amenities are only be varied by moving into another location. Amenities can originally exist in nature, supplied by government or provided by developers. Social services such as medical services, educational services, and transportation services are some kinds of services that are supplied by the government. Services such as shopping mall, clubhouse are those amenities provided by developers in order to meet the demand from the consumers.

In order to prove that amenities will have a direct impact on property values, Holcomb and Robert (1981) carried out a study and the result found that the absence of amenities would have impact on the growth of property value as the investment on the properties would be limited. Therefore, it is proved that amenities would have a direct impact on property value. Amenities can separate into tangible and intangible. Examples of tangible amenities would be clubhouse, shopping centre. Crime rate, regional living standard would be the examples for intangible amenities.

Besides, Diamond (1980) has proved that some amenities would bring negative impact on land price. According to his study, using hedonic price model carried out an empirical

study with variables of distance to CBD, nearest railway station, lake, and crime rate of the region. The result shown that distance to CBD, railway station, crime rate of the region would bring negative impact to the land price. Therefore, amenities are not having a positive impact on the property value all the time.

Also, Ding, Simons et al. (2000) analyzed the effect of both new and rehabilitated residential investment on nearby property values. There are four major findings. The first one is the effect of investment on property values is geographically limited. Second, new investment has a greater impact on nearby property values than rehabilitation. Thirdly, new construction and rehabilitation have a significantly positive impact in low-income area. The most important is that small-scale investment has no impact on nearby property values. It means that investments that are not sufficiently large may not have any impact on nearby property values.

2.3. Empirical models used

In this dissertation, the Hedonic Pricing Model would be introduced and used to test the hypothesis.

2.3.1. Hedonic Pricing Model

In order to find out the benefits which churches have brought to the nearby residential properties development, hedonic pricing model would be used to identify each housing

traits impact on property values and quantify each of them on their influence on property prices.

The Hedonic Pricing Model developed by Rosen (1974) have been the most common model used as a research tool to determine the relationship between dependent variable and independent variables in property market. Rosen (1974) defined Hedonic Prices as the implicit prices of attributes and are revealed to economic agents from observed prices of differentiated produces and the specific amounts of characteristics associated with them.

After the development of Hedonic Pricing Model, many scholars have used it to value the impact of different types of housing attributes and different types of amenities to property prices in Hong Kong. For example, Liisa and Antti (2000), Mok (1995), and Tse and Love (2000) have developed models to investigate the impact of housing attributes and amenities to property prices based on the Hedonic Pricing Model developed by Rosen (1974).

Further research has been carried out and proved that Hedonic Pricing Model is the best statistical model used to quantify the determinants of property prices. The mono-centric model developed by Alonso (1964) is comparatively worse than Hedonic Pricing Model in determining property prices proved by Chau, Leung et al. (2003). Alonso (1964) developed the mono-centric model, the fundamental results of this model explained that

the spatial distribution of land and housing prices are solely determined by the transportation costs to CBD.

Tse and Love (2000) and Chau, Leung et al. (2003), "Housing property is a multi-dimensional commodity which is characterized by its durability, heterogeneity and spatial fixity". Therefore, housing price should be the function of different determinants under the characteristic of property, not only due to the proximity to CBD. Suggested by Chau, Leung et al. (2003), Hedonic Pricing Model should be a better model to investigate the differentiation of prices between differene at properties.

According to Rosen (1974), consumers could only purchase a package of characteristics included in a single commodity, and cannot purchase single characteristic inside the commodity. Similar to commodity, housing characteristics in one housing unit cannot separate. Total payment in the housing market is reflecting the payments made from individual attributes in each implicit market Linneman (1982). Linneman (1982) used a simple, non-housing market example to further strengthen the suggestion by Rosen that partial derivative of the hedonic price equation with any housing trait is the marginal change in property valuation, when other things being constant.

Linneman (1982) supposed a researcher at a supermarket is observed grocery shoppers with different bundles of grocery items due to different family size, income, age and other factors. The researcher is interested in knowing the price of a 7-oz can of beans but he could not look at the price tag. He can still find out the price of 7-oz can of beans if he

knows the total expenditures on grocery items and the items bought by those consumers. It is because the total expenditures on grocery item G are simply the sum over all possible grocery items of Pi times the quantity of items consumed Xi.

$$G = \sum_{i=1}^{N} Pi\ Xi$$

If the researcher can observe all of quantity Xi, and holding the rest of grocery items constant, price of the 7-oz can of beans is simply the change in total grocery payments brought about by adding one 7-oz can of beans. Mathematically means the partial derivative of G respect to X7-oz.

$$\delta G / \delta_{7oz} = P_{7oz}$$

The price of any items could be found by combining the two equations above with differentiate the hedonic function, which only measures the prices without supply and demand functions.

Theoretically, there are unlimited numbers of housing characteristics in valuing a property. Griliches (1971) suggested that all relevant characteristics relating to the determination of market price should be included in the development of hedonic price research. However, this is impossible for obtain and include all relevant information in good quality of all properties. Besides, problem of mutli-collinearity would occur by including too many characteristics suggested by Butler (1982).

Hence, Butler (1982) has suggested that housing characteristics in a hedonic function should be "both yield utility to residents and are costly to produce". Butler (1982) categorized housing characteristics into structural and non-structural characteristics. Moreover, he further categorized non-structural characteristics into locational and neighborhood characteristics.

After the categorization of housing characteristics by Butler (1982), Powe, Garrod et al. (1995) further categorized housing characteristics into 5 housing attributes based on the categorization by Butler (1982).

1. Structural — Plot size, number of rooms, garage space, central heating, structural integrity, etc.

2. Local socioeconomic and public — Employment rate, racial composition, social conditions, wage differentials, quality of schools, local taxes, etc.

3. Environmental and neighborhood — Landscape, wildlife, tree cover, air quality, noise and water frontage, etc.

4. Locational or accessibility — Access to shopping centres, railway linkages, major roads, urban centres, etc.

5. Legal — Property rights or legal constraints regulating the use of property

According to Powe, Garrod et al. (1995), property prices can be empirically specified as the following equation,

$$Ph0 = f(Ami + ENVi + Qi + Si + SEi + Yi)$$

Where *Ph0* = the transaction price of the house

    AMi = a vector of local amenities (accessibility and locational variables)

    ENVi = a vector of the environmental amenities in the vicinity of the ith property

    Qi = the quarter of the year in which the ith property was purchased

    Si = a vector of the structural characteristics of the ith property

    SEi = a vector of variables describing the social-economic characteristics of

        the Ward containing the ith property

    Yi = the year in which the ith property was purchased

Therefore, the coefficients of the housing attributes can be derived when holding other factors constant using the hedonic pricing model by the regression technique.

2.4.   Determinants of residential property price

In determining the factors' impact on residential property price, they can categorize into macroeconomic and microeconomic factors.

2.4.1. Macroeconomic factors

In economic field, macroeconomic is the study of financial systems at a national level. The determination of market price of a product is supply and demand in the market. In property market, the prices of the household property follow the same rule. Different types of factors are taking different roles to affect the supply and demand of properties in the property market. Major macroeconomic determinants included interest rates, households' income, and demographic factors.

2.4.1.1. Interest rate

Interest rate is a percentage charged on a loan or paid on an investment for the use of the money. Therefore, it can be considered as a cost for the early available of future return.

Real estate is the largest investment in financial market. Most of the home owners need to secure their purchase by making mortgage with banks. Interest rate would act as the cost for the home owners to finance the properties. It is an important factor that affects the demand of home buyers.

Peek and Wilcox (1991) proved that real interest rate is an important housing price determinant in determine single-family housing prices. In general conditions, residential

property price will affect by the movement of long-term interest rate. Real housing prices will usually increase when interest rate decline and vice versa. The reason is the cost of the purchase for the buyers is lower when the long-term interest rate is low. Therefore, more and more people can afford to buy the residential properties. As a result, the demand would be driven up by the demand. Thus, property prices are leading by the supply and demand mechanism of the property market.

2.4.1.2. Household income

Household income would be a factor that having a wide range of influence on demand of property. It determines the choice of living of the residents such as size, location, quality of living. Besides, it is related to the affordability of the household to repay their mortgage loans. Linneman and Wachter (1989) also mentioned that job security of the household will promote property purchase as banks are more willing to approve the application as risk borne with the households are lower.

During economic downturn period, unemployment rate will rise with lower job security. As a result, the home purchase would be lower. Historically, Hong Kong residential property price dropped a lot as unemployment rate continuously increases after the Asian Financial Crisis.[1] Hong Kong is now facing another economic downturn period due to Financial Tsunami occurred in later 2008.

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[1] Private Domestic – Average Rents and Prices by Class, Rating and Valuation Department, HKSAR
   Labour Force, Unemployment and Underemployment, Census and Statistics Department, HKSAR

2.4.1.3. Population

Peoples need shelters for their living, so housing is an essential element for families and people to have a shelter to live. Population of the city is another factor that determines the supply and demand of the property market. Peek and Wilcox (1991) mentioned that the greater the number of households, the greater the demand for houses. Therefore, higher population would lead to high demand on housing.

2.4.1.4. Demographic factors

Demographic factors generally include the household formation, age, sex, marital status and nationality. Different groups of people with different household formation will have different affordability and demand on housing. Besides, age of the home buyers will affect the decision of buying property. It is because the age structure of the home buyers will have different purchasing power in the property market. In general, young family groups are more affordability than old family as burden for retirement is lower.

2.4.1.5. Government policy and political stability

According to Hong Kong government land policy, government is the largest land supplier in the market. Moreover, the government operates the public housing and supervises all real estate activities in the market. Due to the restrictive supply of land, the consequence

is observable. Peng and Wheaton (1994) has shown that restrictive supply of land in Hong Kong lead to higher housing prices.

2.4.2. Microeconomic factors

Butler (1982) categorized housing characteristics that determine property values into three housing attributes, and they are Structural, Locational, and Neighborhood attributes.

2.4.2.1. Structural attributes

Structural attributes is group of factors that are related to physical characteristics and property-specific of a property. Structural attributes of each property is unique, and it is commonly included number of rooms, age of building, floor area, floor level, clubhouse facilities, and structural quality of the building.

Floor area determines the property price of the property. The larger the salable floor area or usable floor area, the higher the property price. Mok (1995), Do and Grudnitski (1995), and Carroll, Clauretire et al. (1996) have proved that there is positive relationship between area and price. Mok, Chan et al. (1995) has shown negative relationship between Gross Floor Area and property price. According to the explanation, pricing strategy may be reason of this, which is a pricing strategy that the price per square foot for the bigger flats is slightly lower than that of a much smaller flat.

Other than floor area, age of the property would also be an important structural attribute. Mok, Chan et al. (1995), Kaufman and Cloutier (2006), Hughes and Sirmans (1992), and Chau, Wong et al. (2004) have been suggested that building age is having a negative relationship with property price. The reason is the deterioration or obsolescence of the property will occur as time goes by. Besides, newer property would enjoy a premium over similar older property.

Another structural attribute would be the floor level. Mok, Chan et al. (1995) suggested that a flat with a higher floor level will sale at a higher price in the same building. It mainly due to higher floors are having a better view, better air quality, and having fewer nuisances from traffic on road and street. Further research by Ho (1999) assured that a sea view, river, and racecourse are having positive relationship with property price in Hong Kong real estate market. Comparatively a reclamation project is having negative impact on that.

2.4.2.2. Locational attributes

Location and accessibility of the real estate is one of the major considerations during the purchase of property. In general, home buyers usually would consider the location of the property, determine whether it is convenience to them or not. Besides, developer will use the location factor as a point to advertise the development, such as supporting by fully developed transportation system. In determining the location is convenient or not, accessibility of the property to Central business district (CBD) would be the major factor.

Alonso (1964) illustrated the relationship between the distance from city centre and property price. The result has shown that a shorter distance between them will enjoy a premium over other properties. Bid-rent theory was introduced by him, which means the value a consumer is willing to pay for different locations and distances from CBD. Alonso (1964) mentioned that there is trade off between transportation and time cost to travel to the CBD and land rent or value. Land rent should be lower for places far away from CBD to offset the transportation and time costs.

According to Alonso (1964), transportation improvement will have positive impact on property price. The reasons are transportation improvement would make commuting easier and decrease the commuting time. Besides, it will make the commuting cost cheaper than before. As a result, it will lower the land price in CBD and increase the land price in far away district. However, negative impact may bring along by transportation improvement from externalities by those transportation facilities. But in general, improvement of transportation would have a positive relationship with property price.

So, Tse et al. (1997) carried out study to investigate the impact of presence of different modes of public transportation services on property price. They divided the impacts into four categories, which are availability of transport, commuting cost, travel time, and convenience of transport.

They proposed that Hong Kong being a high density city with concentrated economic activities in CBD and limited traffic road, all of these would lead to traffic congestion which discourages the using of private vehicles. As a result, the demand of public transport would be larger than other countries. Their research found out that minibus and MTR seems to be the most important mode of transport for middle income citizens.

Besides those transportation and accessibility factors, views of property are also related to the location characteristics of the property. As the nature of Hong Kong residential development is high rise buildings, the view of a flat would be an important factor in determining property prices. Rodriquez and Sirmans (1994) investigate that how accurate valuation of "view" amenity by appraisers impact on estimation of property value as there are not sufficient guidance for adjustment of property value with a view. In their research, the views of lakes and golf courses were examined. The result is that a good view will add approximately 8% to value of the property.

Mok, Chan et al. (1995) imported seaview as one of the independent variable in Hedonic Pricing Model when investigating Hong Kong property prices. As flat with seaview would be more expensive than others flats without it. Furthermore, Tse and Love (2000) carried out study on impact of cemetery view to properties nearby. The result is cemetery view will have negative impact on property price.

2.4.2.3. Neighborhood attributes

In a city, property is rarely isolate themselves from others, so neighborhood attributes is refer to the neighborhood environment of the property which affect the property price. As a result, neighborhood environment would be another factor for consumers to consider.

Linneman (1980) found out that 15 to 50 percentage of the standard deviation in site valuation is caused by neighborhood attributes, which proved the importance of neighborhood attributes in determining property prices. In respect of different aspects relating to neighborhood attributes on property prices, different research has been carried out, such as environmental goods, undesired facilities, and nuisance from airport.

Li (2005) carried out study in the field of behavior economics, which investigate the neighborhood effect or the externalities exerted on the property which affect the property prices. It selected presence of public or subsidized near private housing estates as a negative externalities. It proposed that negative impact of public or subsidize housing may not be physically observable as pollution emitted from factories. However, there should be psychological impact that residents from private housing estates would feel dislike for having public or subsidize housing neighborhood. The research was carried out by Hedonic Pricing Model and it concluded that public housing scheme having a negative effect to property prices.

2.5.   Related literatures

Previous researches carried out by other scholars will be reviewed in this part. It mainly focuses on two journals about impact of churches to residential property values in other countries which mainly are single-family properties.

2.5.1. Impact of Churches to residential property values

Numbers of studies have been carried out about the impact of churches to the residential property values. Both public and private parties involved in land use decisions relating to neighborhood churches may consider the effect of churches on sales price as a factor. A traditional hedonic pricing model would used to investigate the effect of church proximity on the selling price of single-family homes. Do, Wilbur et al. (1994)

Do, Wilbur et al. (1994) examine that the effect of churches on sales price of single-family properties based on tested with a standard hedonic pricing model, using a simple of 469 sales transactions drawn from a large metropolitan area. Nonchurch effects are held constant with a standard set of housing-related variables. The results indicate the effect of churches on sales price is negative up to approximately 850 feet. The impact this negative externality effect would decreases as distance from a church increases.Do, Wilbur et al. (1994)

Different from Do, Wilbur et al. (1994), Carroll, Clauretire et al. (1996) obtains the opposite result of that reported by Do, Wilbur et al. (1994).

Carroll, Clauretire et al. (1996) analysis the impact of neighborhood churches on residential property values by investigating nearly 5,000 residential property transactions in Henderson, Nevada, between January 1986 and December 1990. The results find that real property values decrease, at a decreasing rate, as distance from a neighborhood church increase. The research bolster the findings by showing that distance from the site of a future church has little or no impact on residential property values, whereas distance from an existing church is associated with lower property values. It indicates that neighborhood churches are amenities that enhance the value of neighborhood residential property. It demonstrates that larger churches (as measured by square foot of lot size) tend to have a greater positive impact on residential property values. Carroll, Clauretire et al. (1996)

The reasons for the different between two studies suggested by Carroll, Clauretire et al. (1996) is that the Do, Wilbur et al. (1994) show that neighborhood churches are nuisances that reduce property values over relatively short distance (limitation of 850 feet), Carroll, Clauretire et al. (1996) find that neighborhood churches are amenities that enhance property values over much larger distances (at least one-half mile). It suggested that the small size of Do, Wilbur et al. (1994) sample (469 sales transactions) compare with large size of Carroll, Clauretire et al. (1996) sample (5,000 sales transactions), plus

the restriction of the sample to properties at a very short distance from churches, may have distorted Do, Wilbur et al. (1994) findings. Carroll, Clauretire et al. (1996)

However, Carroll, Clauretire et al. (1996) also suggested that it is possible that both studies accurately reflect the relationship between neighborhood churches and property values in their respective communities. Different cities would have different housing value gradients related to the concentration of churches within cities.

2.5.2. View attributes

The view of the property is one of the factors that affecting the property price. Different types of view will have different degree of impact on the property price. For example, Do and Grudnitski (1995) obtained the empirical result that golf course will increase the property price of the nearby residential property price by 7.6%. The relationship between green belts in Colorado and residential property values was found by Carroll, Lillydahl et al. (1978). It shows that the property values decline with distance from the green belts in neighborhood, which means people are preferred to live near the green belts. Besides the green belts, sea view also is a preferable view for people.

Many researches have found that sea view will have a significant implicit values on residential property values. Brown and Pollakowski (1997), Huang (1996), Mok (1995), and Pollard (1980), all of them have proved that the impact of sea view on residential property prices. Apart from sea view, other types of view, such as ocean view, lake view,

and river view have proved to brings premium to property prices. Benson, Hansen et al. (1998) has proved that ocean view will brings premium to property values similar to sea view. Darling (1973) has proved the impact of lake view is similar to ocean and sea view.

In case of Hong Kong, Ho (1999) has the empirical results showing that the river view contributes the highest implicit value in Hong Kong. The sea view will have the second highest impact on property values. Also, the racecourse view in Shatin will increase the residential property values, but at the smallest degree of impact. It also proved that graveyard view brings negative cost to amenity in Hong Kong. Yeung (2005) has further proved that graveyard view amenities bring significant penalty to property prices in area with dominant Chinese. The major reason behind the penalty to property prices is due to the cultural belief in Chinese societies such as Hong Kong.

2.6.   Contribution of literatures

Residential property price is determined by different types of factors, including macroeconomic and microeconomic factors. In this chapter, it reviews some of the researches carried out by different scholars about the factors which determine the willingness of consumers to purchase the residential property. Research papers and journals are discussed in order to set up the foundation of this study. Related literature about property view and churches are discussed because they will be the major focus in this study. The Hedonic Pricing Model is introduced which is the model will be used in the later part of this dissertation to investigate the impact of view of church on nearby

residential property prices. After reviewing all the related previous studies by different scholars and researchers, the methodology and empirical result of this study will be strengthened.

Chapter 3

Background Information

3.1. St. Thomas the Apostle Catholic Church

3.1.1. History of Catholic in Tsing Yi

Tsing Yi is an island in Hong Kong. At the early time, the population on Tsing Yi is relatively low. At that time, most of residents in Tsing Yi Island are fishermen. Long before the construction of the two Tsing Yi bridges, they travel to other district such as Tsuen Wan, Kwan Fong by boats.

After the Second World War, some of the fishermen living in Aderdeen typhoon shelter were moved to the Tsing Yi typhoon shelter. That group of people formed the first catholic group in Tsing Yi. At that time, Scared Heart Church in Tsuen Wan was responsible for preach in Tsing Yi.

In the 1970s, Hong Kong government decided to develop Tsing Yi into a residential district. In April of 1977, the Tsuen Wan catholic diocese decided to form the first Mass Centre in Tsing Yi. In July of 1982, Tsing Yi was formed its own catholic diocese and separated from Tsuen Wan catholic diocese. At the same year, the Tsing Yi catholic diocese was named St. Thomas the Apostle.

At the beginning of the development in Tsing Yi, government aimed at develops southern part of Tsing Yi first. After that, government moved its focus on northern and centre part of Tsing Yi Island. At the same time, the original location of the St. Thomas the Apostle do not have enough rooms for the rapidly increased catholic in Tsing Yi. Therefore, the Tsing Yi catholic diocese decided to build a new sacrarium in Tsing Yi. Before the completion of the church building, it was hosted at Father Cuuchiara Memorial School.

After the negotiation with government, Tsing Yi catholic diocese decided to build the St. Thomas the Apostle Catholic Church at current location. In November of 1996, the construction of St. Thomas the Apostle Catholic Church was started. In July of 1999, the construction of St. Thomas the Apostle Catholic Church was completed.

3.1.2. Location

St. Thomas the Apostle Catholic Church is having a spiritual expression for its building enclosure. Religion as a spiritual subject is transformed into a physical architecture. It makes the architecture becomes a frozen spiritual symbol.

St. Thomas the Apostle Catholic Church is located at 5 Tsing Luk Street, Tsing Yi. It is located at the centre part of Tsing Yi and surrounding by the Tsing Yi Park and some residential development. They included Tsing Yi Estate, Tsing Yi Garden and Broadview Garden. Overall, this site is relatively open on the boundaries.

Fig.1 The location of St. Thomas the Apostle Catholic Church

Source: http://www.centamap.com

3.1.3.   Land Use Zoning

The zoning of St. Thomas the Apostle Catholic Church is under Tsing Yi OZP (S/TY/23) and zoned as G/IC (Government / Institution / Community). It intended to serve the needs of the local residents.

According to the Outline Zoning Plan in 1984, the current location of St. Thomas the Apostle Catholic Church is already zoned as G/IC. At that time, the St. Thomas the Apostle Catholic Church and the Tsing Yi Garden were not constructed yet. However, the site of the current St. Thomas the Apostle Catholic Church has not been measured by the Town Planning Office at that time.

The site of the current St. Thomas the Apostle Catholic Church can be found in the Outline Zoning Plan in 1989. The irregular five-sided shape construction site was first measured in the Outline Zoning Plan in 1989.

Fig. 2 Outline Zoning Plan of St. Thomas the Apostle Catholic Church (2009)

Source: http://www.ozp.tpb.gov.hk

Fig. 3 Outline Zoning Plan of St. Thomas the Apostle Catholic Church (1984)

Fig. 4 <u>Outline Zoning Plan of St. Thomas the Apostle Catholic Church (1989)</u>

3.1.4. Architectural Design

The St. Thomas the Apostle Catholic Church is a 6-storeys building. It is an irregular shape building which built on an irregular shape construction site. It is different from the traditional European style church, which are having same shape and area at different floor level. The St. Thomas the Apostle Catholic Church is having different shape of floor plan at different floor level.

The irregular five-sided shape of the site positively generates the plan and the elevations. As adjacent to a park, the north elevation of the church hall at the upper floor is designed with a glass wall for views in and out. This design is to match with the concept of a more open and inviting religion. (Wong (1998)

The entrance to the building is abstracted form the asymmetrical Chinese word for door "門". Brick tiles and fairfaced concrete are used to finish the building in order to give a solid feel of the material texture. The design concept of the whole church is based on the combination of clock, crucifix and tower shape.

The whole enclosure design of church is combination of functional, environmental and spiritual. Sustainability in the sense of both physical and spiritual aspects can be realized by the concern for both aspects and transformed into building plans and elevations. (Wong (1998)
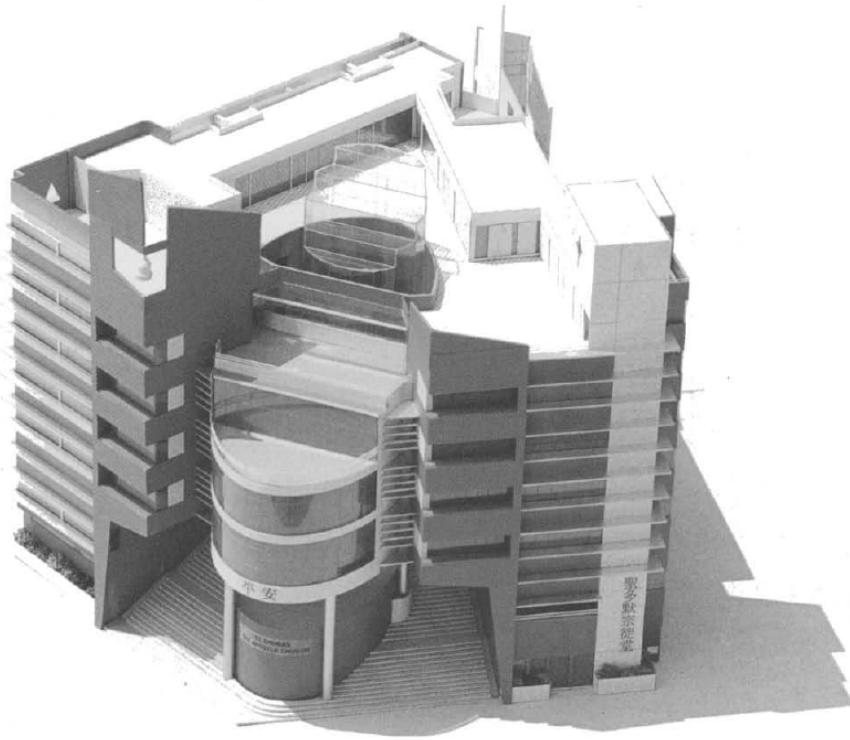
Fig. 5 <u>Model of the St. Thomas the Apostle Catholic Church</u>
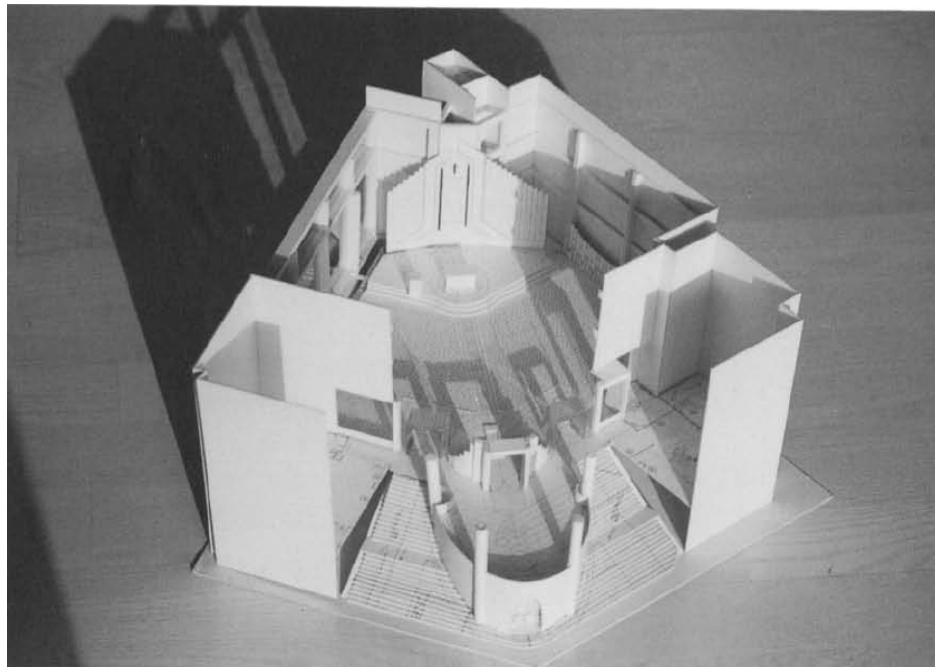
Fig. 6 <u>Model of the interior of the St. Thomas the Apostle Catholic Church</u>

3.1.5. Services provided

The St. Thomas the Apostle Catholic Church can accommodate about five hundreds people. It aimed at serve the local residents and catholic in Tsing Yi. It has a mass everyday in the morning. Besides, it also can provide a place for marriage between catholic. They will provide place for catholic to pray. It is a licensed place for public worship for celebration of marriages.

The St. Thomas the Apostle Catholic Church consists of foyer, baptismal font, altar, chapel, classroom, play area, roof garden, assembly hall, and priest's quarter. It has a cylindrical light well at the centre and a triangular light well at the back of the building. The St. Thomas the Apostle Catholic Church provides baptismal font for catholic to baptize.

Moreover, the church has a priest's quarters on the top floor for priest to live in the church. The St. Thomas the Apostle Catholic Church has provided play area and classroom for catholic to learn and play in the church. Furthermore, there is a roof garden open for the catholic to enjoy.

Also St. Thomas the Apostle Catholic Church will organize different kinds of activities and charity services to the public. Besides, the church has opened a St. Thomas Catholic

Kindergarten on the ground floor. This church not only provides services for catholic in Tsing Yi. It also serves the public in Tsing Yi.

3.1.6. Reason for selection

St. Thomas the Apostle Catholic Church is chosen in this research because the neighborhood buildings nearby are residential buildings. As this study is aimed at study the impacts of view of church to the property price. Therefore, one of the requirements is that the church must be a single building structure, like the St. Thomas the Apostle Catholic Church.

Another is that the nearby residential buildings should have some of the residential units a direct view on the church in order to examine the impact of view of church. There must not be any obstacles between the church and residential buildings. Last but not least, the completion time of the church should not be too old that the transaction data for the nearby residential property cannot be found. It is because this study needs to collect the transaction data of the nearby residential property before and after the completion time of the church.

3.2.   Tsing Yi Garden

3.2.1. Profile of Tsing Yi

Tsing Yi is an island in the urban area of Hong Kong, to the northwest of Hong Kong and south of Tsuen Wan. The Tsing Yi Island can be divided as four quarters, the northeast quarter is a residential area, the southeast quarter is a container port, the southwest holds heavy industry, and the northwest includes the recreation trail, transportation interchange and dockyards and ship building industry. The total area of Tsing Yi Island is about 10.69 km^2, and it was extended drastically by reclamation along the seashore. Three of the harbours or bays were reclaimed for the development of new towns.

In the early days, the inhabitants on the Tsing Yi Island were mostly fishermen. The population was concentrated in the northeast part of the island. At that time, people can only travel to Tsing Yi by boats. From the 1920s onwards, numerous of factories and industries was built on Tsing Yi, such as lime factories, oil storage depots, cement plant, power station, and shipbuilding industries. In 1980s, six large-scale companies on the Tsing Yi Island collectively built the Tsing Yi Bridge, which connect the Tsing Yi Island with Kwai Chung. It was completed in 1974 and it was the only road connection to the Tsing Yi Island for more than ten years.

After the establishment of the Tsing Yi Bridge, Hong Kong Government commenced an extensive new town project on the Island. The northeast part of the Tsing Yi Island

became the location of the new town. In order to develop the new town, the two harbours were reclaimed for residential use.

As the completion of the new town has cause the local residential population boom, the Tsing Yi Bridge was unable to cope with the increasing traffic. In order to solve the traffic congestion, the Tsing Yi North Bridge was built in 1987. It connects the Tsing Yi Island with Tsuen Wan. Tsing Yi was continually under further development after the completion of the Tsing Yi North Bridge.

Tsing Yi Island becomes the transportation hub in Hong Kong. It has the Tsing Yi Station which is part of MTR Tung Chung Line and Airport Express. Also, it connected with eight bridges. They included Ting Kau Bridge, Tsing Ma Bridge, Tsing Yi Bridge, Kwai Tsing Bridge, Tsing Tsuen Bridge, Cheung Tsing Bridge, Tsing Lai Bridge, and Stonecutter's Bridge. As a result, the transportation system in Tsing Yi is fully developed in order to accommodate the local residential population.

3.2.2. Characteristics

Tsing Yi Garden was completed in 1986 by Cheung Kong (Holdings) Limited. It has seven high rise towers and provides 1,520 residential units. There are two types of size of residential units in Tsing Yi Garden, and they are 432 s.f. and 670 s.f.. Also, it has its own shopping arcade. The shopping arcade is located at the podium of the Tsing Yi Garden and has approximately 111,000 s.f..

Tsing Yi Garden also provides facilities for the residents. At the podium of Tsing Yi Garden, there is a swimming pool open for the residents in Tsing Yi Garden. Also, there is a tennis and badminton court in the garden on ground level. There also has a club house in the Tsing Yi Garden. It provides meeting room, play area, and activities rooms for residents to use.

The living environment of Tsing Yi Garden is pleasant and ideal, since it is situated right next to Tsing Yi Park. Therefore, residential units have fantastic views of Tsing Yi Garden and the sports ground. There is a shopping plaza in Tsing Yi Garden and a grocery market nearby. It takes only 10 minutes to walk to Maritime Square for shopping and entertainment. Furthermore, the Urban Service Complex Building and many other public facilities such as a library, soccer fields, Tsing Yi Swimming Pool, Tsing Yi Sports Ground and badminton courts are nearby. Transportation is quite convenient, and it takes only a few minutes to walk to the Tsing Yi MTR Station.

3.2.3. Location

Tsing Yi Garden is located on 7 – 9 Tsing Luk Street. It is located in the centre of Tsing Yi Island. There are different leisure facilities surrounding Tsing Yi Garden. They included the Tsing Yi Park, St. Thomas the Apostle Catholic Church, Tsing Yi Town Clinic, and Tsing Yi Municipal Services Building.

Fig. 7 The location of Tsing Yi Garden

Source: http://www.centamap.com

3.2.4. Interaction between St. Thomas the Apostle Catholic Church

The residents of Tsing Yi Garden can easily assess to St. Thomas the Apostle Catholic

Church within five minutes. According to the record by St. Thomas the Apostle Catholic

Church, some of the residential units in Tsing Yi Garden was bought by the church for

priest's living quarters. Tsing Yi Garden also is the residential development that can enjoy the direct view of the St. Thomas the Apostle Catholic Church.

Long before the construction of the St. Thomas the Apostle Catholic Church, Tsing Yi Garden has been located at current location for about ten years. Therefore, Tsing Yi Garden has experienced the impact of the completion of St. Thomas the Apostle Catholic Church.

St. Thomas the Apostle Catholic Church has been the main church in Tsing Yi, every week many people will join the Sunday Masses in the church. Besides, the church held many activities with the residents in nearby residential estates and other Tsing Yi residents.

Chapter 4

Methodology

4.1. Introduction

In this dissertation, it aims at model and quantify the effects of a church on the property nearby. One of the most widely used models for estimating residential property price in the market is the Hedonic Pricing Model. Therefore, the Hedonic Pricing Model would be introduced and used to test the hypothesis.

4.2. Concept of Hedonic Pricing Model

As mentioned in Chapter 2, the Hedonic Pricing Model is used to determine the relationship between the property characteristics and values. According to Butler (1982), property characteristics can be classified into structural, locational and neighborhood characteristics. Structural traits (S) are including physical characteristics of property such as floor level, size and age. Locational traits (L) are referring to accessibility of the property to nearby location such as CBD, shopping centres, and recreational facilities. Neighborhood traits (N) are meaning all those facilities and services provided by the land use nearby, such as school, church and landfill. Therefore, property price (P) can be expressed as the following function:

$$P = f(S, L, N)$$

In the above function, the P is called a dependent variable and S, L, N are independent variables. Assuming that there is a linear relationship between property price and its property characteristics, the relationship can be shown as an equation as follow:

$$P = a_0 + \Sigma a_i S_i + \Sigma b_j L_j + \Sigma c_k N_k + \epsilon$$

Where,

P	=	Property price of an individual property unit
a_0	=	Constant term
S_i	=	Variable represent the structural traits
L_i	=	Variable represent the locational traits
N_k	=	Variable represent the neighborhood traits
a_i, b_j, c_k	=	Regression coefficients of the corresponding independent variables
ϵ	=	Stochastic or error term

The regression coefficients a_i, b_j and c_k are used to estimate the change in property price (P) associated with a unit change in S_i, L_i, N_k, when other factors being constant. They can be obtained by differentiating the equation with different traits as the following:

$$\Delta P / \Delta S_i = a_i$$

$$\Delta P / \Delta L_j = b_j$$

$$\Delta P / \Delta N_k = c_k$$

According to the regression coefficients, the hedonic price of the corresponding property characteristics can be found. Therefore, the Ordinary Least Square (OLS) technique will be used to compute the regression coefficients. The OLS technique is used to estimate the true and unobservable function by minimizing the residual sum of square, which is the difference between the actual and the forecast values of the dependent variable such as property price. The estimated coefficients by using OLS technique are generally unbiased, accurate and consistent. Therefore, OLS technique will be employed in this study.

4.2.1. Choice of Functional Form

The choice of functional form is depends on the nature of the relationship between the dependent variable and independent variables. An incorrect choice of functional form may result an inaccurate estimation. Linneman (1980) shows that there is 86% overestimation in his hedonic pricing model because of misspecification of functional form. Therefore, choosing the correct functional form is very important.

In order to obtain the accurate result, selecting an appropriate functional form is an important task. But Butler (1982) stated that hedonic price theory provide insufficient

guidance for choosing the appropriate functional form. Functional form of the equation can be varied, such as linear, logarithmic, logarithmic-linear, etc. Rosen (1974) suggested that the correct functional form of the equation should be the one that give the highest R^2, which represents the goodness of fit to the equation. But usually the choice of functional form depends on two situations,

1. No prior information is available, or
2. A prior knowledge of the relationship between dependent and independent variables can be logically deduced.

In the former situation, trial and error based on empirical observation should be taken in order to choose the best functional form. For example, start from using linear function as the first attempt, and replace with more flexible functional form such as polynomial function if the linear function results a failure.

If it is the latter situation, the choice can be made much easier. The correct functional form can be chosen by following the functional forms adopted in the past, which is the one assumes the already established relationship.

In this dissertation the semi-log model will be chosen and applied in the study as it is the most popular specification for hedonic pricing model in the past

4.2.2. Dummy variable

Independent variables can be categorized into qualitative or quantitative. Quantitative variables are variables which can be measurable and take values, such as flat, age, and floor level. For qualitative variables, they are usually non-measureable such as sea-view, and existing of facilities. In order to measure qualitative variable, dummy variable would be used to model qualitative factors in the hedonic pricing model in this study. They usually take on only two value, either 0 or 1. They usually used to explain the effect when the particular condition is satisfied or not.

For example:

$$P = a_0 + \Sigma a_i\, S_i + \Sigma b_j L_j + \Sigma c_k N_k + d_l X_l + \epsilon$$

Taking the example of having a sea view for a residential unit, X_l is a dummy variable that represent the property with or without a sea view. If the residential unit possesses a sea view, then $X_l = 1$. If not, then $X_l = 0$.

The numbers of dummy variables included in the equation should be the numbers of qualitative factor (n) minus 1, which means (n-1) dummy variables. In this study, the dummy variables are used for separating the different views by the residential units. There are total three types of views in the target residential development, namely church

view, open view, and building view. The church view is referring to the view of St. Thomas the Apostle Church. Open view is referring to the view of Tsing Yi Park and the nearby football field. The building view is referring to the view of the nearby blocks in the same residential development. Hence, two dummy variables will be used, and they are church view and building view.

4.3.   Limitations of Hedonic Pricing Model

Although Hedonic Pricing Model can be used estimating residential property price in the market and analysis the data, it has some limitations which are multicollinearity, heteroscedasticity and the problems for choosing the suitable function forms.

4.3.1. Multicollinearity

When there are two or more independent variables are highly correlated with each other, multicollinearity will likely to be happen. The effect of the multocollinearity will be negative. For example, the t-value will be under-estimate and make it difficult to interpret the coefficients of the independent variables.

Multicollinearity can be reduced by applying the correlation matrix. Also, dropping one or more correlated variable model is also an option to solve the problem. But diagnosis is needed to examine which variables are the correlated variables in the model.

4.3.2. Heteroscedasticity

Heteroscedasticity will happen when the variance of the errors terms is not the same. There are some reasons for the happening of heteroscedasticity. The first one is that there may be some data which measured more accurate than others. Also, it may due to the misspecification of the functional form. The omission of certain independent variables is one of the reasons too. Besides, the variance of the error terms is correlated with one of the independent variables is also one of the reasons for heteroscedasticity. In order to solve the problem of heteroscedasticity, data transformation or White's correction should be used.

4.3.3. Functional forms

As mentioned before, the selection of functional form should be carefully. It is because the regression result is depends on the functional form. The problems of functional form have been discussed in previous section. The semi-natural logarithmic model will be employed in the model.

4.4.   Study Target

In this dissertation, it aims at investigate the impact of church view on property prices for residential unit. The target church in this dissertation would be the St. Thomas the Apostle Church. In general, this construction of the church can be divided into three periods, before construction, construction period and completion.

Period	Date
Before construction	Before 24/11/1996
Construction	24/11/1996 – 4/7/1999
Completion	After 4/7/1999

Table 1 <u>Period of stages of St. Thomas the Apostle Catholic Church</u>

As this dissertation is aims at investigate the impact of church view on property prices, not the services provided by the church, so the date 24/11/1996 is chosen, which is the date when the residential property nearby noticed that having a church view, as a time indicator for the residential units having a church view or not. Therefore, transaction data between the time period 1991 to 2004 of the Tsing Yi Garden will be collected in order to examine the impact of church view.

The residential property that is going to investigate in this dissertation is a residential development namely Tsing Yi Garden locating next to St. Thomas the Apostle Church.

Fig. 8 <u>The location of the Study Target</u>

Source: http://www.centamap.com

From the map, St. Thomas the Apostle Church is on the north-western of the Tsing Yi Garden. Within 7 blocks of residential building in Tsing Yi Garden, only a numbers of residential units can have a church view. As mentioned in chapter 3, St. Thomas the Apostle Church is one of the Catholic Church in Tsing Yi Island. It provides a place for catholic to have a mass, marriage, and pray. In general, churches would give a visual

enhancement and peaceful environment to the nearby area. Hence the hypothesis can be derived from the nature of St. Thomas the Apostle Church.

4.5. Hypothesis

People will tend to pay a premium for the enjoyment of a view of building which has a graceful external appearance, such as churches, so residential units enjoying a direct church view should experience an increase in property prices.

4.6. Source of data

The required transaction data and details of the residential property unit in this study could be obtained from the EPRC system. EPRC system is a system that holds the transaction data for most of the residential properties in Hong Kong. EPRC database was established in 1991. The dates of transactions in the EPRC database are obtained from the Land Registry which means it is reliable for analysis.

Information obtained from EPRC for this study includes the price of transaction, data of transaction, floor level, gross floor area and date of occupation permit for the properties. Other required information such as age and the view of the residential units are not provided in EPRC.

For the data of the age of the residential units, it is calculated by comparing the date of occupation permit for the properties and the date of transaction, and age is measure in terms of months. In order to determine whether the residential unit is having a church view or not, site investigation was made with the floor plan of the Tsing Yi Garden was obtained. The view of living and dining room is the indicator whether the residential unit is enjoying a church view or not. After on-site investigation, the author found that properties must be below 21/F in order to have a clear church view even it is facing the church. The properties above 21/F will consider to have an open view even it is facing the church.

The open view in this study refers to the view of the Tsing Yi Park, the nearby football field, and the vacancy site before the completion of St. Thomas the Apostle Church. Residents are preferred to having an open view and without any blockage, such as buildings nearby. However, it is expected that people are more preferred to having a view from an architectural design than an open view without any view from seashore or sea.

The building view in this study refers to the view of the nearby residential buildings. Due to the design layout of the Tsing Yi Garden, some of the residential units are facing the nearby residential block of Tsing Yi Garden. It is expected that residents are less preferred to having a building view. It is because the view of the window will be block by that building. Also, the residents live in the residential unit with a building view may think less privacy than residential units with other view.

Fig. 9 Floor plan of Tsing Yi Garden

Source: http://www.midland.com.hk

4.7. Variables

As mentioned above, variables need to be selected for the Hedonic Pricing Model. In order to have an accurate result, misspecification of variables should be avoid. In general, there are two situations that misspecification may occur, and they are over-specification and under-specification. The reason for over-specification is an irrelevant independent

variable is included in the model, and the result is the estimated independent variables are unbiased and consistent. A relevant independent variable which is omitted would be the reason for under-specification, and the result is the opposite of over-specification, which will cause bias and inconsistent for the estimated coefficient.

In order to avoid misspecification, independent variables should be selected carefully. All key relevant variables should be included. Based on Butler (1982), the independent variables can be categorized into 3 attributes mentioned in chapter 2. The independent variables used in the model using in this study can be categorized into 3 main types. The followings are the relevant variables included in the model of this study.

Variable	Description	Types
RP	Real property transaction price	
AGE	Age of the property	Structural attributes
AGE^2	Square term of AGE	
FLOOR	Floor level of the property	
$FLOOR^2$	Square term of FLOOR	
GFA	Gross floor area of the property	
CV	Church view	Locational attributes
BV	Building view	

Table 2 Descriptions on variables included in the model

4.7.1. Dependent variable

RP (Real property transaction price)

The property transaction price in the model would be the real property price instead of the nominal property price which obtained from EPRC. It is because the market situations are different in different time periods. Therefore, there will be time-effect on the transaction data. Those time-effects are causes by the different factors, such as the interest rate, inflation rate, and economic situation. Such time-effect would lead to bias and give an incorrect result. In order to avoid time-effect, adjustment needs to be taken.

The nominal property price will be deflated before input the price data into the model. It will be deflated into real transaction prices by using the corresponding monthly price indices which are obtained from the Rating and Valuation Department (RVD). Monthly price indices will be selected instead of yearly or quarterly, because the property market is volatile and the real transaction prices will be more accurate. However, Rating and Valuation Department only published quarterly price index instead of monthly before 1993. Therefore, transactions within 1991 to 1992 will be deflated by the quarterly price index.

The price index is designed to measure the rental and selling price changes with the quality is keeping a constant. Rating and Valuation Department is selected a base year for

the comparison, which is based on the year 1999. Therefore, transaction price will be deflated into the price level in 1999 for comparison in the study. The real transaction price is obtained by the following formula:

$$RP = NP_t \times 100 / PI_t$$

Where,

RP　　= Real Property Price

NP　　= Nominal Property Price

PI　　= Price Index

The data for nominal property price will be obtained from EPRC database. Within the time period from 1991 to 2004, there were total 1,502 transaction records in Tsing Yi Garden.

4.7.2. Independent variable

4.7.2.1. Structural attributes

AGE – Age of the property

This independent variable is representing the age of the property at the time of the transaction occurred. It is calculated in monthly bases, which is measured between the

transaction date and the date of issuance of the occupation permit (OP). The issuance of the occupation permit indicates that the construction of the property is completed.

Generally, building will deteriorate and becomes less attractive to the purchaser as building getting old. As a result, the value of the building will decrease. Therefore, it is expected that there is a negative relationship between the age of the building and the property price. The coefficient of this independent variable (AGE) should give a negative sign. Square term of AGE will be included in the model in order to capture the non-linear effect of increasing AGE.

FLOOR – Floor level

The floor is defined as the floor level of the property located, which is the number of storeys above ground level. Floor level of the property indicates the virtual height of the property. In general, properties located at a higher floor level are more preferable to the purchasers. People are more willing to pay a higher price for flats located in the upper floor. It is because the flats with a higher floor level can enjoy a quieter environment with a better view.

On the other hand, properties located in the lower floor will suffer a lower property price. It is because the lower floors are more likely to suffer from traffic nuisance and nuisance from other economic activities. Thus, it is expected that property price will increase with

the floor levels of the property. Square term of FLOOR will be included in the model in order to capture the non-linear effect of increasing FLOOR.

GFA – Gross Floor Area

The size of the property is measured by its gross floor area. According to the definition by Building (Planning) Regulation (Cap. 123F) under Building Ordinance, it stated that "the gross floor area of a building shall be the area contained within the external walls of the building measured at each floor level (including any floor below the level of the ground), together with the area of each balcony in the building, which shall be calculated from the overall dimensions of the balcony (including the thickness of the sides thereof), and the thickness of the external walls of the building". Other measuring method such as Usable Floor Area or Saleable Floor Area will not be used as the properties in this study are having similar usable floor area ratio. Therefore, gross floor area is preferable and easier to obtain. It is expected that the larger the size of the property, the property price will be higher as the user can enjoy more living space. Therefore, the coefficient is expected to have a positive sign.

However, square term of GFA will not be included in the model. It is because the study target is only having two types of flat size. There are only two types within seven blocks of residential estates. Although the square term of GFA is used to model the non-linear effect of increasing GFA, the study target is only having two sizes of GFA. Therefore, the

including of square term of GFA is meaningless. As a result, the square term of GFA will not be included in the model of this study.

4.7.2.2. Locational attributes

CV – Church view

This is one of the dummy variables in the model of this study. It represents whether a flat possessed of a full church view. The church view specified in this study refers to the view of the St. Thomas the Apostle Church. The dummy variable will be equal to one if the flat has a church view and will be equal to zero if it does not. According to hypothesis of this study, it is expected that the coefficient of church view is having a positive sign.

BV – Building view

This variable represents whether a flat possessed a building view. The building view in this study refers to the view of the nearby residential buildings. Similar to church view, it is also a dummy variable. It will be equal to one if the flat has a building view and equal to zero if not. It is expected that residents are less preferred to having a building view. It is because the view of the window will be block by that building. Also, the residents live in the residential unit with a building view may think less privacy than residential units with other view. Therefore, it is expected that the coefficient of this variable will be negative. It is expected that people are more preferred to having an open view without

any view from seashore or sea compare with the building view. Therefore, people should be less preferred to having a building view compare with church view and open view. As a result, the coefficient of building view will be negative.

4.8.   Structure of Hedonic Price Model Equation

In order to showing that the impacts of church view on nearby residential properties, Hedonic Pricing Model will be employed. After taking into account all the attributes of the properties in this study, the Hedonic Pricing Model equation is shown as the following:

$$\log (RP) = a_0 + a_1 AGE + a_2 AGE^2 + a_3 FLOOR + a_4 FLOOR^2 + a_5 GFA + a_6 CV + a_7 BV$$

Where,

RP	= Real transaction price
AGE	= Age of the buildings
AGE^2	= Square term of AGE
FLOOR	= Floor level of the property
$FLOOR^2$	= Square term of FLOOR
GFA	= Gross Floor Area of the property
CV	= Property which possesses a church view
BV	= Property which possesses a building view

Here is the summary of the independent variables and the expected sign of its coefficient:

Independent variable	Expected sign of its coefficient
AGE	(-)
AGE^2	(?)
FLOOR	(+)
$FLOOR^2$	(?)
GFA	(+)
CV	(+)
BV	(-)

Table 3 <u>Expected sign of the coefficient of the independent variables</u>

4.9.   Model Interpretation

4.9.1. Regression coefficient (a_i)

The coefficient (a_i) is the measure of the changes of the dependent variable in relation to a unit change in dependent variable while holding all other variables constant. In this

study, the coefficient (a_i) is measuring the magnitude of impact of the attribute on the property price of residential unit. Under the semi-log regression model, the coefficient of the independent variable is representing the changes of the dependent variable in a percentage terms due to a unit change of the independent variable. The sign of the coefficient is used to determine whether there is a positive or negative relationship between the independent and the dependent variables. It means that if the sign of coefficient of an independent variable is negative, the dependent variable will experience a decrease when there is a unit of increase in that independent variable.

4.9.2. Coefficient of determination (R^2)

The coefficient of determination is used to measure the proportion of variation in the dependent variable which can be explained by the variation in the independent variable. It is measured in the range from 0 to 1. The closer R^2 is to 1, the higher the explanatory power of the variation in the dependent variable by the model. The value of R^2 can be representing in percentage term, if R^2 is equal to 0.75, it means that 75% of changes in the dependent variable can be explained by the independent variable included in the model. The remaining 25% is unknown and cannot be explained. More independent variables added to the equation, higher coefficient of determination. However, more independent variables lead to higher R^2 irrespective of whether the variables are significant. In order to tackle this problem, adjusted R^2 will be used.

The equation for calculate adjusted R^2:

$$\text{Adjusted } R^2 = 1 - (1 - R^2)\,(N - 1)\,/\,(N - k)$$

Where,

N = number of observations

k = number of independent variables (excluding constant term)

Adjusted R^2 is also used to measure the proportion of variance of the dependent variable explained by the variance of independent variables. For a small degree of freedom, as there are a large number of independent variables relative to the sample size, the R^2 would be adjusted downward. The degree of freedom is defined as $(N - k - 1)$. The difference between the R^2 and the adjusted R^2 should be small for degree of freedom which is larger than 30.

4.9.3. T-statistics

T-statistics is an indicator to measures the variable is statistically significant or not. It measures the significant level of the effect of independent variable on the dependent

variable. The value of t-statistics (t_i) depends on the coefficient of independent variable (b_i) and the standard error of the coefficient of that independent variable (Sb_i).

$$t_i = b_i / Sb_i$$

The t-statistics can show the significance of the coefficient of the attribute when the critical value in the regression model has been set. There would be a critical t-statistics (t_c) when it has been given significant level and degree of freedom. When the t_i is higher than the t_c at a given significant level and degree of freedom, then the coefficient b_i is significant at that significant level. For example, the independent variable is significant at 5% level, then the remaining 95% is representing that b_i is non-zero and reject the null-hypothesis. Therefore, a higher value of t_i implies the coefficient b_i is more likely to be different from zero, which means the attribute is going to affect the value of the dependent variable. Therefore, the larger the value of t_i, the higher significance level and more accurate estimation can be made. However, the t-statistics only measures the statistical significance of the effects of the independent variables but not the strength of that effect.

4.9.4. P-values

P-values are usually used instead of t-statistics as it shows the chance for the estimated coefficient is equal to zero. Besides, a small p-values ($< x\%$) means that the coefficient b_i is significant at that x% level, or b is significant at $(1 - x\%)$ confidence level. Also, it

means the coefficient has less than x% chance that it has no effect on the dependent variable.

4.9.5. F-statistics

F-statistics is used to test the significance of the coefficient of determination (R^2). F-statistics can test the null hypothesis that none of the independent variable helps to explain the variation of the dependent variable about its means. Therefore, a higher f-statistics means that there is at least one of the independent variable is significant and can explain the variation of dependent variable. A higher f-statistics can reject the null hypothesis.

Chapter 5

Empirical Result

5.1.   Introduction

In this chapter, the statistical result of the hedonic pricing model used in this study will be presented. The regression result of the model discussed before will be generated by the software E-views. The interpretation of the empirical result will be made. Based on the empirical result, explanation will be given to explain the relationship between the neighborhood churches and property values in community of Hong Kong. Finally, implications related to the study will be given based on the result generated.

5.2.   Model analysis

In this study, it aims at find out whether church view will bring impact on residential property values or not. Further investigate whether the impact of church view is positive or negative. Based on the result obtained, the author will try to explain the relationship between neighborhood churches and property values in community of Hong Kong.

5.2.1. Data selection

In order to carry out the hedonic pricing model, the transaction data of the private residential estate Tsing Yi Garden was obtained. All data used in this study are obtained from Tsing Yi Garden, so the locational and neighborhood characteristics of the properties in this case can be controlled.

In this study, the transaction data of the Tsing Yi Garden from 1991 to 2004 were collected. In that period, there were total 1,502 suitable transaction records. All data required in the model will be measure and examine before input into the model. For example, the time effect will be eliminate before input into the model. The software E-views will be used in this study in order to generate the empirical result.

5.2.2. Empirical result

This study is aims at investigate the impact of church view on residential property price. As residential units in Tsing Yi Garden are having three types of view, namely church view, open view, and building view. The impact of the church view will be investigated by employing the dummy variables church view (CV) and open view (OV). Besides, square term of age of the property (AGE) and floor level of the property (FLOOR) will be added in order to test the non-linear effect of these variables. However, square term of

GFA will not be included as there are only two type of flat size in Tsing Yi Garden. The square term of GFA will be useless in such condition. As mentioned in Chapter 4, the logarithmic form will be used in order to examine the percentage changes in the dependent variable due to the independent variables in the model.

The equation is as following:

$$\log (RP) = a_0 + a_1 AGE + a_2 AGE^2 + a_3 FLOOR + a_4 FLOOR^2 + a_5 GFA + a_6 CV + a_7 BV$$

The result is presented in the following:

Dependent variable: log (RP)

Method: Least Squares

Sample: 1 1502

Included observations: 1502

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.922178	0.039114	-23.57663	0.0000**
AGE	0.007024	0.000519	13.53604	0.0000**
AGE^2	-2.16E-05	1.86E-06	-11.59532	0.0000**
FLOOR	0.008177	0.001605	5.093962	0.0000**
$FLOOR^2$	-0.000130	4.62E-05	-2.807437	0.0051**
GFA	0.001476	2.74E-05	53.88363	0.0000**
CV	0.035586	0.011606	3.066150	0.0022**
BV	-0.016860	0.006791	-2.482637	0.0132*

R-squared	0.709401
Adjusted R-squared	0.708039
F-statistic	521.0147
Prob (F-statistic)	0.000000

* 5 per cent significance

** 1 per cent significance

From the table above, the value of the adjusted R-squared is 0.708039, which is 70.8%. It represented that the model can explain 70.8% of the variation of the dependent variable. The explanation power of this model is quite high.

The F-statistic of this model is high at the value 521.0147 with Prob (F-statistic) less than 0.01%. Therefore, the null hypothesis that none of the independent variable can explain the variation of the dependent variable can be rejected.

According to the result obtained, all of the independent variables are statistically significant at 1% level, except the independent variable open view (BV), which is statistically significant at 5% level.

However, there is a difference between one of the actual sign of the coefficient with the expected sign of the coefficient in the model. The comparison is shown as follow:

Independent variable	Expected sign of coefficient	Actual sign of coefficient
AGE	(-)	(+)
AGE^2	(?)	(-)
FLOOR	(+)	(+)
FLOOR^2	(?)	(-)
GFA	(+)	(+)
CV	(+)	(+)
BV	(-)	(-)

Table 4 Comparison of actual and expected sign of coefficient

The only coefficient of the independent variable different from its expected sign is the independent variable AGE. It is representing the age of the properties when the transaction occurred. The coefficient of the independent variable AGE has shown a positive sign with the value 0.007024. It is statistically significant at 1% level. This means that an increase in one month of the age of the property will increase the property price by 0.7%. The result means that an increase in age of the properties will not lead to a decrease on property prices. Instead of decreasing, the property prices will increase when there is an increasing in age of properties. It does not match the expected result. As generally a building will deteriorate and becomes less attractive to the purchaser when building getting old, which results a decrease on property prices.

The reason behind this strange result for independent variable AGE may be the improvement in the accessibility of the Tsing Yi Garden. It is because when the Tsing Yi Garden was completed, there is just only one road connected to Tsing Yi Island, which is the Tsing Yi Bridge. Most of the people in Tsing Yi Island were travel to other places by ferry or boats at the pier. However, the transportation system of Tsing Yi has improved from time to time. After the completion of Tsing Yi Garden, the Tsing Yi North Bridge was completed. Moreover, Tsing Yi Island becomes one of the MTR stations, and be a part of the MTR Tung Chung Line and Airport Express. Furthermore, Tsing Yi Island becomes the transportation hub in Hong Kong. It connected with eight bridges which lead to different districts. Therefore, the loading of the road network in Tsing Yi Island has been decreased considerably. Also, the transportation network of the estate become more mature and more bus routes and mini bus routes will serve the Tsing Yi Island. As a result, the travelling time from Tsing Yi Island to other districts will be shortened. The positive coefficient of independent variable AGE may reflects the improvements in the accessibility of Tsing Yi Garden.

The coefficient of the independent variable AGE^2 is negative with the value of -2.16E-05. It is significant at the 1% level. It represents that the increase in age of the property increase the property price at a decreasing rate. It can be explained that the benefits from the improvement of transportation network in Tsing Yi will be taken off by the rate of depreciation of the buildings.

The coefficient of the independent variable FLOOR is positive with the value of 0.008177. It is significant at the 1% level. This means that an increase in one floor level of the property will increase the property price by 0.82%. This result matches with the expectation that purchasers are will pay a premium for living at a higher floor level. It can be explained that a flat at a higher floor level can enjoy a more superior view. Also, the nuisance from the traffic and other economic activities can be minimized as living at a higher level which is far away from the ground level.

The coefficient of the independent variable $FLOOR^2$ is negative with the value of -0.000130 and is significant at 1% level. It implies that the increase in floor level of the property increase the property price at a decreasing rate. It can be explained that people are preferred to live at a higher floor level, but after they achieve a certain floor level, they are not willing to pay more money for a much higher floor level.

The coefficient of the independent variable GFA is positive with the value of 0.001476 and is significant at 1% level. This means an increase in one square feet of GFA of the property will increase the property price by 0.15%. This matches the expected result that purchasers are willing to pay more for more space and enjoy a larger living space.

The coefficient of the independent variable CV which is representing the church view, it is having a positive sign with the value of 0.035586. It is significant at 1% level. This means that the properties with a church view will be higher than those residential units

having open view by 3.56%. This matches the hypothesis that people will tend to pay a premium for the enjoyment of church view.

The coefficient of the independent variable BV which is representing the building view, it is having a negative sign with the value of -0.016860. It is significant at 5% level. This means that the properties with a building view will be lower than those residential units having open view by -1.69%. Compare with the coefficient of CV, people are willing to pay more for the properties with church view instead of building view. This matches the expectation that people are less preferred to having a building view.

Besides church view (CV) and building view (BV), there is another view in Tsing Yi Garden namely open view (OV). The open view refers to the residential units which enjoy the view of Tsing Yi Park on the north, the vacancy site on south and south-west and the soccer field on south-east. By the coefficient of independent variables CV and BV, we can rank the preferable view of the people among three views. The highest is the church view, the second is open view, and the lowest is building view. From the result, people will spend 3.56% more for church view compares to open view. On the other hand, people will spend -1.69% less for building view compares to open view.

From the empirical result, it can confirm the hypothesis of this research. People will tend to pay a premium for the enjoyment of church view, so residential units enjoying a direct view should experience an increase in property price.

5.3.   Further explanation

According to Do, Wilbur et al. (1994) and Carroll, Clauretire et al. (1996), proximity to a neighborhood church will creates impact on housing values. However, the empirical result of Carroll, Clauretire et al. (1996) is sharply contrast with those of Do, Wilbur et al. (1994). The empirical result of Do, Wilbur et al. (1994) show that neighborhood churches are nuisances that reduce property values over relatively short distance. However, the empirical result of Carroll, Clauretire et al. (1996) show that neighborhood churches are amenities that enhance property values over larger distance. Based on the contrast, conclusion was drawn that relationship between neighborhood churches and property values is different in different communities.

If the community of Hong Kong is same of the study by Do, Wilbur et al. (1994), the residential units which are the nearest to the church will have a decrease in property values. Therefore, the residential units which have a direct church view should be nearer than other residential units do not have a church view in this study. But according to the empirical result shown above, it proved that people will pay a premium for the enjoyment of church view. Therefore, the neighborhood churches are not nuisances that reduce property values over relatively short distance in Hong Kong.

However, the empirical result in this study cannot prove that neighborhood churches are amenities that enhance property values over larger distance. It is because this study is

based on the impact of church view. The empirical result can only proved that people will pay a premium for enjoyment of church view, but cannot test whether the churches can enhance property values over larger distance in the community of Hong Kong, or even in the community of Tsing Yi.

5.4.   Implication of study

According to the empirical result, the neighborhood churches amenities bring impact to property prices of nearby residential estate. There is a different degree of impact between a church views to other views. As a result, town planners should take extra care when zoning G/IC for the development of churches which near residential land use zoning in order to maximize the land value. On the other hand, developers have to consider the amount of church view amenities in the estate when designing the layout of the residential estate. Purchasers also have to take in the account for the impact brought by church view. As the resale ability of a property of having church view will be different from other types of view, so purchasers need to consider the church view when they bought the property.

Chapter 6

<u>Conclusion</u>

6.1.   Review of study

This dissertation has reviewed the church view in Hong Kong. It is shown to be significantly affecting the property prices. The extent of influence is measured by the implicit value of the view amenity as quantified by a hedonic pricing model. The implicit value of the view is measured by the coefficient of the view independent variable in the hedonic pricing model.

The objective of this research is to examine the impacts of church view on residential property prices. It was tested in a hedonic pricing model by using 1,502 property transaction data from Tsing Yi Garden within the period 1991 – 2004. The church view that Tsing Yi Garden enjoy is the St. Thomas the Apostle Catholic Church. It is a modern design church, and is a bit different in design of traditional churches. It integrated functional, environmental and spiritual approaches into the enclosure design. St. Thomas the Apostle Catholic Church was built in 1996 with an aim to serve the local public. Its modern enclosure design has matched the environment of nearby residential estate. Besides baptismal font, altar and chapel that usually appear in traditional churches, St. Thomas the Apostle Catholic Church also provide classroom, play area and roof garden. Although the design is different as to bring harmony to nearby environment and provide

different services to the local public, it is having the same functions as the other churches. The empirical result obtained from this study confirmed the hypothesis and shown that the properties which having a church view will experience an increase in property prices.

Another objective of this study is to explain the relationship between neighborhood churches and property values in community of Hong Kong. The relationship between neighborhood churches and property values is based on the research done by Do, Wilbur et al. (1994) and Carroll, Clauretire et al. (1996). The empirical result shown that the property which having a church view will experience an increase in property price. It opposes the result of Do, Wilbur et al. (1994) that the residential units which are the nearest to the church will have a decrease in property values. Therefore, neighborhood churches are not nuisance for community of Hong Kong. It should be an amenity that will increase nearby property values.

According to the result from Carroll, Clauretire et al. (1996), the neighborhood churches are amenities that enhance property values. The enhancement of property values decline as the distances between churches and properties become larger. This study is opposing the result of Do, Wilbur et al. (1994). The empirical result in this study can prove that neighborhood churches are amenities that increase nearby property values. However, the empirical result can only confirm that the church view will be a view amenity that increases the property price of nearby residential estate. It cannot be ensure that the neighborhood churches will be an amenity to nearby residential area within a distance range.

From the result of this study, town planners in Hong Kong should take into the account the development of churches where near a residential zoning in order to maximum the land value. Developers also should consider the view of church when designing the landscape of the residential estates. It is because the people are willing to spend more to have a church view.

6.2.   Limitation of study

Although the empirical result has proved the hypothesis in this study, this study may not be comprehensive enough to conclude the impact of church view on property price due to some limitations.

The investigation time is starting from 1991 to 2004, and 1,502 transaction data were collected for analysis. It may not be enough for carry out a reliable study. However, this problem cannot be avoid as there is only the Tsing Yi Garden is having a direct view on the church, and have a same horizontal level as the church. Other residential buildings are located far away from the church, or have a different horizontal level compare with the church, which are not suitable to be used in this study.

Some assumptions were made before the analysis of this study, these assumptions may lead to inaccuracy result when compare with real situation. In this study, the author assumes that churches will have a graceful external appearance. Another is that the

distance effect of the churches is not considered in this study. Besides, the author did not consider the impact of the improvement of the transportation network.

Therefore, it is better to include more estates and different churches instead of one to confirm the effect of church view on property price.

6.3.   Areas for further studies

The impact of religious belief about church view on property prices is area required for further study. In this study, the religious factor is not considered. Apart from the view of the church, the psychological aspect within the religious factor may affect the purchaser preference when choosing their properties. Even the author proved that church view will increase the property price in Hong Kong, it is not ensure that church view is an amenity that increases the property price in other countries or cities. It is because there are differences between the culture of Hong Kong and other places. Therefore, the researchers may need to find out whether the cultural factor, religious factor will have significant impact in property prices in different communities with different cultural and religious backgrounds.

In this study, the author based on the empirical result that church view will increase the property price and try to explain that the relationship between neighborhood churches and property values. The empirical result has shown that church view is amenity that enhances property values. It proved that the neighborhood churches are not nuisances that

reduce property values over a short distance. However, further studies are required to prove that neighborhood churches are amenities that enhance property values over larger distance. It is worth studying as it may result a better town planning in Hong Kong.

This study is concentrated on the impact of church view on residential property prices. It is unclear that whether this impact hold true for other types of properties such as commercial, retails, or industrial. Therefore, further researches are needed to find out the impact of church view on different types of properties prices.

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Appendix I

Photographic illustration – St. Thomas the Apostle Catholic Church

Irregular five-sided shape construction site

Outlook of the St. Thomas the Apostle Catholic Church

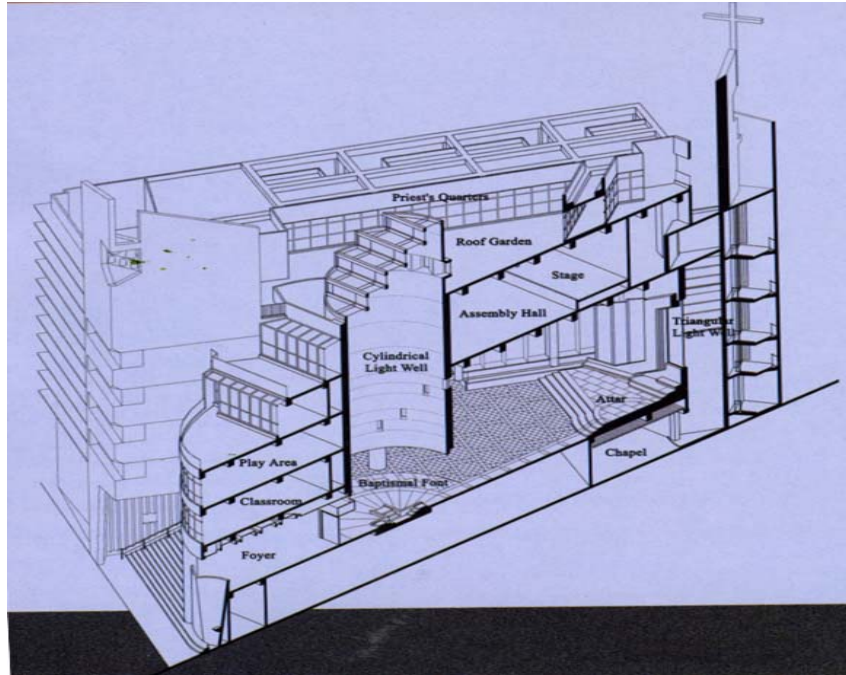Entrance of the St. Thomas the Apostle Catholic Church

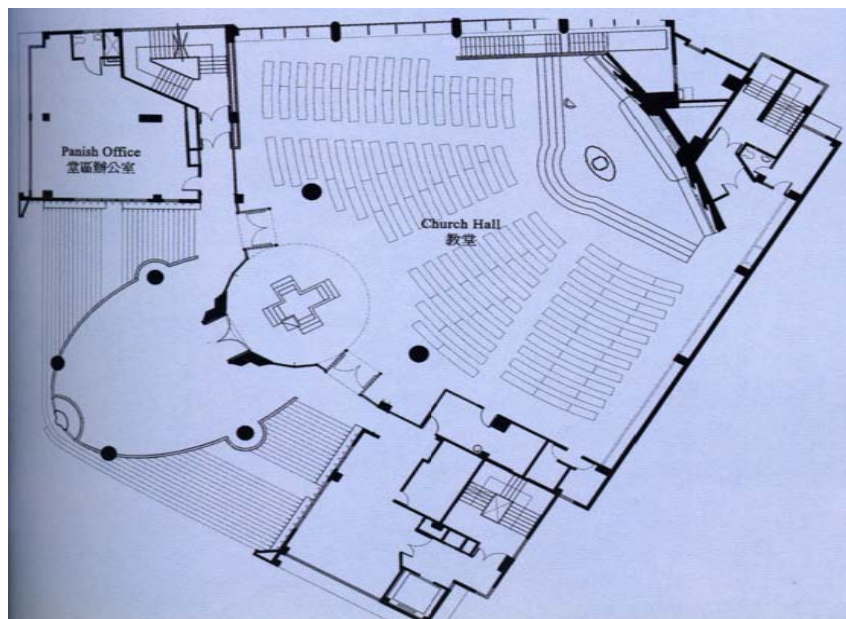Altar of the St. Thomas the Apostle Catholic Church

Appendix II

Layout plan of St. Thomas the Apostle Catholic Church

Layout plan

Floor plan

Appendix III

Photographic illustration – Tsing Yi Garden

Outlook of Tsing Yi Garden

View from ground level

Nearby environment of Tsing Yi Garden

View from higher level

Appendix IV

Landscape of Tsing Yi Garden

Concept plan of Tsing Yi Garden

Landscape of Tsing Yi Garden

Appendix V

Transportation network of Tsing Yi Garden

Source: http://maps.google.com.hk

Appendix VI

Detailed regression result by Eviews

Dependent Variable: LOG(RP)

Method: Least Squares

Date: 03/19/09   Time: 15:28

Sample: 1 1502

Included observations: 1502

White Heteroskedasticity-Consistent Standard Errors & Covariance

LOG(RP)=C(1)+C(2)*AGE+C(3)*(AGE^2)+C(4)*FLOOR+C(5)*(FLOOR^2)+C(6)*GFA+C(7)*CV+C(8)*BV

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.922178	0.039114	-23.57663	0.0000
C(2)	0.007024	0.000519	13.53604	0.0000
C(3)	-2.16E-05	1.86E-06	-11.59532	0.0000
C(4)	0.008177	0.001605	5.093962	0.0000
C(5)	-0.000130	4.62E-05	-2.807437	0.0051
C(6)	0.001476	2.74E-05	53.88363	0.0000
C(7)	0.035586	0.011606	3.066150	0.0022
C(8)	-0.016860	0.006791	-2.482637	0.0132

R-squared	0.709401	Mean dependent var	0.477069
Adjusted R-squared	0.708039	S.D. dependent var	0.220238
S.E. of regression	0.119002	Akaike info criterion	-1.414037
Sum squared resid	21.15733	Schwarz criterion	-1.385730
Log likelihood	1069.942	Hannan-Quinn criter.	-1.403492
F-statistic	521.0147	Durbin-Watson stat	1.826118
Prob(F-statistic)	0.000000		