HOUSING MARKET OF A MEDIUM-SIZE CITY IN CHINA: A CASE OF XIAMEN

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SUMMARY

China has experienced many changes since 1979 when the country embarked on a major economic reform. As one of the largest welfare sectors, housing is the most important part of the economic restructuring process. After twenty years of experience, the welfare housing system has been reformed and a new market-oriented housing system is growing. Along with these developments, a private housing market is now emerging in urban China. To date while most studies focus on the theoretical characteristics of the new housing market in China, little is known about the determinants of the consumers' preference in the emerging private housing market in contemporary China. Using data from a survey in Xiamen, this thesis aims to identify the consumers' preference behavior and to shed light on the housing reform and the formation of the new private housing market in a medium-size city in China. By looking at the consumers' perspective through the use of principal component analysis, the study finds three factors, namely, *"Physical"; "Living Environment"; "Amenities and Financial Benefits"* best represent the image structure of the element of the private housing market in Xiamen, China. By adopting the discrete choice model, the nested logit model is found better than the multinomial logit model to fit the data. The analysis shows that the factors *"Physical"* and *"Amenities and Financial Benefits"* have a stronger relationship with the preference behavior than *"Living Environment"*. Further analysis shows that Education Level is the most significant socioeconomic characteristic which influences respondents' preference. This study may be of interest to the policymakers who can utilize the findings to justify new housing policies at the macro level and better optimize resources. Private developers may also find this study useful in tailoring their private residential projects to suit the preferences of their target consumers. Lastly, the findings in this study are also beneficial for real estate agents such that they would be able to match the housing with different buyers' preferences more effectively.

CHAPTER 1

INTRODUCTION

This chapter gives a brief introduction of the study by addressing the background of the research. This is followed by the main objectives and significance of the study. Finally, the chapter concludes with the organization of this thesis.

1.1 BACKGROUND

In China, rental occupancy, with rents set at exceedingly low levels, was the norm prior to the 1978 housing reform. But the low rent policy proved a heavy financial burden to the State. Urban residents had no incentive to become home owners. People regarded housing as welfare and there was virtually no demand for the development of a private housing market in urban China. Promotion of homeownership has been from the very beginning an integral part of the housing reform. It is seen as a means to solving many of the problems associated with the provision of housing as a welfare item, such as the difficulty in generating adequate housing construction funds. (Li, 2000). The formula of housing resource allocation for local residents has gradually been changed. Banning housing distribution by enterprises and ordering rent and wage adjustment to cash out the in-kind benefit have put the housing system squarely on the road to marketization. The material distribution of housing has been replaced by monetary compensation and many public housing have been privatized. At the same time, the institutionalization of personal mortgage has facilitated this change, allowing

households without substantial savings to buy private housing in the open market. Households will have to put up 20–30 per cent of their income to finance their home purchase, presumably through mortgage loans. Maintenance and repairs have to be handled by individual owners and private firms. In fact, a brand new private housing market, which is to enable housing exchanges and be guided by local housing demand, is emerging in urban China because of housing reform.

Housing, whether in a market economy or a state socialist country, is a necessity that may take up a major share of household expenditure when charged at full cost. Equity in home ownership is often the largest single investment that most households make (Michael and Kwong, 2002). In the case of China, the existence of strong and well-entrenched institutional forces further compounds the situation. In many respects the traditional system of economic and social organization still prevails, although new elements continue to creep in, and the cumulative changes could be fundamental and far reaching. The housing market in China is inherently complex, with market elements intermingling with elements of the traditional redistributive economy. Hence, knowing the preference behavior of the households, their decision-making process and the demand for housing services will not only ascertain the smooth running of the housing market, but will also assist government officials to formulate and implement better housing policies that would improve the overall resource allocation and efficiency.

1.2 OBJECTIVES OF STUDY

The objectives of this research are:

1. To review the housing reform and the emergence of a private housing market in China;

2. To investigate the determinants of consumers' preference in the private housing market in a medium-size city in China;

3. To examine the implications from the findings.

1.3 SCOPE OF STUDY

This study is confined to residents living in the Xiamen city. Using housing reform as a background in the development of the private housing market in China, the study seeks to investigate the residents' preference among the five private housing choices, namely, new commodity housing in new estates (H1), new commodity housing in mature estates (H2), resale commodity housing in mature estates (H3), resale privatized public housing in mature estates (H4) and resale Economic and Comfortable housing in mature estates (H5).

1.4 SIGNIFICANCE OF STUDY

Using data from a survey in Xiamen, this study identifies the major factors that affect the consumers' preference in the newly emerging private housing market in contemporary China. By doing this, it attempts to shed light on the housing reform and the formation of the new private housing market in a medium-size city in China. This will ultimately aid in the better development of future housing markets in China as part of its quest to reform its housing sector.

With increasing aspirations of the population, it is inevitable that higher expectations will be set for private housing. Hence, this study may be of interest to the policymakers who can utilize the findings to justify new housing policies at the macro level and better optimize resources. Private developers may also find this study useful in tailoring their private residential projects to suit the preferences of their target consumers. Lastly, the findings in this study are also beneficial for real estate agents such that they would be able to match the housing with different buyers' preferences more effectively.

1.5 ORGANISATION OF STUDY

There are a total of seven chapters in this thesis. **Chapter 1** presents an introduction to the research study, the objectives, the scope of study, the significance of study and the organization structure of this thesis.

Chapter 2 is devoted entirely to a literature review of milestone works that have been completed on the housing markets both in China and in other countries. Past works on housing attributes are also reviewed.

Chapter 3 gives the details of the housing reform in China and the newly emerging private housing market in this country. It also focuses on background knowledge of the study area - Xiamen city, its housing market and the details of the five private housing choices.

Chapter 4 maps out the research strategy of this study, followed by a description of the research design and research method. In particular, various issues on survey and design of questionnaire are highlighted. Lastly, the concepts of the data analysis techniques are also addressed in detail.

Chapter 5 presents the analysis of data, interpretation, discussion and development of result findings.

Finally, **Chapter 6** summarizes the main findings of this research study and discusses the implications of the findings. It also covers the limitations to the research and offers recommendations for future research areas.

1.6 SUMMARY

This chapter has presented the background to the research problem of this study. In addition, it has also covered the objectives of the study and organization of this study. The next chapter will be the literature review of this study.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Housing markets differ from other markets, such as the financial markets in some important ways. They are relatively more illiquid, heterogenous and physical. Because of these particular characteristics, many studies have been done on housing markets. This chapter will first give a brief review of this literature in China. This is followed by a review of those studies in other countries. It will end with the identification of housing attributes affecting private homebuyers' decisions.

2.2 HOUSING MARKETS IN CHINA

In China, most studies focus on the theoretical characteristics of the new housing market, such as the transition of housing systems from centrally planned to market-oriented economic system. A few of the studies investigate the nature of this new market and the continuous influence of the state on the market operation. For example, Zhou and Logan (1996) analyze the housing reform process and its consequences from the standpoint of housing and real estate development in urban centers. They point out that market reform in China has affected inequalities in access to housing. Zhang (2001) examines the relationship between state and market and the changing roles of the state and market in the housing reform process. He uses the concepts of the model of demand and the model of powers to explain the interaction of

the state and market in the process of China's urban housing reform. He also argues that State actions can improve the working of the market as well as distort the market. The incentives and feedback of the market can help the State work more effectively, but the growth of the market also deconstructs the State further. When the market grows and gainers in the market form political forces that make reform move towards the market, the role of the State moves towards that of enabling, facilitating and steering.

Some researches examine the stages of housing reforms in China. Wang and Murie (1996) provide a review of housing reforms and a systematic account of the key features of the commercialisation process. They also focus on the attempts to privatise public-sector housing in urban areas in the context of the major characteristics and problems of the urban housing system, the development of reform policies and legislation and current reform practice. For more information about the housing reform in China, see Chan (1999), Zhang (1997) and Zhong and Hays (1996).

Others discuss the new legal framework and its implications on housing development (Zhu, 2002; Zhang, 2000). For example, Zhang (2000) discusses housing reform and its impact on the governance of housing in China. He points out that the roles of the State and work units have been shifted from providers to enablers in the market of housing supply after the introduction of privatization and the market mechanism. However, the role of work units in housing distribution remains almost intact. The

scope of work units' influence is more extensive than before the reform. The involvement of work units as mediators in the housing market affects the performance of the market and contributes to the fluctuations and uncertainty of the market. In order to tackle the new problems arising from reform, the role of work units needs to be redefined.

There are also studies on the housing choices in the new housing market (Fu, Tse and Zhou, 2000; Li, 2000; Michael and Kwong, 2002). Fu, Tse and Zhou (2000) show that the intention to buy commodity housing by Chinese urban workers is sensitive to various incentives, namely, housing mismatch, liquidity constraints, risk attitudes, access to publicly subsidized housing and commodity housing prices. Their probit estimates indicate that the access to publicly subsidized housing is at least as important as the affordability of commodity housing in discouraging private home ownership. Michael and Kwong (2002) attempt to identify the major determinants, household demographics and work unit characteristics, in tenure choice decision. Their case study on Guangzhou provides insights into decisions of the household in Mainland China on choosing the utility-maximizing tenure mode. The results indicate that the market allocation mechanism introduced by the housing reforms has not yet replaced the entrenched influence from work units on home ownership behavior.

Another category of studies is those that investigate the regional variations in property investment and development in China. For example, Han (1998) examines the regional

dimension of property investment and development in China as well as the factors that shape the regional patterns. His results show a sharp difference between the coastal and the non-coastal regions in total volume of property transactions, but no significant variations between the same two regions in property development in the State-dominated sector. International capital, particularly investment from Hong Kong, Macau and Taiwan, is the major factor that boosts an active property market along the coast. State-owned and collectively-owned enterprises are the major players that contribute to maintaining a regional balance in China's property development.

While these explorations contribute to understanding the formation of the housing market, little is known about the determinants of the consumers' preference in the emerging private housing market in contemporary China. Research done in this category will further aid in the reform process of the housing market in China.

2.3 HOUSING MARKETS IN OTHER COUNTRIES

In other countries, previous studies have looked at the different sections of the housing markets, such as dynamics, segmentation, modeling, development, policy, demography and housing choices.

2.3.1 HOUSING MARKET DYNAMICS

Most of the literature on dynamics and equilibrium study the housing markets in the U.S.A. For example, Muth (1988) considers the dynamic behavior of housing markets

and Dipasquale and Wheaton (1994) refine the aggregate behavior of the housing market and forecast the future single family house prices. In more recent years, Riddel (1999) investigates the relative influence of speculative and economic demand on median house price on the Santa Barbara South Coast in the U.S.A. The result reveals a speculative bubble in the housing market forming in late 1987 and collapsing in mid-1990.

2.3.2 HOUSING MARKET SEGMENTATION

As housing markets are heterogenous, some researchers try to examine the issue of housing market segmentation. Richardson and Thalheimer (1982) employ four different statistical techniques (geographic, AID, cluster and discriminant analysis) to define homogeneous groupings of houses within an urban area; Abraham, Goetzmann and Wachter (1994) use clustering techniques to identify structural relationships within the U.S.A. housing markets and develop a bootstrapping procedure to test whether associations between cities are significant.

In the U.K, Stevenson (1999) examines regional housing markets over the period 1983–1995 and the national market on a long term basis and one year later, he reexamines the relationship between inflation and residential property over a 30-year period.

More recently, Goodman and Thibodeau (1998) examine housing market segmentation

within metropolitan Dallas using hierarchical models and single-family property transactions from the first quarter of 1995 to the first quarter of 1997. The preliminary results suggest that hierarchical models provide a useful framework for delineating housing submarket boundaries and that the metropolitan Dallas housing market is segmented by the quality of public education. In 2003, they again examine whether delineating submarkets in the manner proposed by them improve hedonic estimates of property value. The empirical results indicate spatial disaggregation yields significant gains in hedonic prediction accuracy.

2.3.3 HOUSING MARKETS MODELING

To better understand the housing markets, a lot of literature has focused on the modeling of housing markets. For example, Batty (1973) sets out a simple probability model for explaining locational patterns and trip-making in urban housing markets in the U.K. A more flexible approach, based on certain classical considerations involving rents, travel costs, and incomes are introduced and a model of the housing market is formulated using a probability-maximizing method; Courtney (1974) split the U.S.A. housing market into two parts, an allocation subsystem which distributes housing to households and a construction subsystem which distributes resources to construction in various sub-markets. The allocation subsystem is modelled using transportation techniques and the dual variables are used as the interface between the allocation subsystem and the construction subsystem.

While most researchers study the housing markets in one country, J. Muellbauer (1994) interprets econometric models of house prices in two countries, the UK and Germany, to throw light on housing market fluctuations. Given the role of housing wealth in helping to drive consumer expenditure and the balance of payments, his analysis helps to explain some of the differences in macroeconomic behaviour between the UK and Germany. In the same year, Salo (1994) analyses the Finnish housing market by estimating two models. The first is a conventional demand model with slow adjustment, and the other is a simultaneous model of supply and demand. It is shown that the tightening of rent control makes households shift from being renters to owner occupation, thus increasing the aggregate demand for owner occupied housing.

Two years later, Montgomery (1996) sets up a model of the U.S.A. housing market built on foundations set in earlier structural models of the markets while Capozza and Seguin (1996) study expectations of capital appreciation in the U.S.A. housing market. Pain and Westaway (1997) develop a new approach to the modelling of house prices in the UK, with housing demand being conditioned directly on consumers' expenditure rather than the determinants of expenditure. House prices are assumed to adjust so as to clear the housing market and the proposed model is found to have structurally stable parameters across the housing market downturn since 1990. Statistical comparisons with the more conventional models at Her Majesty's Treasury and the Bank of England during the early 1990s provide additional evidence in favour of their proposed approach.

In more recent years, Kenny (1999) uses cointegration analysis to separately identify both the demand and supply of the Irish housing market. His analysis suggests that in the long-run the demand side of the market can be modelled using a stable relationship between house prices, the housing stock, income and mortgage interest rates. To model the supply side of the market, he tests the data for the existence of a stable ratio of house prices to construction costs including land costs which is consistent with 'normal profits' in the house building sector. Interestingly, the results suggest significant constraints on the supply side of the market and the potential for house prices to overshoot their long-run equilibrium level following a sudden increase in housing demand.

2.3.4 HOUSING MARKET DEVELOPMENT

Most of the literature on the housing market development are carried out in immature market, such as Alexeev (1988) who provides evidence that in the later part of the Soviet era market forces are already beginning to replace administrative rationing in allocating scarce housing resources in Russia; Guzanova (1997) finds that in the Russian experience, privatization of housing has resulted in disparate effects on various population groups and Daniell and Struyk (1997) provide early evidence on the development of housing markets in Russia. Their work emphasizes early policy reforms, including fundamental legal reforms, and assesses whether those reforms are effective in developing a market orientation in the housing sector. Lastly, Anderson (2001) studies the emerging housing market in Moldova, a former Soviet republic. He

finds that although Moldova is taking a rather slow approach to economic transition in general, with the economy in a continued decline with GDP per capita falling, the housing market rationality in Moldova is based on market forces.

2.3.5 HOUSING MARKET POLICY

With large transactions costs and costly information, housing is not affordable to everyone. Government in each country always sets different policies to regulate the housing market according to their actual situation. Many have been done on studying the effect of policy on the housing markets. For example, Wolfe (1967) designs a model to predict the effects of public programs (zoning restrictions, code enforcement, taxation, subsidies, renewal and improvement projects) on the quality, quantity and location of city housing in the U.S.A. and Anas and Cho (1988) present the design and preliminary implementation of a dynamic policy oriented model of the regulated housing market in Sweden.

Other similar studies are by Phang and Wong (1997) and Lum (2002). The former finds that factors that typically determine private housing market activity in other countries appear to have played a far less significant role compared to public housing policy changes in Singapore. Lum (2002) studies the public policy and private gain of the residential market in Singapore. She points out that there is a relatively small private sector while almost 86% of Singaporeans live in public housing. The Government owns more than 80% of the land in Singapore, including land destined for

private development.

More recently, Lundborg and Skedinger (1999) incorporate transaction taxes in the Swedish housing market search model with endogeneous house prices and show that these taxes unambiguously create lock-in effects that reduce welfare.

Another related literature is Mansur *et al* (2002), who use a general equilibrium simulation model to assess the potential impacts on homelessness of various housing-market policy interventions in the U.S.A. The results suggest that a very large fraction of homelessness can be eliminated through increased reliance upon well-known housing subsidy policies.

2.3.6 DEMOGRAPHY

Most of the studies on this topic look at the housing markets in the U.S.A. These include Mankiw and Weil (1989), who examine the impact of major demographic changes on the housing market in the U.S.A. They argue that the arrival of the Baby Boom generation at adulthood drove up prices during the 1970s. When the beginnings of the Baby Bust generation matured in the 1980s, prices softened. When this generation arrives in earnest, prices will collapse. And two years later, Hamilton (1991) re-examines the house prices and the Baby Boom generation in different period. In the same year Holland (1991) finds that the growth of housing demand resulting from the Baby Boom appears to be the major factor behind increased real residential investment,

but not the major factor behind increased real housing prices in the postwar U.S.A.

In more recent years, Engelhardt and Mayer (1998) examine the effects of intergenerational transfers on saving behavior in the U.S.A. by analyzing transfers targeted to first-time home purchases. They find that transfer recipients increase the value of the home purchased, but by an amount that is much lower than possible if the transfer were fully leveraged. In addition, transfers appear to help households achieve certain down payment thresholds that give favorable mortgage terms.

On the other hand, Ohtake and Shintani (1996) analyze the housing price determination mechanisms in the Japanese housing market using the housing demand index of demographic factors. They find high price elasticity for long-run housing supply contrary to the studies done in the U.S.A. They conclude that the effect of the demographics on housing prices in Japan appears through a short-run adjustment process.

2.3.7 HOUSING CHOICES

Numerous empirical studies have been done on examining individuals' housing choices in the housing market. By doing so, researchers seek to better estimate the demand for housing. For example, Benjamin and Paaswell (1977) present a methodology to analyze the stated needs and preferences of residents of new rental housing in the U.S.A. Their model makes use of multi-dimensional scaling techniques

to assist in the analysis of detailed questions on housing attributes and overall rankings of the housing choices themselves. They find that major dimensions of choice are determined to be size, value and luxury. Interior space attributes are considered more important than location and accessibility to activities.

Quigley (1985) presents an empirical analysis of housing choice in the U.S.A. housing market based on individual households and dwellings which also estimates the degree of independence of neighborhood and dwelling characteristics. His empirical results suggest that the independence assumption may be inappropriate and also that housing choice may be more sensitive to variations in workplace accessibility than is indicated by the more restricted model of household choice. And Dibb and Wensley (1988) suggest that primary issues, such as property size and location, are more significant in determining purchase behaviour than secondary ones, such as double glazing, fitted bedroom furniture or a security system.

While most studies use either cross-sections or time-series data for analyzing housing choices, Borsch-Supan (1990) estimates a longitudinal discrete choice model of the choice of housing tenure and size using five linked cross-sections of the Panel Survey of Income Dynamics, 1977 to 1981 in the U.S.A. The conditional fixed effects multinomial logit model is employed in order to account for time-invariant heterogeneity across households. He finds that price and income elasticities appear substantially overestimated in cross-sectional analysis as opposed to time-series and

panel data analysis. He also finds that life-age effects are confounded by calendar-time specific effects and therefore may yield implausible results in cross-sectional analysis. In general, the influence of demographic variables appears to be understated in cross-sectional estimation.

Kamara (1994) uses a simultaneous system of three equations to model housing choices for female-headed households in the U.S.A. The system includes housing demand, the probability of owning and the probability of marriage. Also, a wealth gap variable related to the downpayment constraint is measured and included in the tenure choice estimation. He finds that the probability of owning is lower for female households anticipating marriage; the wealth gap significantly affects the homeownership decision for all households and wealth constrained female-headed households are significantly more responsive to changes in the relative price of owning.

Earnhart (2002) uses stated preference and revealed preference data, separately and jointly to examine individuals' housing choices in the U.S.A. He finds that actual and hypothetical housing purchases are similar decision processes with respect to some attributes, such as the number of bedrooms per person, yet are dissimilar with respect to other attributes, such as lot size (acres per person).

In the same year in the Netherlands, Mulder and Hooimeijer (2002) try to unravel both

the cause of the changing pattern of home-leaving between successive cohorts and the relation with the housing market entry in successive periods. They find that educational expansion is a major cause of the shift in the mix of motives between cohorts. It accounts for the accelerating pace of home-leaving and affects the type of housing market entry. They also find that union formation is invariably determined by the employment status of the male partner. Leaving home to live alone is less sensitive to the individual income but is clearly stimulated by ample parental resources. And in housing choice, the opportunity structure provides an extra explanation. The wider access to independent rental accommodation, for instance, reduces the pent-up demand for shared accommodation that results from the educational expansion.

Recently, Boehm and Schlottmann (2004) treat household decisions regarding homeownership as a dynamic process rather than a static phenomenon. They employ a duration model of the sequential housing choices made by families to examine the adjustment of their housing tenure over time in the U.S.A. housing market. Their analysis finds that lower income and minority families achieve homeownership more slowly, they are less likely to maintain this status; and they are less able to move up to "better" units over time.

2.4 HOUSING ATTRIBUTES

Housing differs from many other consumer goods because of its heterogeneous characteristics. These differences add to the complexity of the housing choice

processes. We will identify ten significant housing attributes that influence private homebuyers' decision by literature review. They are grouped into five categories, namely, individual units, external features, living environment, locality and financial considerations. These ten housing attributes will be incorporated into the questionnaire.

2.4.1 INDIVIDUAL UNITS

The category 'Individual Units' refers to features that are specific to the housing unit. In a study by Teo and Kiong (1990), the results show that 33% of new flat occupiers and 32% of resale flat occupiers deem ***Design of Internal Layout*** of units as an important factor in their choice of housing. Continuous improvements made by developers to the design of their apartments have also indicated that internal layout does have an influence on homebuyers' choice.

Evans (1973) discovers that residents prefer to live in areas with a low population density. And Benjamin and Paaswell (1977) find that major dimensions of choice are determined to be size, value and luxury. Interior space attributes are considered more important than location and accessibility to activities. In another article, Rossi (1980) finds hat a prospective buyer selects his dwelling based on space requirements. ***Spaciousness*** in a housing unit has a psychological effect on its residents especially in an urbanised city. As the society becomes more affluent, the residents will also demand a larger living space for more comfort and less congestion.

In research undertaken by Brown (1986), it is found that great emphasis is placed on the peacefulness of site. Thus, housing with ***Picturesque view/Scenery*** will also be favorable for occupiers to escape from their stressful work and enjoy the tranquility of sea or lake.

2.4.2 EXTERNAL FEATURES

Design of External Layout of the project is an important factor that is considered by homebuyers (Chan *et al*, 1998). In the recent movement in private housing trends, it is observed that attempts are made to erect buildings with unique structures as well as aesthetic facades. ***Design of Building Exterior*** of the development is also important to make an impression on the property buyers. It serves as an identity for a product in relation to how it is perceived by the consumer (Betts, 1994).

2.4.3 LIVING ENVIRONMENT

In Rossi's (1980) study, it is discovered that the ***Open Space*** in a development is another factor that is considered by a prospective buyer. And Pollakowski (1982) finds that residents place emphasis on the proximity of their residence to open space.

2.4.4 LOCALITY

Location is the most unique characteristic of a property, as it is impossible for two properties to occupy an identical plot of land at the same time. Even if they do, they will still differ in the floor level and interior layouts. Thus, early studies (Carroll 1952;

Schnore 1957; Getis 1969) propose that proximity to the workplace is a key determinant in the choice of a residential property. Kain (1962) further discovers that individual's purchase separates from proximity to the workplace in direct proportion to their income. Quigley (1985) suggests that housing choice may be more sensitive to variations in workplace accessibility than is indicated by the more restricted model of household choice. In Singapore, proximity to workplace is also found to have a strong influence on the selection of homes (Brown, 1986). And Dibb and Wensley (1988) suggest that primary issues, such as property size and location, are more significant in determining purchase behaviour than secondary ones, such as double glazing, fitted bedroom furniture or a security system. Therefore, the ***Availability of Transport Network to Workplace, Facilities and Amenities*** is an important factor in the choice of residential property.

Brown (1987) finds that in modern housing selection, as the level of income increases, proximity to good schools, shopping, relatives and cost factors decrease in their importance. This implies that the ***Availability of Amenities*** can affect private homebuyers' decision in the housing selection. And they are less important to highly-income buyers.

The majority of residents in Singapore are satisfied with private housing living because of the easy maintenance of a private unit and the ***Availability of Recreational and Entertainment Facilities*** (Teo 1983, 1985; Pollakowski, 1982). Similarly, Sim and Yu

(1991), and Mooney (1985) also observe that amenities and facilities are important selection criteria for private housing.

2.4.5 FINANCIAL CONSIDERATIONS

In terms of cost considerations, Sim and Yu (1991) emphasize that private housing buyers are more concerned with the ***Cost of Ownership (Price)*** and maintenance charges rather than the financial availability. And Case (1974) suggests that a family selects its residential location on the basis of price and cost of using the unit.

2.5 SUMMARY

This chapter gives a brief review of literature on the housing markets both in China and in other countries. It not only helps us with understanding the characteristics of the housing markets in the world, but to better analyze the case in China. As there has been a dearth of research on the consumers' preference behavior in the housing market, especially in the emerging private housing market in contemporary China, this study attempts to fill a gap in this section of literature on housing market. This research will also aid in the reform process of the housing market in China.

Through the review of previous literature, ten housing attributes that make up the residential properties are also identified. They will be adapted to identify the determinants of private homebuyers' decisions within the framework of housing reform in China.

CHAPTER 3

HOUSING REFORM IN CHINA AND AN EMERGING PRIVATE HOUSING MARKET

3.1 INTRODUCTION

This chapter provides the details of the housing reform in China. In doing so, it shows the emerging private housing market in China. Following this, the chapter focuses on background information of the study area - Xiamen city, its housing market and the details of the five private housing in this medium-size city in China.

3.2 HOUSING REFORM IN CHINA

After liberation in 1949, the State moved quickly to nationalize land and to dismantle the system of private housing. As a first step, the Chinese government confiscated all properties that had belonged to former officials of the defeated Guomindang Government, 'anti-communist reactionaries' and foreign capitalists (Zhou and Logan, 1996). By the end of the Culture Revolution, the urban housing stock in China was mostly public. To the government, the high degree of integration between the State and the economy is the practice of state socialism. The State or party power is exercised through its direct control over the economy. It integrates the administrative allocation system with the production system. As far as housing is concern, an ideal model reflects the ideological principle of state socialism. The State takes over virtually all the responsibilities of the production, allocation and management of housing through

work units and local housing departments. The private production and management of housing was virtually removed and the market mechanism ceased to work (Zhang, 2000). Under this housing system, many problems resulted, such as housing shortage, insufficiently equipped facilities, unfair distribution of housing, low rent, poor management and insufficient investment in new housing construction. In 1978, the return of Deng Xiaoping to power in China signaled the reorientation of state policies. From then on, the transition from planned economy to market economy has dominated China's political and economic agenda. The housing sector, as one of the largest welfare sectors, is the most important part of the economic restructuring process (Zhang, 2001). Housing reform in China can be divided into three stages.

3.2.1 FIRST STAGE OF HOUSING REFORM (1979~1988)

The first stage was an experimental stage when changes were carried out in a piecemeal fashion and in a few targeted cities. There were three major experiments during this stage:

The first experiment (1979-1982)

Sale of new houses based on the building costs was the basis of the first experiment. Initially, it was carried out in 1979 in Xian city and Nanning city and the sale price was based on the basic building costs of the total floor space. In 1980, the central government extended the experiment at the national level and the cost of a typical housing unit was the equivalent of about 10-20 years' salary at that time. However, due

to the high selling price compared to the low rent for public housing, as well as the inflexible payment, there was low demand for sale of houses during the first experiment. Thus the first experiment was formally abandoned in 1982.

The second experiment (1982-1985)

The motive of the second experiment was the subsidized sale of newly built housing and existing public housing. In 1983, the State Economic Reform Commission made a proposal to carry out new pilot tests of commercialization for urban housing in the cities of Zhengzhou, Changzhou, Siping and Shashi. Although there was a little improvement from the first one, this sale-orientated experiment terminated in 1985. This was due to the high cost for the local government, and unattractive financial arrangement to sitting tenants. In addition, it was still cheaper to rent a home than to buy one.

The third experiment (1987-1988)

The State Council approved the third experiment in 1987 with a rent reform to promote sales in Yantai city in Shangdong province. Its objective was to gradually commercialize the entire process of housing production, distribution and consumption. In February 1988, the State Council summed up the past experience and issued the "Implementation Plan for a Gradual Housing System Reform in Cities and Towns". This marked the turning-point of housing reform from pilot tests and experiments in selected cities to overall implementation in all urban areas. The overall objective of the

Implementation Plan was to realize housing commercialization according to the principles of socialist planned market economy.

But in the face of rising inflation during late 1988, the Central Government introduced a programme of economic retrenchment. Economic problems in late 1988 were followed by political unrest in 1989. These events slowed down the housing and economic reform programmes in the subsequent years (Wang and Murie, 1996).

3.2.2 SECOND STAGE OF HOUSING REFORM (1991~1997)

By 1991, both the economic and political situation had stabilized. A comprehensive housing reform programme was put forward and the policy to privatize housing stock became one of the most important housing reform policies. This marked the second stage of the housing reform.

The General Office of the State Council issued “Comprehensive Reform of the Urban Housing System” in November 1991 which proposed specific aims for several stages of the reform over a longer period. This time, there was a favoring progress of sales of existing public sector housing. The main reason was that economic reform had brought salary increases for many urban families. In addition, new rent policies had taken away some of the advantage of renting over buying. Finally, the political instability, particularly around 1989, and the changes in Eastern Europe encouraged the public-sector tenants to opt for home-ownership as a way of securing a more stable

future. However, the low sale-price of public housing led the government to suspend the process of approving the housing reform programme at the end of 1993. In July 1994, the Housing Reform Steering Group of the State Council issued “The Decision on Deepening the Urban Housing Reform”. It set the overall strategy based on all previous experiments and local practice, which included a new housing investment, provision, management, distribution, finance and insurance system; a public and private housing saving system and the development of the housing market (Wang and Murie, 1996).

However, the progress of the housing reform was hampered by administrative problems during the implementation period. Prices of land, margins of rent increase and sale prices for public housing had not resulted from the marketplace but had been set by the government. More importantly, the conventional channel - work unit - had not been eliminated. Work unit is the basic unit of social organization in China and has many more functions than a place to undertake one’s work or profession. As defined by Walder (1986), it acts as a center for political education, as a life-course decision maker (i.e., in such matters as granting permission for marriage or divorce) and as an administrative unit for meeting the needs of its employees and their dependents for housing, food, medical care and other material necessities. The origin of work unit could be traced back to the feudal period. At that time, the ruling classes understood that the self-contained, self-monitoring social units helped to maintain social stability. Over dynasties, these basic social units had been maintained by various household

registration systems. Besides maintaining a strict household registration system based on street office, the socialist government has adopted a work-unit system, which represents the State in the management of state-employed laborers. The uniqueness of the socialist work unit is that it has integrated the traditional household registration system with that of the workplace, as part of the industrialization process (Wu, 1996).

After ceasing to build housing themselves, work units began to act as mediators between supplies and consumers by purchasing housing at market prices and reselling to their employees at affordable (discounted) prices. In this way, the role of work units expands to the whole housing market (Zhang, 2001). Since the corporate purchasing power of work units is much greater than individuals, the full scale involvement of work units in the housing market led to the rocketing of housing prices, which made most people unable to afford housing on their own. This also increased the vacancy of the newly-built housing. In addition, the traditional low-wage system did not include the housing expenditure. The mismatched development of a mortgage finance system was unfavorable for personal mortgage finance services. All these hampered the development of a private housing market at the second stage of housing reform.

3.2.3 THIRD STAGE OF HOUSING REFORM (1998~PRESENT)

Having noted the problems in the second stage of the housing reform, the government moved toward the third stage. It aimed to establish a system in which the production, distribution, exchange and consumption of urban housing are driven by the market

(Zhong and Hays, 1996). In July 1998, the State Council published "A circular on Further Urban Housing System Reform and Speed up Housing Development", which ended the welfare allocation of urban housing in China. This "capitalization of housing subsidies" policy aimed to establish a new system so that housing consumption is no longer a burden to the State or work units. Under the new system, urban residents are given a cash allowance to partially cover their housing costs. They can use the allowance to buy their dwelling in the private housing market according to their own needs and economic capability. Zang (1999) points out the major features of this stage of housing reform. First, the State employees must use their income and provident funds together with bank loans to purchase flats. More critically, these changes rationalize the housing allocation process and remove the direct control over the housing distribution system by the work units. The latest stage of housing reform brings free market elements to the housing sector in urban China, therefore housing needs of the work units' employees are met by the market allocation mechanism. This new housing system, which is integrated into the economic development policy, will bring fundamental changes to the structure and operation of the housing market in urban China (Michael and Kwong, 2002).

At the third stage of housing reform, the majority of households aspire to become owner-occupiers. But these aspirations can't be realized overnight. The main problem is affordability. Even in countries with much lower affordability ratios than China, consumers routinely need financial help to purchase homes. In China, the affordability

gap is particularly wide and the state of financial instruments is relatively primitive. So far, two main financing programmes have been used to promote home ownership: Housing Provident Fund and a nascent personal mortgage industry. There may be other attractive options as the country's financial system develops further.

Housing Provident Fund (HPF)

Housing Provident Fund (HPF) is the first programme introduced as a major financial step to tackle the affordability issue, and is now the most widely used home-financing method in China. Shanghai became the first major Chinese city to establish an HPF in 1991, and other large cities soon followed suit. It is now found in more than 100 cities throughout China, and has accumulated more than 40 billion yuan ($4.8 billion) in funds (Rosen and Ross, 2000). HPF relies on mandated contributions from employers and employees - typically, each contributes 5 per cent of the employee's salary to an earmarked bank account. It could only be used for housing purchase, self-building, rebuilding and major repairs during employment. And it could be withdrawn when employees retire.

Personal mortgage

The second major home financing effort is to develop better personal mortgages. In April 1997, the People's Bank of China (China's central bank) issued the "Mortgage Lending Trial Management Measures". This document clearly stipulates that in addition to providing mortgage facility to sitting tenants for the purchase of public

housing, mortgage loans should also be extended to individuals who want to buy housing in the open market. It is a great leap forward in housing reform since China' s public banking system has never treated individuals as customers. One year later, in May 1998, the central bank made a supplementary announcement, and further relaxed the restrictions on mortgage lending. Now all commercial banks can offer mortgages with up to 20-year repayment periods and 20−30 per cent down-payments to potential homebuyers. A few specialized mortgage institutions are also cropping up, including small housing banks and joint ventures between banks and developers to provide consumers with better financing terms tied to specific housing projects (Rosen and Ross, 2000).

3.3 AN EMERGING PRIVATE HOUSING MARKET

Market elements have been introduced on a gradual and incremental basis during the housing reform in China. The next phase is to press for the creation of a private housing market. Now the development companies have taken over the construction of residential structures, and the housing bureau has been assigned a much larger role in the management, provision and allocation of public or welfare housing. In addition, an increasingly large number of dwellings built by the development companies are sold directly to the individual households according to market principles, and the Chinese policy makers have also been considering gradual relaxation of resale restrictions so that the bulk of the existing housing stock can re-enter the market and be digested after a certain period of time (Xie, 1998). To facilitate the exchange of housing, enhance

consumption efficiency and help develop the market to gain maturity, a secondary market for public flats and commodity housing has been established from 1998 in many cities. For example, in 1998, in co-operation with a number of private interests, the School for Real Estate at the Eastern China Normal University in Shanghai first set up a real estate exchange agency (Shangfangchiwan), which has established more than one hundred real estate exchange and information centers. A team of specially trained redundant female factory workers were posted in different exchange centers to provide on-the-spot computerized real estate information to local residents who wished to be relocated to a particular district. These 'Auntie Housing' teams must reside in that particular district and possess personal knowledge of all houses and residents within the area (Lee, 2000). With a few years' experiment and development, now a private housing market, albeit in an embryonic stage, may be said to be emerging in urban China today. Three different types or sectors of private housing may be identified in this emerging market, according to the original nature of the housing.

3.3.1 CATEGORY 1 - COMMODITY HOUSING TRADED OPENLY BOTH IN THE PRIMARY AND SECONDARY MARKET

The term commodity housing has a plethora of meanings in the Chinese language literature. But in this paper we may restrict ourselves only to those dwellings that are constructed for sale by the development companies and we call them commodity housing. The rise of development companies can be tracked back to the so-called comprehensive development, which is the kind of unified development organized by

the city government. Recognizing the problems of project-specific development, the State Council has initiated a reorganization of urban development. The city government now organizes land acquisition and then gives or leases the land to development companies for leveling or providing infrastructure. Following this, the serviced land is transferred to users. After land reform, the method of transferring land has undergone changes. Payment must be made to the municipality in order to obtain the use right. There are three ways of land leasing: through bargain, tender or public auction. The original purpose of comprehensive development was to avoid self-contained land development and to encourage various work-units to share common facilities. Comprehensive development stands for a kind of development organization under the charge of the municipality. The development was not necessarily associated with market mechanisms. Nevertheless, along with setting up the land-leasing system, comprehensive development has been gradually evolving towards market-oriented development. In the past, there were only a few real estate companies that acted as agencies of the municipality. Now, gradually, more companies have been set up and they are unconnected with the city government. The municipality also begin to charge a land premium on these companies and requires them to provide community facilities as planning gain (Wu, 1996).

The introduction of development companies operating with commercial principles implies, to a significant extent, that housing provision in China has been commodified. This is because the housing units these development companies build are sold as

commodities in the strictest sense. As pointed out above, a major development in the system of housing production took place in the late 1980s. Development companies operating under market principles had since been set up to build housing units for sale at full market price, at first to the individual work units and the housing bureau, and lately to any individual households at market prices. People without access to publicly sponsored housing began to make up a growing percentage of buyers. According to China Real Estate Information published by the Ministry of Construction, sales to individual households in the first 11 months of 1997 accounted for 58.7 per cent of the total sales, or 27.7 percentage points over the same period in the previous year (April 1998 issue, p. 11). In many cases housing is even bought as an investment.

3.3.2 CATEGORY 2 - RESALE PRIVATIZED PUBLIC HOUSING IN THE SECONDARY MARKET

Housing reform in China is basically targeted to pubic housing. 'Public housing' in the Chinese language literature usually includes not only housing provided directly by the State (through the local government) but also housing provided indirectly through the various state-owned work units. The latter is a form of public housing in that the work units concerned are state-owned and thus constitute an integral part of the State, and that prices and rents of such housing units are tightly regulated by the State. Attempts have been made since the early reform period to reform the housing provision system, which was widely conceived to be a burden to the State (Wang and Murie, 1996; Wu, 1996). Under the privatization scheme, most of the urban sitting tenants have bought

public housing units at discounted price. The resale of privatized public housing was first experimented with in Shanghai in 1996. In 1998 and 1999, 10,155 units and 19,771 were resold respectively (Shanghai Statistical Yearbook, 1998, 1999 and China News Agency, 2000). In 2000, more than 60% of privatized public housing in China was allowed to be resold. The proportion will continue to grow and will lead to a complete opening-up of the resale market for privatized public housing (China News Agency, 2000). The opening-up of the privatized public housing resale market will certainly impact the prospects of the commodity housing market. Those who feel that commodity housing is too expensive will find that the purchase of old public housing at low prices is a welcome alternative (Zhang, 2001).

3.3.3 CATEGORY 3 - RESALE ECONOMIC AND COMFORTABLE HOUSING IN THE SECONDARY MARKET

Ending welfare allocation of housing apparently pertains only to the work unit sector. The local government, i.e. the housing bureau, will continue to provide subsidized housing. However, there appears to be a change in emphasis. To date, homeownership is the only preferred mode, regardless of the target population. Even the 'Economic and Comfortable housing', which is aimed at the low-income groups, is mainly for sale and not for rent. The Economic and Comfortable Housing Programme is the most influential quasi-market housing development. The scheme requires the State to play an enabling role and work units a supportive role. It planned to build 150 million square meters of housing within five years beginning from 1995 to 2000. Local

authorities are responsible for 60% of funding and the State contributes 40% in the form of loans and as well as land supply and tax relief. The government requires that all planning, design and construction work of the comfortable housing scheme is put to tender. Local authorities' own subsidiary companies need to compete with other developers. It should be non-profit and be sold to low or middle income households at cost prices. Priorities are given to homeless households and those with hardship. The components of housing cost include land acquisition, relocation, design, neighborhood infrastructure fees, management fee, loan interest and tax. The cost of relevant urban facilities is subsidized by local authorities. Individual housing purchasers can apply for mortgage loans up to 60% of the housing price with a repayment period of no longer than 10 years (State Council Housing Reform Leading Group, 1995). There are restrictions or penalties on resale and it is a form of quasi-ownership likely to inhibit mobility and exchange. However, since 1998, the government has been considering gradual relaxation of resale restrictions so that the bulk of the 'Economic and Comfortable' housing can re-enter the market after a certain period of time (Xie, 1998). It is obvious that this more flexible arrangement will enhance consumption efficiency and will help develop the private housing market, especially the secondary market. An efficient secondary market could improve liquidity to home owner equity, which will in turn stimulate the investment motive in the demand for housing.

3.4 THE STUDY AREA: XIAMEN CITY

This section introduces background knowledge of the study area - Xiamen city, its

housing market and the details of the five private housing choices in this medium-size city in China.

3.4.1 INFORMATION ON XIAMEN CITY

Xiamen (also called Amoy) is a famous seaside city situated on the southeast coast of China. It lies at 118°04' 04" east longitude and 24°26' 46" north latitude and facing Xiamen across the Taiwan Strait are Taiwan Island and the Penghu Islands.

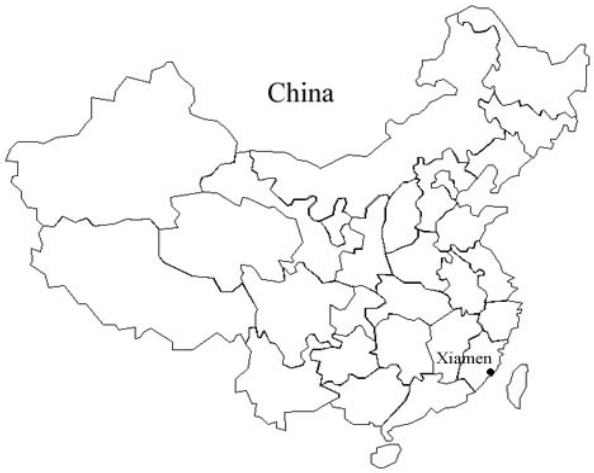


Figure 3.1 Location of the Xiamen City

The city comprises Xiamen Island, Gulangyu (Gulang Islet) and the coastal part of north Jiulong River. It has six administrative districts, consisting of Siming, Huli, Jimei, Haicang, Tong'an and Xiang'an with a land area of more than 1565.09 square kilometers and a sea area of 300 square kilometers. The island which is the downtown area (including Siming and Huli district) covers 133 square kilometers, with a length of 13.7 kilometers from south to north and a width of 12.5 kilometers from east to west.

Figure 3.2 Map of the Xiamen City

As one of the first four special economic zones (S.E.Z.) in China, Xiamen special economic zone was approved by the State Department in October, 1980. A year later, Huli Industrial Area for Export Processing was initiated in a 2.5-sq. kilometer land in the northwest corner of Xiamen and the the special economic area was further expanded to the whole island in March, 1984. In April, 1988, Xiamen was empowered with both provincial-level authorities in economic administration and local legislative power. It is the second biggest city in Fujian province. It is known as the hometown of overseas Chinese and Taiwanese compatriot as well as a major port for their entrance and exit. Historically, it has been an important trading port on the southeastern coast of China. The language predominantly spoken in Xiamen is South Fujian Dialect and by the end of 2002, it had a population of 1.37 million (*Source: Xiamen Statistical Bureau*).

Since Xiamen was designated as a special economic zone (S.E.Z.) in 1981, the city has completed establishing the basic framework of market economy and is relatively advanced in terms of market maturity. For example, in 2000, its GDP of 50.187 billion

yuan was 28.9 times that GDP of 1980, with an annual average increase of 18.3%. Fixed capital investment of Xiamen added up to RMB 128.9 billion. Xiamen Port handled over 19.6526 million tons of cargo, ranking the sixth in China in container transport. Xiamen International Airport has become one of the major aviation hubs in East China, with 22 airline companies manipulating 76 routes to and from major cities at home and abroad including Singapore, Penang, Kuala Lumpur, Manila, Jakarta, Osaka, Nagoya and Bangkok. There are more than 380 outgoing flights each week from the airport (*Source: Xiamen Statistical Bureau*).

3.4.2 HOUSING MARKET IN XIAMEN

While many cities are still struggling with housing reform and social security network for its labor force, Xiamen has been a vanguard in following market economy practices in these two areas. From 1990 to 2001, a total residential floor area of 12.39 million m^2 was built. There were 495 development companies in Xiamen by the end of 2001 and its per capita living space was 18.47 m^2, 5.37 m^2 more than that of Shanghai's, which is the largest city in China *(Source: Xiamen Statistical Bureau and Shanghai Statistical Yearbook).*

A diversified investment pattern, together with the gradually mature real estate industries as well as rapid economic growth, contributed to the parallel development in housing market (Table 4.1). There were 47.374 billion RMB Yuan invested in real estate from 1997 to 2003. Annual investment rose from 6.779 billion RMB Yuan to

7.927 billion RMB Yuan. The proportion of investment in real estate to total fixed asset investment also mounted to 32.41%. The sold area of commodity housing jumped from 1.239 million m^2 in 1997 to 2.498 million m^2 in 2000, and then increased steadily to 2.659 million m^2 in 2003, with a 35.76% average growth per year. Further, the ascendant housing sales price index with the descendant housing rental price index signified that the value of houses as a kind of commodity was more and more recognized.

Table 3.1 Housing development in Xiamen from 1997 to 2003

Indicators	1997	1998	1999	2000	2001	2002	2003
Investment in Real Estate (100 million RMB Yuan)	67.79	76.25	69.35	62.12	56.63	62.33	79.27
Sold Area of Commodity Housing (10000 m^2)	123.93	138.02	172.81	249.84	257.39	226.06	265.92
Sales Volume of Commodity Housing (100 million RMB Yuan)	32.95	43.88	53.63	73.72	73.12	69.42	91.95
Vacant Area of Commodity Housing (10000 m^2)	/	/	173.93	167.49	176.13	130.81	112.49
Housing sales price index (last year as the base)	100	100.6	100.5	100.1	102.2	103	102.5
Housing rental price index (last year as the base)	100	102.6	101.1	97.2	91.4	89.6	90.9
Land trading price index (last year as the base)	100	100	100	100	101.1	102.8	104.3

(Source: Xiamen Statistical Bureau and Price yearbook of China)

3.4.3 COMPARISON AMONG THE PRIVATE HOUSING CHOICES

As mentioned before, there are three types of housing in the emerging private housing market in the country after the housing reform. With the development of a private housing market, residents in Xiamen could buy the one that best fits their requirements and budget at full market price among the many housing units available in the market. Five private housing choices could be identified, according to different housing types, whether new or resale and whether in new or mature estates. These are new commodity housing in new estates (H1), new commodity housing in mature estates (H2), resale commodity housing in mature estates (H3), resale privatized public housing in mature estates (H4) and resale Economic and Comfortable housing in mature estates (H5). Table 3.2 provides a comparison of the salient housing attributes among the five private housing choices.

3.5 SUMMARY

Twenty years of housing reform have produced a highly complex policy environment, with market elements gradually penetrating into the planned economy and the well-entrenched system of resource allocation. Housing reform in China is still progressing, and the policy environment remains in a state of flux. People in urban cities of China, with the cash subsidy in hand, will have to access housing in this emerging private housing market. This chapter has highlighted certain salient features of this market. Three types of housing have been identified, namely, commodity housing, resale privatized public housing and resale Economic and Comfortable

housing. The matching of households to the various types of private housing is no longer a complex process. They can buy at full market price among the many housing units available in the market the one that best fits their requirements and budget.

This chapter has also given the background knowledge of the study area - Xiamen city - in detail. Xiamen has long been one of the first four Special Economic Zones in China, and has acted as the pioneer in many of the market-oriented reforms. It was chosen as the study site because it is relatively advanced in terms of market maturity and has one of the most complex mixes of housing types in the country. The experience of Xiamen could have direct relevance to other cities in China. The private housing choices in this city are outlined at the end of this chapter. The next chapter will discuss the research methodology of the study.

Table 3.2 Comparison among the Five Private Housing Choices

Housing Attributes	New commodity housing in new estates [H1] (Eg. Haicang, Jimei)	New commodity housing in mature estates [H2] (Eg. Siming, Huli)	Resale commodity housing in mature estates [H3] (Eg. Siming, Huli)	Resale privatized public housing in mature estates [H4] (Eg. Siming)	Resale Economic and Comfortable housing in mature estates [H5] (Eg. Huli)
Age of Flat	New	New	Usually more than 5 years	Usually more than 10 years	Usually more than 5 years
Age of Estate	Less than 5 years	More than 5 years	More than 5 years	More than 10 years	More than 5 years
Area of Units	All sizes	All sizes	All sizes	Less than 100 sqm	Less than 150 sqm
Housing Types	Multi-storey (1-7 storey, without lifts); Semi-high-rise (8-20 storey, with lifts)	Multi-storey (1-7 storey, without lifts); Semi-high-rise (8-20 storey, with lifts); High-rise (>20 storey, with lifts)	Multi-storey (1-7 storey, without lifts); Semi-high-rise (8-20 storey, with lifts); High-rise (>20 storey, with lifts)	Multi-storey (1-7 storey, without lifts)	Multi-storey (1-7 storey, without lifts); Semi-high-rise (8-20 storey, with lifts)
Structure of housing	Concrete-frame; Brick- and-concrete composite	Concrete-frame; Brick- and-concrete composite	Concrete -frame; Brick- and-concrete composite	Brick- and-concrete composite	Concrete-frame; Brick- and-concrete composite
Amenities	Insufficiently catered e.g. lack of wet markets.	Well-catered with schools, wet markets, retail outlets and eateries.	Well-catered with schools, wet markets, retail outlets and eateries.	Well-catered with schools, wet markets, retail outlets and eateries.	Well-catered with schools, wet markets, retail outlets and eateries; but lack of hospital, sports and entertainment facilities
Public Transport Nodes	Immature network of bus	Mature network of bus.	Mature network of bus.	Mature network of bus.	Mature network of bus.
Average Monthly Property management fees (RMB)	RMB 0.5~1 /m^2	More than RMB 1 /m^2	More than RMB 1 /m^2	Self-management; without professional property management	RMB 0.5~1 /m^2
Average Price (RMB)	RMB 2500 /m^2	RMB 3500 /m^2	RMB 3000m^2	RMB 2750/m^2	RMB 3250/m^2

CHAPTER 4

RESEARCH METHODOLOGY

4.1 INTRODUCTION

This chapter maps out the research strategy and details of the research methods adopted in this study. Lastly, the concepts of the data analysis techniques will be addressed.

4.2 RESEARCH STRATEGY

The research strategy adopted is that of the mixed method design. Tashakkori and Teddlie (1998) defined mixed method as a form of combination of qualitative and quantitative approaches in the methodology of a study. The integration of both qualitative and quantitative methods would complement each other's advantages and minimise inadequacies of each method. Furthermore, this integration would result in more valid findings, unlike monomethod designs. The adoption of a purely qualitative or quantitative method would entail a narrow perspective of the study which is unfavorable. So in this study, the qualitative research was carried out at the initial stage of the research followed by the quantitative phase.

4.3 QUALITATIVE RESEARCH

Qualitative research employs a variety of techniques such as focus groups and in-depth interviews to collect data for usage in the quantitative research phase. According to

Tull and Hawkins (1993), in-depth interviews have been found to produce more and better quality ideas per interviewee relative to focus groups. Walker (1985) stated that a sample size of between 20 to 40 in-depth interviews is necessary. Hence in this study, in-depth interviews were conducted with ten private homeowners, ten renters and ten real estate professionals, such as housing agents, developers and estate officers. The objective is to identify the housing attributes which would influence private homebuyers' decision and to solicit opinions from the interviewees on their preference among the five private housing options. The respondents were asked about housing options in the private housing market. In addition, they were asked what they would consider when choosing a house and which option they prefer among the five private housing.

The results of the qualitative phase showed that excluding the ten housing attributes identified from the previous literature review, there are nine more housing attributes that are also significant in influencing buyers' decision. These nine housing attributes are grouped into four categories, namely, individual units, external features, living environment and financial considerations. They are listed as follows:

1. Individual Units:

Structural Soundness of Housing is the basic requirement for the quality of the property. As changes in consumer preferences have created new demands in the private housing market, there is a need to provide ***Variety of Housing Types*** (e.g.

High-rise or Semi-high rise housing) and ***Variety of Apartment Types*** (e.g. number of bedrooms) to cater to the various demands and living lifestyle. There has also been an increase in properties with high technology services in order to meet the demand of the purchasers. ***E-enabled Apartment*** is the current trend among private developers with features offered including local area network and broadband Internet access.

2. External Features:

Emphasis is also placed on improving the ***Quality of External Works*** to build a better surrounding environment, such as walkways and lamp posts, to make an impression on the property buyers.

3. Living Environment:

More people nowadays hope to improve their standard of living. This can be accomplished through ***Landscaping***, which adds greenery to liven up the dull concrete buildings. There are also several services provided by property management that facilitate buyers to select their ideal properties. ***Quality of Maintenance*** of the property is an important aspect considered by residents to ensure that their properties are well maintained. Another factor to note in this category is the ***Security*** of the private housing. Private housing provides residents with better security as compared to public housing. These features not only protect the residents' interests, they also provide them with additional privacy.

4. Financial Considerations:

A good property is constantly in demand, regardless if it is for lease or sale. This secures homebuyers or investors a ***High Return Investment*** where the property will be able to have good rental opportunities or yield high profit of resale.

From the previous literature review of housing attributes and the results of the qualitative phase, there are all together nineteen housing attributes that are significantly influencing buyers' decision. These significant housing attributes discussed are summarized in Table 4.1.

Table 4.1 List of housing attributes identified

Individual Units	Variety of Housing Types Variety of Apartment Types Structural Soundness of Housing Design of Internal Layout Spaciousness E-enabled Apartment Picturesque view/Scenery
External Features	Design of Building Exterior Design of External Layout Quality of External Works
Living Environment	Open Space Landscaping Quality of Maintenance Security
Locality	Availability of Amenities Availability of Transport Network to Workplace, Facilities and Amenities Availability of Recreational and Entertainment Facilities
Financial Considerations	Cost of Ownership (Price) High Return Investment

Another finding from the qualitative phase was that the interviewees generally prefer new commodity housing in mature estates (H2) as they could enjoy the dual benefits of new housing in good condition and an established network of amenities and public transportation. These useful research findings were adopted in refining the framework for the quantitative research.

4.4 QUANTITATIVE RESEARCH

The aim of quantitative research is to quantify the data obtained from the above qualitative research and generalize the results from the sample to the population of interest. Quantification of data is usually done by way of a structured questionnaire and application of some form of statistical analysis on the data collected. The statistical analyses carried out for this research study are chi-square test, factor analysis and discrete choice (multinomial logit and nested logit) model. In this study, survey is adopted as the research design primarily because it provides a relatively quick and efficient way of assessing information about the population.

4.4.1 SAMPLING

Sampling may be defined as the methods of selection from a population (Tan, 2001). It is a process whereby inferences of the population are made on the basis of information obtained from the sample, and by way of application of some statistical tools. The sampling frame is the actual list of elements from which sampling will take place. It should be as close to the population of interest as possible. For this study, the sampling

frame would be all residents living in Xiamen city.

4.4.2 SAMPLE SIZE

The sample size is determined using a simple statistic that approximates closely to the population parameter.

$$\text{Sample Size (n)} = \frac{K^2 (p) (1-p)}{L^2}$$

where

K = standard error

p = Population proportion

L = allowed error

The calculations using a standard error of 1.96, allowed error of 0.05 and a population proportion of 50%, the required sample size would be 384. However, a sample size of 1000 was proposed in this study, after taking into account several qualitative factors such as the number of variables, the nature of analysis and resource constraints.

4.4.3 SAMPLING TECHNIQUE

A multi-cluster sampling technique was adopted in the selection of sample. The six administrative districts in Xiamen were used as the first level of clustering. Following this, we randomly selected 200 households each in the downtown districts (Siming and

Huli districts) and 150 households each in the rural districts (Jimei, Haicang, Tong'an and Xiang'an districts), making a total sample size of 1,000. The survey was carried out by way of household personal interviews. The interviews were carried out on weekdays and weekends from August to October, 2003.

4.4.4 DEVELOPMENT OF QUESTIONNAIRE

It is critical that the questionnaire is designed to relate to the research objectives. Hence, before the final questionnaire was implemented, a pilot survey was conducted with 20 randomly chosen respondents to improve on the structure and contents of the questionnaire.

In addition to the pilot survey, the sequence of the questions is also important so as not to create bias in buyers' perceptions. Furthermore, the length of the questionnaire should be a comfortable one. Neuman (1997) stated that a short questionnaire of 3 to 4 pages is appropriate for the general population. For this research study, the questionnaire consists of 4 pages, inclusive of the respondent's profile.

4.4.5 DESIGN OF QUESTIONNAIRE

The questionnaire is divided into two sections. The first section is designed to incorporate the various housing attributes that potential homebuyers would consider when purchasing private housing. If the research study was to have external validity, the housing attributes used should be the attributes that the public uses to discriminate

between different private housing options. According to Moore (1988), attribute identification should be carried out with reference to three sources, namely, previous literature, managerial interests and preparatory fieldwork, which includes in-depth interviews. However, since this research is a consumer-based study, only the previous literature and the findings in the qualitative phase were selected to identify the housing attributes used in this study.

The respondent was required to rate each housing attribute of the five private housing options, namely, "new commodity housing in new estates (H1)", "new commodity housing in mature estates (H2)", "resale commodity housing in mature estates (H3) ", "resale privatized public housing in mature estates (H4) " and "resale Economic and Comfortable housing in mature estates (H5) " on a 5-point Likert Scale, where '1' = Very Poor, '3' = Neutral and '5' = Excellent. In addition, households were asked to state their preferences by ranking the five options. A rank of '1' for a particular housing option indicates that it is the most preferred while a rank of '5' indicates that it is the least preferred.

The second section of the questionnaire is devoted to the profile of respondents for the purpose of classification. The respondent's profile was deliberately placed at the last section so as not to discourage respondents at the onset by asking them to disclose their personal information.

4.5 DATA ANALYSIS TECHNIQUES

In this research, three main techniques of data analysis are adopted, namely, chi-square test, factor analysis and discrete choice (multinomial logit and nested logit) model. Factor analysis is carried out prior to the discrete choice model in order to identify the underlying dimensions or factors associated with buyers' perception. These factors will then be utilized in the discrete choice model to determine the significant attributes in affecting buyers' preference among the five private housing options. Chi-square test is conducted to identify the most significant socioeconomic characteristic which affects the preference among the five private housing options.

4.5.1 CHI-SQUARE TEST

This is a bivariate analysis that shows whether a relationship exists between two categorical variables. It could not show the causality. At the 0.05 significance level, a significance value of 0.05 and below will conclude the existence of a relationship between the two variables.

4.5.2 FACTOR ANALYSIS

Factor analysis is often used in data reduction to identify a small number of factors that explain most of the variance observed in a much larger number of variables. In this way, factor analysis can help to solve the problem of multi-collinearity.

Comrey (1992) summarized the following major steps when performing a factor

analysis:

1) selecting the variables;

2) computing the matrix of correlations among the variables;

3) extracting the unrotated factors;

4) rotating the factors;

5) interpreting the rotated factor matrix.

Before factor analysis is performed, it is important to determine the appropriateness of the data set for factor analysis. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's test of sphericity are two measures to test for the presence of correlations among the variables.

The KMO is a measure of sampling adequacy. Higher KMO suggests a higher degree of correlation between the variables of the identified groups. The KMO measure of sampling adequacy is an index which compares the correlation coefficients to the magnitudes of the partial coefficients. It is generated as follows:

$$KMO = \sum_i \sum_j r_{ij}^2 / (\sum_i \sum_j r_{ij}^2 + \sum_j \sum_i a_{ij}^2)$$

where r_{ij} is the simple correlation between variables i and j, and a_{ij} is the partial correlation coefficients between variables i and j. If the sum of squared partial correlation coefficients is small when compared to the sum of squared correlation coefficients, the KMO measure is close to 1. Small values (less than 0.5) for this measure indicate that factor analysis may be inadvisable since correlations between

pairs of variables cannot be explained by other variables. Sharma (1996) suggested that the overall KMO measure should be greater than 0.80. However, a measure above 0.60 is tolerable.

The Bartlett's test of sphericity provides the statistical probability that there are significant correlations among at least some of the variables (Hair *et al.,* 1998). Hence, the lower the determinant, the higher the correlation between two or more variables and thus, the better is the data set for factor analysis. However, Sharma (1996) cautioned that as the Bartlett's test is sensitive to sample size, a large sample size would produce a low Bartlett's test of sphericity determinant even though the correlations among the variables are small. Thus, Bartlett's test of sphericity should not be the sole determinant for the appropriateness of the data set for factor analysis.

It is also important to ensure that the sample size is large enough for factor analysis. Comrey (1992) provided a guide for the sample size to be used, e.g. sample size of 50 as very poor, 500 as very good and 1000 as excellent. Since the sample size for this study is 1000, the results from factor analysis can be said to be reliable.

The latent root criterion (eigenvalues greater than one) has been adopted as the main method for extracting the appropriate number of factors. This criterion is the most reliable when the number of variables is between 20 and 50 (Hair *et al*., 1998). Hence, the latent root criterion is adopted for factor extraction in this research study as 19

variables of housing attributes are included, very close to 20. The rationale behind this technique is that any individual factor should account for the variance of at least a single variable if it is to be retained for interpretation. Therefore, only factors having eigenvalues greater than 1 are considered significant while those with less than 1 will be considered insignificant and disregarded.

After the factors have been extracted, it is advisable to carry out factor rotation. Although unrotated factor solutions achieve the objective of data reduction, factor rotation is needed to achieve a simpler factor structure that offers the most adequate interpretation of the variable. Varimax rotation was chosen over quartimax rotation for this study as each factor represents a distinct construct and no general factor is suspected.

In the interpretation of the rotated factors, only the significant factor loadings should be considered for further analysis. Hair *et al.* (1998) proposed that for a sample size more than 350, a factor loading of 0.30 is considered significant. This criterion was adopted for this research study. The variables with higher loadings are likely to influence the labeling of the factors. However, it should be recognized that these labels are the outcome of subjective interpretation of the researchers. On the other hand, the alpha value indicates the reliability of the attributes to each factor (Cronbach, 1951).

4.5.3 DISCRETE CHOICE (MULTINOMIAL LOGIT AND NESTED LOGIT) MODEL

In this study, the discrete choice model is adopted to estimate the relative importance of the determinants in affecting respondents' preference among private housing options. This is because it is better than other models designed to handle interval scale data of attitude variables (Gautschi, 1981). The respondents are assumed to be faced with a discrete set of choices of private housing types within which they have to make a choice. The model uses the ratings of the housing attributes of the chosen and unchosen private housing type in the choice set. It assumes that the respondents are familiar with the available choice sets and their respective housing attributes.

4.5.3.1 MULTINOMIAL LOGIT (MNL) MODEL

The multinomial logit (MNL) model follows that the ***J*** alternatives are each characterized by a set of ***M*** attributes. X_{jt} respondent "***t***" chooses among the ***J*** alternatives. There is a single parameter vector, β. The model underlying the observed data is assumed to be the following utility function:

$$U(\textit{choices of } j \textit{ for individual } t) = u_{jt} = \beta' x_{jt} + \varepsilon_{jt}, \quad j = 1, \cdots, J$$

The random individual specific terms ($\varepsilon_{1t}, \varepsilon_{2t}, \cdots, \varepsilon_{jt}$) are assumed to be independently distributed, each with an extreme value (Gumbel) distribution.

$$F(\varepsilon_{ij}) = \exp(-\exp(-\varepsilon_{ij}))$$

Under these assumptions, the probability that individual ***t*** chooses alternatives ***j*** is:

$$prob\ [u_{jt} > u_{kt}]\ \ for\ \ all\ \ k \neq j$$

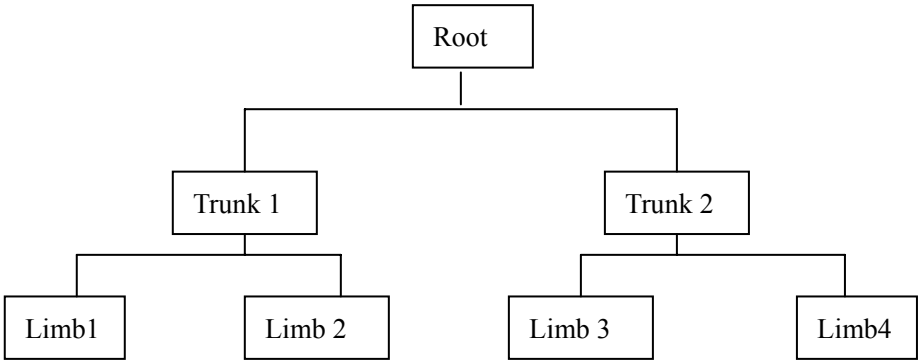
For independent extreme value distributions, this probability is:

$$prob\ [y_t = j] = \frac{\exp(\beta' x_{jt})}{\sum_j \exp(\beta' x_{jt})}$$

where y_t is the index of the choice made. Regardless of the number of choices, there is a single vector of M parameters to be estimated (the attributes that describes each choice, i.e. the arguments that enter the utility functions, in our case, is the same for all choices).

4.5.3.2 NESTED LOGIT (NL) MODEL

The nested logit (NL) model is a less restrictive version of the multinomial logit (MNL) model. It groups similar choices and selectively relaxes the assumption of the independence of irrelevant alternatives (IIA). It is imposed within the nested choices but is relaxed across them. IIA is a consequence of the initial assumption that the stochastic terms in the utility functions are independent. As a result, the IIA assumption imposed equal response elasticities across choices. This means that the introduction of an additional choice will decrease the predicted proportion of the sample that chooses each of the original alternatives in proportion to their size before the introduction (Hoffman and Duncan 1988). One might, however, expect a greater impact on more similar alternatives. Consider a two level model as follows:



Individuals are assumed to choose one of the alternatives (limb) at the lowest level of the tree. Thus, they also choose a trunk. We denote by ***i|k*** the choice of alternatives ***i*** in trunk ***k***. The conditional probability of alternatives ***i*** in trunk ***k*** is :

$$P(i \mid k) = \frac{\exp(\beta' x_{i|k})}{\sum_{n|k} \exp(\beta' x_{n|k})} = \frac{\exp(\beta' x_{i|k})}{\exp(J_k)}$$

Where J_k is the inclusive value for trunk ***k***

$$J_k = \log \sum_{n|k} \exp(\beta' x_{n|k})$$

At the next level up the tree, we define the conditional probability of choosing a particular trunk ***k***

$$P(k) = \frac{\exp(\alpha' y_k + \tau_k J_k)}{\sum_m \exp(\alpha' y_m + \tau_m J_m)}$$

τ_k is the coefficient on the inclusive value J_k.

By the law of probability, the unconditional probability of the observed choice made by an individual is :

$$P(i,k) = P(i \mid k)P(k)$$

This is the contribution of an individual observation to the likelihood function for the sample.

The multinomial logit (MNL) model estimation procedure assumes that the elements of the choice set are independent while the nested logit (NL) model procedure allows the alternatives of the same subsets to share unobserved characteristics. And in theory, estimating a multinomial probit (MNP) model is another methodological option. The multinomial probit (MNP) model is less restrictive than multinomial logit (MNL) model and even less restrictive than the nested logit (NL) model because it completely relaxes the IIA assumption. This model, however, is computationally very intensive and becomes quite difficult to estimate when there are more than four choices. So in our case which has five choices, we only compare the MNL model and the NL model to select which model fits our case better.

In all estimation presented in this study, we apply the full information maximum likelihood (FIML) estimation procedure of the multinomial logit (MNL) model and the nested logit (NL) model offered in Limdep 7.0. For information about these estimations, see Greene (1995), Maddala (1983) and McFadden (1981).

4.6 SUMMARY

This study has adopted a sequential mixed-method design which involves qualitative and quantitative research. This chapter has presented areas relating to research strategy, method and techniques of data analysis. The issues and concepts addressed in this chapter will be applied in the data analysis to be presented in the next chapter.

CHAPTER 5

EMPIRICAL RESULTS

5.1 INTRODUCTION

This chapter summarizes the main findings from the survey. First, it will analyze the respondents' mean perception ratings on the various housing attributes, followed by their rankings of the five private housing options. Factor analysis will be performed to investigate the underlying latent dimensions represented in a set of variables. Subsequently, the discrete choice (multinomial logit and nested logit) model will be adopted to estimate the relative importance of the housing attributes in affecting respondents' preference among the five private housing options. Chi-square tests will be conducted to investigate which socioeconomic characteristics is the most significant in affecting the preference among the five private housing options. Lastly, discrete choice model will be performed again to examine the importance of the factors influencing the preference among private housing options by the most significant socioeconomic characteristic.

5.2 MEAN PERCEPTION RATINGS

Descriptive statistics were used in the tabulation of the mean perception ratings of all the housing attributes for each private housing option. The results are shown in Table 5.1. It shows that new commodity housing in mature estates (H2) recorded the highest mean ratings among the five choices, although it recorded the lowest score for the

attributes “price” implying that new commodity housing in mature estates (H2) involved the highest cost of ownership.

Resale Economic and Comfortable housing in mature estates (H5) and new commodity housing in new estates (H1) recorded the second and third highest score respectively. Their mean ratings for most of the attributes were similar, a little lower than new commodity housing in mature estates. But new commodity housing in new estates (H1) scored the lowest mean ratings among the five choices for the attributes of “Security”, “Availability of Amenities”, “Availability of Transport Network to Workplace, Facilities and Amenities”, “Availability of Recreational and Entertainment Facilities” and “High Return Investment”, which gave it a lower overall mean rating than resale Economic and Comfortable housing in mature estates (H5). It also recorded the highest mean ratings among the five choices for the attributes of “Spaciousness”, “Open Space” and “Price”, which might due to the differences between the new estate and the mature estate.

Resale commodity housing in mature estates (H3) and resale privatized public housing in mature estates (H4) recorded relatively lower ratings. Most attributes of resale privatized public housing in mature estates (H4) recorded the lowest mean ratings among the five choices, although it scored second highest for “Availability of Amenities”, “Availability of Recreational and Entertainment Facilities” and “Price”. It earned the lowest overall mean score rating.

Table 5.1 Mean Perception Ratings of the Five Private Housing Preference

Attributes	Mean Perception Ratings				
	New commodity housing in new estates (H1)	**New commodity housing in mature estates (H2)**	**Resale commodity housing in mature estates (H3)**	**Resale privatized public housing in mature estates (H4)**	**Resale Economic and Comfortable housing in mature estates (H5)**
Variety of Housing Types	3.26	3.71	3.06	2.95	3.33
Variety of Apartment Types	3.32	3.61	3.10	2.92	3.30
Structural Soundness of Housing	3.39	3.69	3.11	2.99	3.30
Design of Internal Layout	3.36	3.57	3.03	2.90	3.23
Spaciousness	3.53	3.51	3.02	2.91	3.25
E-enabled Apartment	3.10	3.71	3.05	2.92	3.23
Picturesque view/Scenery	3.34	3.50	3.01	2.99	3.35
Design of Building Exterior	3.36	3.70	3.02	2.87	3.25
Design of External Layout	3.45	3.52	3.02	2.95	3.32
Quality of External Works	3.21	3.68	3.16	3.10	3.40
Open Space	3.49	3.33	2.97	2.96	3.37
Landscaping	3.39	3.53	3.10	3.08	3.50
Quality of Maintenance	3.13	3.59	3.10	3.00	3.36
Security	3.06	3.65	3.30	3.19	3.39
Availability of Amenities	2.95	3.70	3.46	3.50	3.43
Availability of Transport Network to Workplace, Facilities and Amenities	2.91	3.80	3.60	3.59	3.53
Availability of Recreational and Entertainment Facilities	2.69	3.61	3.36	3.38	3.22
Cost of Ownership (Price)	2.97	2.33	2.69	2.81	2.75
High Return Investment	2.80	3.35	3.25	3.23	3.20
Overall Mean	**3.19**	**3.53**	**3.13**	**3.07**	**3.30**

5.3 RANKING OF THE FIVE PRIVATE HOUSING PREFERENCES

Table 5.2 shows that 56.3% of the households ranked new commodity housing in mature estates (H2) the first, while resale Economic and Comfortable housing in mature estates (H5) and new commodity housing in new estates (H1) were rated first by the second and third largest group of people respectively. These are followed by resale commodity housing in mature estates (H3) and resale privatized public housing in mature estates (H4). This is consistent with the results from Table 5.1 where new commodity housing in mature estates (H2) recorded the highest overall mean rating. Furthermore, results from the table of ranking are reflective of the findings from the qualitative phase where most interviewees preferred new commodity housing in mature estates.

Table 5.2 Ranking of the Five Private Housing Preference

	Rank					**Total**
Private Housing Type	**1**	**2**	**3**	**4**	**5**	
New commodity housing in new estates (H1)	**124**	**201**	**130**	**127**	**418**	**1000**
% within rank	12.40%	20.10%	13.00%	12.70%	41.80%	100.00%
New commodity housing in mature estates (H2)	**563**	**161**	**102**	**88**	**86**	**1000**
% within rank	56.30%	16.10%	10.20%	8.80%	8.60%	100.00%
Resale commodity housing in mature estates (H3)	**79**	**288**	**282**	**240**	**111**	**1000**
% within rank	7.90%	28.80%	28.20%	24.00%	11.10%	100.00%
Resale privatized public housing in mature estates (H4)	**62**	**139**	**264**	**310**	**225**	**1000**
% within rank	6.20%	13.90%	26.40%	31.00%	22.50%	100.00%
Resale Economic and Comfortable housing in mature estates (H5)	**172**	**211**	**222**	**235**	**160**	**1000**
% within rank	17.20%	21.10%	22.20%	23.50%	16.00%	100.00%
Total	**1000**	**1000**	**1000**	**1000**	**1000**	**5000**
% within rank	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

5.4 PREFERENCE AMONG PRIVATE HOUSING OPTIONS ANALYSIS

Using the data relating to the perception ratings and ranking of the five private housing in the choice set, a private housing preference analysis is carried out. Firstly, factor analysis will be performed to investigate the underlying latent dimensions represented in set of variables. Subsequently, the discrete choice (multinomial logit and nested logit) model will be adopted to estimate the relative importance of the housing attributes in affecting respondents' preference among the five private housing options. Chi-square tests will be conducted to investigate which socioeconomic characteristics is the most significant associated with the preference among the five private housing options. Lastly, discrete choice model will be performed again to examine the importance of the factors influencing the preference among private housing options by different Education Level groups.

5.4.1 FACTOR ANALYSIS

The values of the Bartlett's test of sphericity (0.000) and KMO (0.944) in Table 5.3 indicate that the data are appropriate for factor analysis. Factor analysis using varimax rotation yielded 3 housing factors with eigenvalues greater than 1 and these factors account for 55.81% of the variance within the original variables. The three factors are *Physical (F1); Living Environment (F2); Amenities and Financial Benefits (F3).*

"Physical" is strongly associated with attributes, such as "variety of housing and apartment types", "spaciousness", "picturesque view/scenery" and "design of internal

layout". This factor accounts for 38.87 % of the variance.

The factor "*Living Environment"* accounts for 10.55 % of the variance within the original variables. It is linked to variables, such as "quality of external works", "open space", "landscaping", "security" and "quality of maintenance".

"*Amenities and Financial Benefits"* is associated with variables, such as "availability of amenities", "availability of recreational and entertainment facilities", "cost of ownership" and "high return investment". All these variables load highly within this factor which accounts for 6.39 % of the variance within the original set of variables.

Coefficient alpha estimates for the three factors all exceed 0.65, which indicate acceptable reliability of the attributes to each factor (Cronbach, 1951). The factor loadings produced under this section of factor analysis will be adopted in the discrete choice model to be presented in the next section.

Table 5.3 Latent Dimensions of Housing Attributes

Factor	Attributes	Factor Loadings
Factor 1 Physical (F1) Variance: 38.87% Coefficient Alpha: 0.90	Variety of Apartment Types Design of Internal Layout Structural Soundness of Housing Spaciousness Variety of Housing Types E-enabled Apartment Design of Building Exterior Picturesque view/Scenery Design of External Layout Quality of External Works Open Space	0.755 0.748 0.725 0.711 0.679 0.603 0.556 0.536 0.477* 0.377* 0.311*
Factor 2 Living Environment (F2) Variance: 10.55% Coefficient Alpha: 0.88	Landscaping Open Space Quality of Maintenance Design of External Layout Security Quality of External Works Design of Building Exterior Picturesque view/Scenery	0.753 0.731 0.669 0.594 0.588 0.534 0.491* 0.434*
Factor 3 Amenities and Financial Benefits (F3) Variance: 6.39% Coefficient Alpha: 0.76	Availability of Transport Network to Workplace, Facilities and Amenities Availability of Recreational and Entertainment Facilities Availability of Amenities High Return Investment Security Quality of Maintenance Quality of External Works Cost of Ownership (Price)	0.812 0.771 0.750 0.547 0.467* 0.332* 0.330* -0.319
Bartlett's Test of Sphericity Kaiser-Meyer-Olkin Measure of Sampling Adequacy Total Variance		0.000 0.944 55.81%

** Denotes an attribute with a higher loading within another factor*

5.4.2 DISCRETE CHOICE (MULTINOMIAL LOGIT AND NESTED LOGIT) MODEL

Using the factor loadings generated from the factor analysis, a multinomial logit (MNL) model was first performed to determine the effects of the factors in influencing respondents' preference among the five private housing options. The results are presented in Table 5.4. The goodness-of-fit index (ρ2) should vary between 0 and 1. This model has produced a goodness-of-fit index of 0.182 with the log-likelihood of -1316.904.

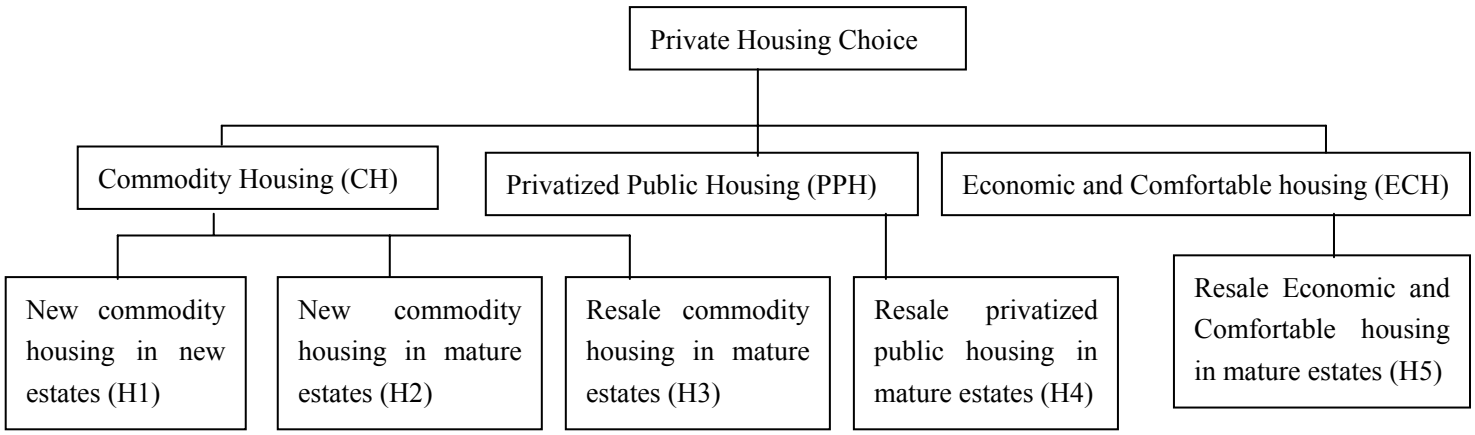
Table 5.4 Results of the multinomial logit (MNL) Model

Factors	Coefficient	Standard Error	t-value	Sig. value
Physical (F1)	0.8309	0.0502	16.549	0.000
Living Environment (F2)	0.6204	0.0524	11.850	0.000
Amenities and Financial Benefits (F3)	0.6913	0.0506	13.672	0.000
Summary Statistics				
Number of observations				1000
Iterations completed				5
Goodness-of-fit index (ρ^2)				0.182
Log-likelihood				-1316.904

The choice among alternatives may also be viewed as taking place at more than one level. For instance, in our case, we consider the character of the private housing choice among the five alternatives. One might view the choice among these five choices as first among Commodity Housing [New commodity housing in new estates (H1), New commodity housing in mature estates (H2) and Resale commodity housing in mature estates (H3)], Privatized Public Housing [Resale privatized public housing in mature

estates (H4)] and Economic and Comfortable housing [Resale Economic and Comfortable housing in mature estates (H5)]. This sort of the hierarchical choice is handled in the setting of a nested logit (NL) model. The structure of the tree is as follows:

Figure 5.1 The tree structure of the Nested Logit (NL) model



The results of the nested logit (NL) model are presented in Table 5.5. This model has produced a goodness-of-fit index of 0.330 with the log-likelihood of -1299.152.

Table 5.5 Results of the nested logit (NL) Model

Factors	**Coefficient**	**Standard Error**	**t-value**	**Sig. value**
Physical (F1)	0.6875	0.0560	12.277	0.000
Living Environment (F2)	0.5664	0.0504	11.227	0.000
Amenities and Financial Benefits (F3)	0.6087	0.0503	12.111	0.000
Inclusive vale (τ_{CH})	1.3807	0.0767	17.990	0.000
Inclusive vale (τ_{PPH})	1.1271	0.1264	8.915	0.000
Inclusive vale (τ_{ECH})	1.2150	0.1202	10.105	0.000
Summary Statistics				
Number of observations				1000
Iterations completed				5
Goodness-of-fit index (ρ^2)				0.330
Log-likelihood				-1299.152

To choose between the multinomial logit (MNL) model and the nested logit (NL) model, we apply a likelihood-ratio test (Greene, 1993). The MNL model can be seen as a restricted case of the NL model under the IIA assumption. The chi-square distributed test statistic for the likelihood-ratio test is given by:

$$LR = -2[\ln L_{MNL} - \ln L_{NL}] = 35.504 \sim \chi^2_{(3,d.f.)}$$

where $\chi^2_{crit.(0.95,3)} = 7.82$, [the degrees of freedom equal to the number of tree inclusive value (IV) parameters], $\ln L_{MNL}$ is the log-likelihood of the multinomial logit model under the assumption that all similarity coefficients equal one ($H_0 : \tau_i = 1$) and $\ln L_{NL}$ is the log-likelihood of the nested logit model. Since the observed test statistic exceeds the critical value of a 5% test, we reject the hypothesis H_0 and thus prefer the nested logit (NL) model to the multinomial logit (MNL) model.

Table 5.5 shows that at the 0.05 level of significance, all the three factors are statistically different from zero, thus implying that all three factors have an effect on the dependent variable. The factors *Physical (F1)* and *Amenities and Financial Benefits (F3)* have higher coefficient estimates than *Living Environment (F2).* It implies that the former two factors have a stronger relationship with the preference among the five private housing options than the latter one. These findings are consistent with the results from Dibb and Wensley (1988). They suggest that primary issues, such as property size and location, are more significant in determining purchase behaviour than secondary ones, such as double glazing, fitted bedroom furniture or a security system.

The above findings are also consistent with the results from the mean perception ratings and ranking distribution where both the *Physical* and *Amenities* factors are rated highly for new commodity housing in mature estates (H2) which have the highest percentage of 1st ranking. *Physical (F1)* has higher coefficient estimate than the other two factors, this shows that it has the strongest relationship with respondents' preference among the five private housing options. This is the reason why resale commodity housing in mature estates (H3) and resale privatized public housing in mature estates (H4) were ranked the last two. They had poor mean ratings among the five choices for *Physical* attributes.

5.4.3 CHI-SQUARE TEST

The cessation of welfare allocation of housing forces urban residents to the open market and blurs the income difference between residents of open market housing and those of public housing (Zang, 1999). At the same time, it also enhances the development of a private market and makes income and other indices of socioeconomic status important differentiating factors of choice in the open market sector (Michael and Kwong, 2002). The descriptive statistics about the respondents' profile are listed in Appendix 3.

Chi-square tests were conducted here to show whether a relationship exists between the preference among the five private housing options and each socioeconomic characteristics. As a basis, at the 0.05 significance level, a relationship exists if

significance value is 0.05 and below. The results in Table 5.6 show that the preference among the five private housing options has a relationship with “Age group”, “Education Level” and “Dwelling Status”. It is interesting that the “Work Units' Type” and “Monthly Gross Household Income” are not significant. Since “Education Level” is the most significantly related to respondents’ preference among the five private housing options, a graphical illustration will be presented to examine the preference among the five private housing options by respondents with different Education Level.

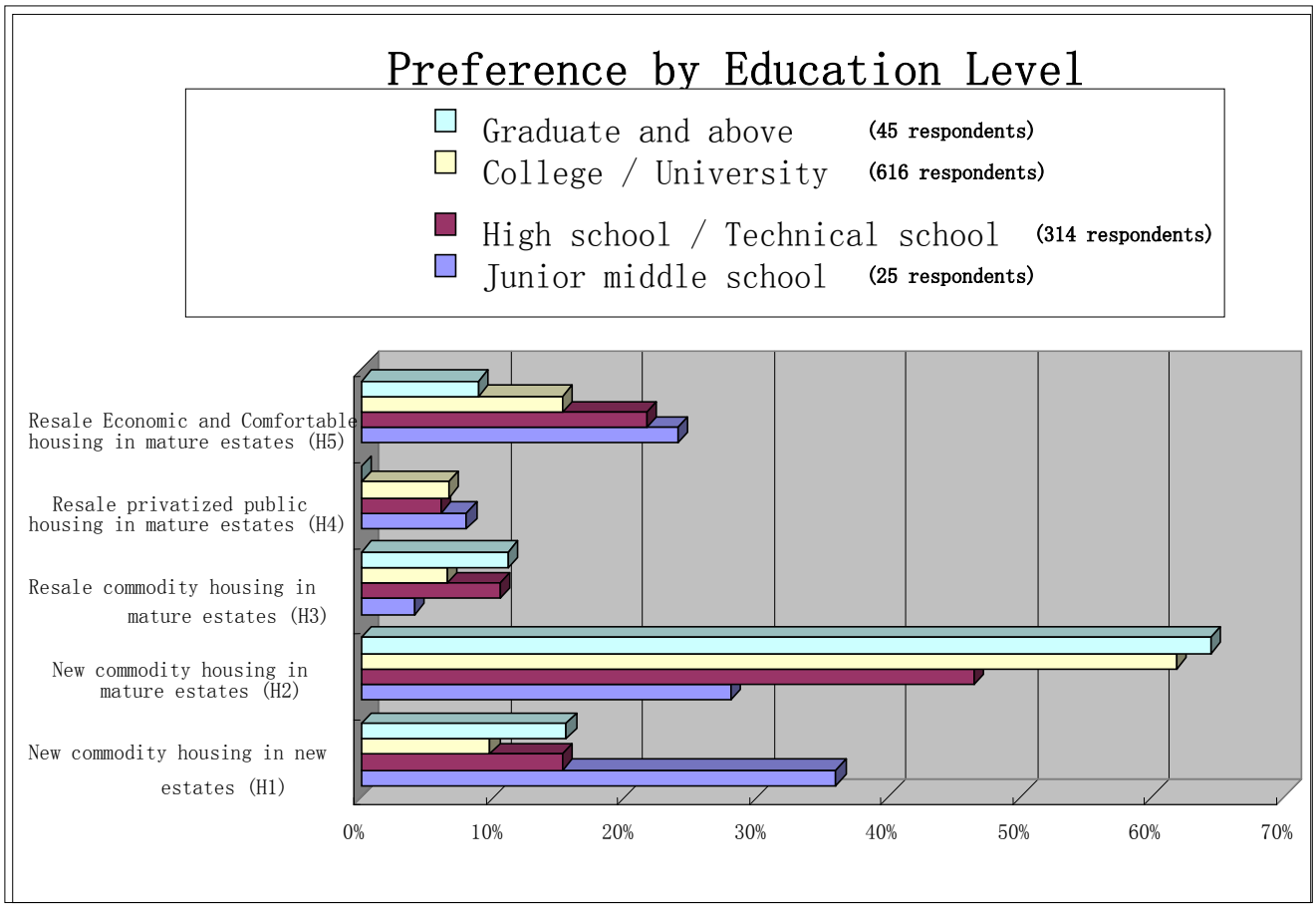
Table 5.6 Results of Chi-Square Test

	Significance Value
Preference*Age Group	0.00045#
Preference*Gender	0.09175
Preference*Marital Status	0.235
Preference*Education Level	0.0000071#
Preference*Dwelling Status	0.00722#
Preference*Work Units' Type	0.08143
Preference*Monthly Gross Household Income (RMB)	0.63218

 # represents the socioeconomic characteristics which are significantly related to respondents’ preference among the five private housing options at the 0.05 significance level

Figure 5.2 indicates the preference for the five private housing options by respondents with different Education Level. Most respondents with the Education Level of *Junior middle school* prefer new commodity housing in new estates (H1). On the other hand, most respondents with the Education Level of *High school / Technical school, College / University, Graduate and above* prefer new commodity housing in mature estates (H2).

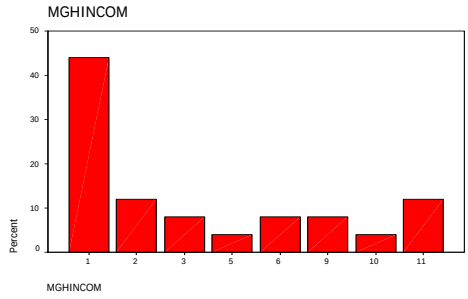
Figure 5.2 Preference among the five private housing options by Education Level



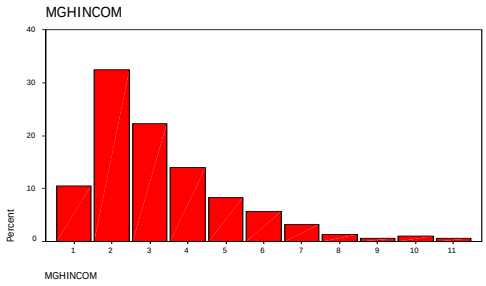
As shows in Table 5.1, new commodity housing in new estates (H1) scored the highest mean ratings among the five choices for the attributes of "Spaciousness", "Open Space" and "Price". Respondents with the Education Level of *Junior middle school* prefer it likely due to lower cost of ownership (price). This is supported when we compare the percentages of the monthly gross household income among respondents with different Education Level (Figure 5.3). It can be clearly seen from Figure 5.3 that the higher the Education Level, the higher monthly gross household income (as showed by the largest frequencies). Therefore, most respondents with lower Education

Level prefer new commodity housing in new estates (H1) as it is more affordable for this group of respondents.

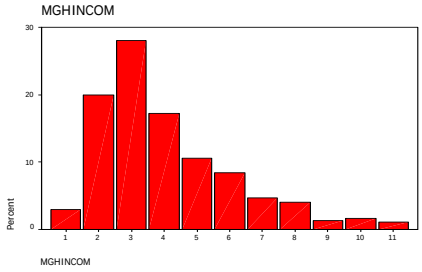
Figure 5.3 Percentages of the monthly gross household income among respondents with different Education Level



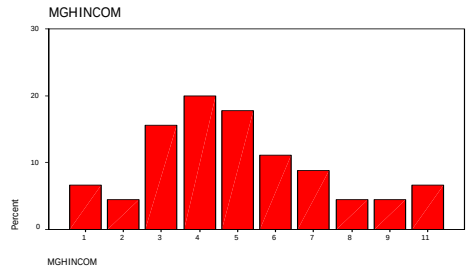
Junior middle school



High school / Technical school



College / University



Graduate and above

(1 represents monthly gross household income < RMB 1000, 2 represents between RMB 1000-2000, 3 represents between RMB 2000-3000 and so on till 11 represents > RMB 10,000)

After looking into the preference among the five private housing options for respondents with different Education Level, the next section aims to investigate the significant factors influencing their preference in order to understand their needs better.

5.4.4 DISCRETE CHOICE MODEL BY EDUCATION LEVEL

The overall discrete choice model presented earlier provides a general sentiment of the population. Since the results of chi-square tests have shown that Education Level is the

most significantly related to respondents' preference among the five private housing options, this section uses Education Level to investigate whether there are any differences in the importance of the factors affecting the preference among the five private housing options with different Education Level.

The respondents are separated into two Education Level groups, namely, *High school / Technical school and below* and *College / University and above*. In this study, the *Junior middle school* Education Level group is integrated into the *High school / Technical school* Education Level group because there are few respondents in the former Education Level group. It may be insufficient to run a discrete choice model on its own with such few respondents.

Table 5.7 Results of the multinomial logit (MNL) Model *(High school / Technical school and below)*

Factors	**Coefficient**	**Standard Error**	**t-value**	**Sig. value**
Physical (F1)	0.6405	0.0805	7.953	0.000
Living Environment (F2)	0.5994	0.0860	6.969	0.000
Amenities and Financial Benefits (F3)	0.5191	0.0813	6.385	0.000
Summary Statistics				
Number of observations				339
Iterations completed				5
Goodness-of-fit index (ρ^2)				0.140
Log-likelihood				-469.3668

Table 5.8 Results of the nested logit (NL) Model (*High school / Technical school and below*)

Factors	Coefficient	Standard Error	t-value	Sig. value
Physical (F1)	0.5400	0.0869	6.213	0.000
Living Environment (F2)	0.5545	0.0841	6.590	0.000
Amenities and Financial Benefits (F3)	0.4734	0.0800	5.921	0.000
Inclusive vale (τ_{CH})	1.3069	0.1198	10.911	0.000
Inclusive vale (τ_{PPH})	1.1331	0.2407	4.707	0.000
Inclusive vale (τ_{ECH})	1.1812	0.2203	5.361	0.000
Summary Statistics				
Number of observations				339
Iterations completed				5
Goodness-of-fit index (ρ^2)				0.274
Log-likelihood				-465.2874

Table 5.7 and Table 5.8 present the result of the two discrete choice models of *High school / Technical school and below* Education Level group. To choose between the multinomial logit (MNL) model and the nested logit (NL) model, we apply a same likelihood-ratio test as before. The chi-square distributed test statistic for the likelihood-ratio test is given by:

$$LR = -2[\ln L_{MNL} - \ln L_{NL}] = 8.1588 \sim \chi^2_{(3,d.f.)}$$

where $\chi^2_{crit.(0.95,3)} = 7.82$. Since the observed test statistic exceeds the critical value of a 5% test, we reject the hypothesis $\boldsymbol{H_0}$ and thus prefer the nested logit (NL) model to the multinomial logit (MNL) model.

Table 5.9 Results of the multinomial logit (MNL) Model (*College / University and above*)

Factors	Coefficient	Standard Error	t-value	Sig. value
Physical (F1)	0.9562	0.0658	14.534	0.000
Living Environment (F2)	0.6141	0.0656	9.360	0.000
Amenities and Financial Benefits (F3)	0.7855	0.0649	12.105	0.000
Summary Statistics				
Number of observations				661
Iterations completed				5
Goodness-of-fit index (ρ^2)				0.207
Log-likelihood				-843.4297

Table 5.10 Results of the nested logit (NL) Model (*College / University and above*)

Factors	Coefficient	Standard Error	t-value	Sig. value
Physical (F1)	0.7879	0.0746	10.566	0.000
Living Environment (F2)	0.5611	0.0628	8.932	0.000
Amenities and Financial Benefits (F3)	0.6826	0.0651	10.482	0.000
Inclusive vale (τ_{CH})	1.4162	0.0998	14.189	0.000
Inclusive vale (τ_{PPH})	1.1161	0.1483	7.524	0.000
Inclusive vale (τ_{ECH})	1.2338	0.1452	8.500	0.000
Summary Statistics				
Number of observations				661
Iterations completed				5
Goodness-of-fit index (ρ^2)				0.362
Log-likelihood				- 829.5941

Table 5.9 and Table 5.10 present the result of the two discrete choice models of *College / University and above* Education Level group. To choose between the multinomial logit (MNL) model and the nested logit (NL) model, we apply the same likelihood-ratio test as before. The chi-square distributed test statistic for the likelihood-ratio test is given by:

$$LR = -2[\ln L_{MNL} - \ln L_{NL}] = 27.6712 \sim \chi^2_{(3,d.f.)}$$

where $\chi^2_{crit.(0.95,3)} = 7.82$. Since the observed test statistic exceeds the critical value of a 5% test, we reject the hypothesis $\boldsymbol{H_0}$ and thus prefer the nested logit (NL) model to the multinomial logit (MNL) model.

The results above show that for both Education Level groups, the nested logit model is better than multinomial logit model to fit the data. Table 5.8 illustrates that the factors *Living Environment (F2)*, *Physical (F1)* and *Amenities and Financial Benefits (F3)* have decreasing order of importance in the preference among the five private housing options by people with the *High school / Technical school and below* Education Level. For people with the *College / University and above* Education Level, the ordering becomes *Physical (F1)*, *Amenities and Financial Benefits (F3)* and *Living Environment (F2).*

The higher Education Level group regards *Physical (F1)* and *Amenities and Financial Benefits (F3)* to be more important than *Living Environment (F2)* in affecting their preference. This finding is consistent with the results from Dibb and Wensley (1988). They suggest that primary issues, such as property size and location, are more significant in determining purchase behaviour than secondary ones, such as double glazing, fitted bedroom furniture or a security system.

On the other hand, the lower Education Level group attaches higher importance to *Living Environment (F2)* and *Physical (F1)* than *Amenities and Financial Benefits (F3).*

This finding is consistent with the results from Benjamin and Paaswell (1977). They find that major dimensions of choice are determined to be size, value and luxury. Interior space attributes are considered more important than location and accessibility to activities. Though *Amenities and Financial Benefits (F3)* has an effect on the lower Education Level group's preference, this factor is not so significant in their preference among the five private housing options. The reason why *Amenities and Financial Benefits (F3)* are not so significant in their preference can be explained by Bates (1988) who asserted that in forecasts of consumer demand, there is an implied trade-off between two or more factors. Hence, in order to enjoy better *Living Environment*, this lower Education Level group may forsake the enjoyment of more *Amenities* and more *Financial Benefits.*

Since the factor *Living Environment (F2)* is significantly different between the two Education Level groups, we try to find more details about this factor in the preference among the five private housing options. Table 5.11 and Table 5.12 list the estimated elasticities of the estimated probabilities with respect to changes in the F2 (*Living Environment*) variable in the preference among the five private housing options by people with the *High school / Technical school and below* Education Level and with the *College / University and above* Education Level respectively. The results show that direct elasticity of F2 (*Living Environment*) in the lower Education Level group are higher than those in the higher Education Level group. (Higher direct elasticity means that 1 percent change rate of the Factor in alternative Hi will result in a higher change

rate of the probability of selecting choice Hi in the model). It is consistent with the above findings that the lower Education Level group attaches higher importance to *Living Environment (F2)* than *Amenities and Financial Benefits (F3),* while the higher Education Level group regards *Amenities and Financial Benefits (F3)* to be more important than *Living Environment (F2)* in affecting their preference.

Table 5.11 Estimated elasticities with respect to F2 - Living Environment *(High school / Technical school and below)*

	F2 (*Living Environment*) of alternative				
Effect on	**H1**	**H2**	**H3**	**H4**	**H5**
H1	0.450 *	-0.062	0.002	0.003	-0.057
H2	-0.038	0.015 *	0.002	0.003	-0.057
H3	-0.038	-0.062	-0.129 *	0.003	-0.057
H4	-0.054	-0.083	0.005	-0.163 *	-0.057
H5	-0.054	-0.083	0.005	0.003	0.080 *

** Denotes the direct elasticity of F2 (Living Environment)*

Table 5.12 Estimated elasticities with respect to F2 - Living Environment (*College / University and above*)

	F2 (*Living Environment*) of alternative				
Effect on	**H1**	**H2**	**H3**	**H4**	**H5**
H1	0.100 *	-0.013	0.007	0.000	-0.048
H2	-0.039	-0.035 *	0.007	0.000	-0.048
H3	-0.039	-0.013	-0.124 *	0.000	-0.048
H4	-0.063	-0.010	0.016	-0.108 *	-0.048
H5	-0.063	-0.010	0.016	0.000	0.090 *

** Denotes the direct elasticity of F2 (Living Environment)*

5.5 SUMMARY

This chapter has presented some findings from the data analysis. The results show that three factors, namely, *Physical; Living Environment; Amenities and Financial Benefits* are important in influencing the buyers' preference among the private housing options. The nested logit model is found to fit the data better than the multinomial logit model when choosing the discrete choice model, and it shows that the factors *Physical* and *Amenities and Financial Benefits* have a stronger relationship with the preference than *Living Environment*. The results also demonstrate that Education Level is the most significant socioeconomic characteristic related to respondents' preference. A more detailed breakdown of the choice made by respondents with different Education Level shows that people with a lower Education Level consider *Living Environment* as the most important factor in the preference among private housing options while to those with higher Education Level, *Physical* is the first. The next chapter will conclude the whole study and provide some implications that can be derived from this study.

CHAPTER 6

CONCLUSION

6.1 INTRODUCTION

This last chapter provides a summary of the main findings from this study. The implications of the findings will also be discussed. Finally, the chapter ends with the limitation of study and recommendations for future research.

6.2 SUMMARY OF MAIN FINDINGS

Using data from a survey carried out in Xiamen, this thesis studies the determinants of consumers' preference in the private housing market in a medium-size city in China. These five private housing choices, both in the primary and secondary market, are namely, new commodity housing in new estates (H1), new commodity housing in mature estates (H2), resale commodity housing in mature estates (H3), resale privatized public housing in mature estates (H4) and resale Economic and Comfortable housing in mature estates (H5) respectively. To date, such study is vacant as to model the consumers' preference behavior in the housing market, especially in the emerging private housing market in contemporary China following housing reform.

The results show that three factors, namely, *Physical; Living Environment; Amenities and Financial Benefits* are important in influencing the buyers' preference among private housing options. The nested logit model is found to fit the data better than the

multinomial logit model when choosing the discrete choice model. It shows that the factors *Physical* and *Amenities and Financial Benefits* have a stronger relationship with the respondents' preference than *Living Environment*. The results also demonstrate that Education Level is the most significant socioeconomic characteristic related to respondents' preference. A more detailed breakdown of the preference among the five private housing options made by respondents with different Education Level indicated that respondents with the *Junior middle school* Education Level prefer new commodity housing in new estates (H1) and respondents with the other Education Level prefer new commodity housing in mature estates (H2). When applying the discrete choice model to different Education Levels, there are contrasting results in the significance of the factors influencing the preference among the five private housing options. People with lower Education Level consider *Living Environment* as the most important factor in the preference among private housing options while to those with higher Education Level, *Physical* is the first.

6.3 IMPLICATIONS

Due to the limited land resources and the increasing population in the downtown area, the Xiamen government has decided to extend development in the rural area. On 1st November, 2000, the State Department approved the "General Urban Planning (from 1995 to 2010) of Xiamen City", which is an important base for Xiamen City's urban construction, development and management. In this plan, the downtown area will be expanded to 560 square kilometers, more than four times larger than now. In addition,

many satellite towns will be built around the center of the Xiamen Island. Large enterprises and factories now in the downtown area will be moved outside to these areas. These changes will have fundamental impact on the people who now live in the downtown area (mature estates). To better develop these satellite towns, the government should consider how to attract people to settle in these new estates, especially those people with higher Education Level. The findings of this study show that in the preference among private housing options, people with higher Education Level consider unit and building characteristics the most important factor. So the government should pay more attention to this factor, such as providing more housing rooms, better design of internal layout and building exterior, more sound housing structure and spaciousness, better local network and picturesque view. If the satellite towns have such services, people with higher Education Level are willing to settle. They could enjoy the convenience and do not need go nearby. These could be formulated and implemented by having better housing policies in the Xiamen city.

The results of the statistical analysis are also generally in line with the nature of housing market segmentation and the forces governing housing allocation and consumption in Xiamen and other cities in China. “Work Units” is no longer a significant characteristic related to respondents’ preference in the emerging private housing market at the third stage of housing reform in China. This is a totally different phenomenon from the finding of Zhang (2001) at the second stage of housing reform. He points out that the role of work units had expanded to the whole housing market at

that stage. And this is also a little different from the finding of Michael and Kwong (2002). Their results indicate that the market allocation mechanism introduced by the housing reforms has not yet replaced the entrenched influence from work units on home ownership behavior. In addition, the factor Amenities and Financial Benefits is not the most important factor in the preference among private housing options among different households, no matter with lower or higher Education Level. This indicates that with the financing programmes of Housing Provident Fund and personal mortgage, the affordability gap in the emerging private housing market is now being reduced step by step. These two findings imply that till now the third stage of housing reform in China has achieved some degree of success compared to the first two stages. However, reform is an evolving process. Such areas as housing finance, asset and property management, real estate agencies need more improvement. Housing reform in China still has a long way to go.

Another implication is for private developers and real estate agents. The findings of this study show that in the preference among private housing options, people consider unit characteristics the most important factor. As it is suggested by Earnhart (2002), actual and hypothetical housing purchases are similar decision processes with respect to some attributes, such as the number of bedrooms per person. So the private developers and real estate agents should pay more attention to these unit characteristics, such as providing the private housing purchasers more housing rooms, better design of internal layout and building exterior.

6.4 LIMITATIONS

Although the findings of this research are encouraging, a few limitations exist. Even though considerable attention was given to the identification of housing attributes, it is possible additional variables could be included to improve the constructs. And it'll be more objective to use a weighted score for each housing attributes in deriving the overall mean.

6.5 RECOMMENDATIONS FOR FUTURE RESEARCH

There exist potential avenues for future research that can be developed from this study. An extension of this study can be done by comparing whether there are any significant differences in the preferences of private housing between residents in different regions of the Xiamen city, as well as other cities in China.

In addition, it's better to add "what type of housing you currently live in" in respondent's profile in the questionnaire, to see if preferences match the respondents' current situation. And further research also could investigate the other socio-economic characteristics such as dwelling status and age group that are also significantly related to buyers' preference among private housing options. It is hoped that this study will stimulate future research which can contribute to the better development of the Chinese housing market.

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APPENDIX --- RESEARCH ON PRIVATE HOUSING CHOICE BEHAVIOUR IN XIAMEN CITY, CHINA

COMPARISON AMONG NEW COMMODITY HOUSING IN NEW ESTATES, NEW COMMODITY HOUSING IN MATURE ESTATES, RESALE COMMODITY HOUSING IN MATURE ESTATES, RESALE PRIVATIZED PUBLIC HOUSING IN MATURE ESTATES AND RESALE ECONOMIC AND COMFORTABLE IN MATURE ESTATES

Dear respondent,

I am a postgraduate from NUS who is conducting a survey on private housing choice behavior in Xiamen.

It would be appreciated if you could state your views by rating the following attributes. Thank you for participating in the survey.

With reference to the new commodity housing in new estates, new commodity housing in mature estates, resale commodity housing in mature estates, resale privatized public housing in mature estates and resale Economic and Comfortable in mature estates, how would you rate the following attributes of the housing from a scale of 1 to 5, where 1 is “Very Poor” and 5 is “Excellent”.

Attributes	**New commodity housing in new estates**	**New commodity housing in mature estates**	**Resale commodity housing in mature estates**	**Resale privatized public housing in mature estates**	**Resale Economic and Comfortable in mature estates**
Individual Units	**Very Poor** 1 2 3 4 5 **Excellent**	**Very Poor** 1 2 3 4 5 **Excellent**	**Very Poor** 1 2 3 4 5 **Excellent**	**Very Poor** 1 2 3 4 5 **Excellent**	**Very Poor** 1 2 3 4 5 **Excellent**
Variety of Housing Types (Eg. Multi-storey, Semi-high rise and High-rise)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Variety of Apartment Types (Eg. 1,2,3,4,5 bedroom)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Structural Soundness of Housing (Eg. Concrete-frame, Brick-and-concrete composite)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Design of Internal Layout (Eg. Wide parlor, Narrow access corridor)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

Attributes	New commodity housing in new estates	New commodity housing in mature estates	Resale commodity housing in mature estates	Resale privatized public housing in mature estates	Resale Economic and Comfortable in mature estates
Spaciousness (Eg. Floor area, Bedroom size)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
E-enabled Apartment (Eg. Local area network, Wide band)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Picturesque view/Scenery	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
External Features	**Very Poor Excellent**	**Very Poor Excellent**	**Very Poor Excellent**	**Very Poor Excellent**	**Very Poor Excellent**
Design of Building Exterior (Eg. Facade appearance, Block design)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Design of External Layout (Eg. Building density, Floor-area ratio, Space between block, Ventilation and Building orientation)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Quality of External Works (Eg. Walkways, Lamp posts)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Living Environment	**Very Poor Excellent**	**Very Poor Excellent**	**Very Poor Excellent**	**Very Poor Excellent**	**Very Poor Excellent**
Open Space	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Landscaping (Eg. Greenery)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Quality of Maintenance (Eg. Cleanliness, Upkeep)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

Attributes	New commodity housing in new estates	New commodity housing in mature estates	Resale commodity housing in mature estates	Resale privatized public housing in mature estates	Resale Economic and Comfortable in mature estates
Security	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Locality	**Very Poor Excellent**	**Very Poor Excellent**	**Very Poor Excellent**	**Very Poor Excellent**	**Very Poor Excellent**
Availability of Amenities (Eg. Retail and Food outlets, Markets, Schools, Hospitals, Post Office and Bank)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Availability of Transport Network to Workplace, Facilities and Amenities (Eg. Buses)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Availability of Recreational and Entertainment Facilities (Eg. Sports complexes and Pubs)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Cost of Ownership	**Very Poor Excellent**	**Very Poor Excellent**	**Very Poor Excellent**	**Very Poor Excellent**	**Very Poor Excellent**
Price	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
High Return Investment	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Ranking of your choice (1 for most preferred, 5 for least preferred)					

End of Questionnaire.

Thank you once again. Have a nice day!

RESPONDENT'S PROFILE

Age Group:	1	<21
	2	21 - 30
	3	31 - 40
	4	41 - 50
	5	>50
Gender	1	Male
	2	Female
Marital Status:	1	Married
	2	Single
Education Level	1	Junior middle school
	2	High school / Technical school
	3	College / University
	4	Graduate and above
Dwelling Status	1	Own
	2	Rent
	3	Informal tenures
Work Units' Type	1	State institutes & Agencies
	2	State-owned enterprise
	3	Collective enterprise
	4	Private enterprise
	5	Foreign-funded & Joint-venture enterprise
	6	Self-employed
	7	Others
Monthly Gross Household	1	< 1,000
Income (RMB)	2	1,001 - 2,000
	3	2,001 - 3,000
	4	3,001 - 4,000
	5	4,001 - 5,000
	6	5,001 - 6,000
	7	6,001 - 7,000
	8	7,001 - 8,000
	9	8,001 - 9,000
	10	9,001 - 10,000
	11	> 10,000

DESCRIPTIVE STATISTICS ABOUT THE RESPONDENTS' PROFILE

Characteristics			Percentage
Age Group:	1	<21	2.7%
	2	21 - 30	56.8%
	3	31 - 40	30.9%
	4	41 - 50	7.5%
	5	>50	2.1%
		Total:	100.0%
Gender	1	Male	50.9%
	2	Female	49.1%
		Total:	100.0%
Marital Status:	1	Married	48.0%
	2	Single	52.0%
		Total:	100.0%
Education Level	1	Junior middle school	2.5%
	2	High school / Technical school	31.4%
	3	College / University	61.6%
	4	Graduate and above	4.5%
		Total:	100.0%
Dwelling Status	1	Own	49.1%
	2	Rent	32.2%
	3	Informal tenures	18.7%
		Total:	100.0%
Work Units' Type	1	State institutes & Agencies	12.6%
	2	State-owned enterprise	28.3%
	3	Collective enterprise	7.1%
	4	Private enterprise	23.1%
	5	Foreign-funded & Joint-venture enterprise	15.2%
	6	Self-employed	4.0%
	7	Others	9.7%
		Total:	100.0%
Monthly Gross Household Income (RMB)	1	< 1,000	6.5%
	2	1,001 - 2,000	23.0%
	3	2,001 - 3,000	25.2%
	4	3,001 - 4,000	15.9%
	5	4,001 - 5,000	10.0%
	6	5,001 - 6,000	7.7%
	7	6,001 - 7,000	4.3%
	8	7,001 - 8,000	3.1%
	9	8,001 - 9,000	1.4%
	10	9,001 - 10,000	1.4%
	11	> 10,000	1.5%
		Total:	100.0%