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Master's Thesis of Environmental Planning

# Factors Affecting House Ownership Rates in Hong Kong

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# Abstract

Even though the Hong Kong government has formulated many housing ownership plans over the years, housing ownership in Hong Kong has always been at a relatively low level, and there is a gradual downward trend. In recent years of research, the housing issue of youth in Hong Kong has been repeatedly mentioned. According to the theory of family life cycle, young people in the transitional stage of the family will have more significant housing ownership issues when they are faced with the choice and transition of housing ownership. The problem of youth's housing ownership actually reflects the problem of total society. Therefore, this study uses stata15.1 to analyze the data of the 18 district councils in HK and analyzes the social demographic, family and economic characteristics and educational characteristics. The study found that the main factor that affects the housing ownership rates in Hong Kong is the economic characteristics of family. Due to the PRH system, even if the income of some groups increases, it will not promote the housing ownership rate in Hong Kong. Government should strictly enforce the PRH entry and exit procedures to guarantee the housing needs of some non-housing low- and middle-income people. Develop small-unit subsidized housing according to the trend of family size, and specifically build subsidized housing or PRH for young families and youth, and hope that this will provide direction for future policies.

**Keyword :** house ownership, rates, affecting factors,panel, stata15.1

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# Chapter I . Introduction

## 1. Introduction

Hong Kong governments have tried to improve housing consumption and housing ownership through various strategies. For example, the home ownership rate 70 percent housing program started in 1997.Home Ownership Program (HOS), Tenant Purchase Scheme (TPS), Rent-and-buy plan and First home loan program .In addition, the House Ownership Secondary Market (SMS) supply public rental housing (PRH), was launched in 1997.Even with the implementation of many preferential terms for housing ownership from twenty one to twenty nineteen, the proportion of self-occupied houses in Hong Kong is still low in about 49%.

Purchasing and renting are the most basic choices in a family' s housing life. Whenever a choice, more people prefer to buy rather than rent(Opoku & Abdul-Muhmin, 2010) From the perspective of house ownership data, in Hong Kong, it is very difficult for most families to change from tenant status to owner status. Since owning a homeowner is the desire of almost everyone, Western countries have been struggling to find effective solutions to help their residents. For example, in the United States, homeowner ownership has nearly become a belief (Lands, 2008). However, Hong Kong has always believed that it is necessary to ensure housing ownership (Wah, 2000), but the unsatisfactory plan is leading to class consolidation and division (Wong, 2015). At the same time, there have been frequent discussions on youth housing issues and policies in recent years. Therefore, it is even more necessary to understand why the

housing ownership rate in Hong Kong is low and declining.

Although the increase in housing demand is generally caused by rapid economic and population growth (Li, 2015), Hong Kong's originally low housing ownership rate (compared to the high rates in Singapore, Mainland China, and other countries in Europe and America) has been further changed from 2004 to 2004. This dropped from 54.1% in 2019 to 49.2% in 2019. Given that the government has launched a number of plans to alleviate Hong Kong's housing problems, they think that certain reasons will inevitably lead to a reduction in housing ownership. Unfortunately, the factors affecting Hong Kong's housing ownership are not uniform (Li, 2015). At the same time, almost the extant studies on the element affecting Hong Kong home ownership focus on economics.. For example, shortage of land supplyment is considered the main reason (Chau & Ng, 1998); investment considerations will also affect the buyer's decision-making (La Grange & Pretorius, 2000); The main reason for housing prices are considered high in low interest rates (Wong, 2003); instead of evaluating the combine of household economic and social demographic aspects. Some researches are study on published secondary time series data (Jayantha & Hui, 2012) (Gabriel & Rosenthal, 2005; Rosen & Rosen, 1980), another study fields use econometric models(Gabriel & Rosenthal, 2005), in the mean time, current research relies on large sample data. analysis.

It is worth noting that although the issue of house ownership is a highly probable subjective choice, and information needs to be collected from sample individuals or affected groups, there are few empirical studies evaluating the impact of households' desires in

Hong Kong. The factors of their housing conditions, except for Li (Li, 2015), they studied the factors affecting the demand for home ownership between the X and Y generations.. Cheung et al. (2020) used the Hong Kong Census and Statistics Department (C & SD) of the General Household Survey (GHS) to analyze Research on the relationship between marriage and home ownership rate, Lau and Wei (2018) studied the family size and housing market dynamics, and found that families with a larger number of people may choose more affordable housing, while Hu and Chou (2016) studied separately The trend of young people' s housing arrangements has been improved. And their impacts of housing consumption on income of tenants in informal co-leasing units (Leung et al., 2020), Zheng and Gao (2020), the impact of gender ratio and childbirth on households and the economy. They are all studies of a singular nature and there is no comparative analysis of the ratio of each house ownership by various factors. (Jayantha & Oladinrin, 2019) Although a closed survey was conducted on 502 households in the form of a questionnaire to study the reasons for the decline in housing ownership in Hong Kong in terms of economy, household expenditure, household size, the sample size was small and regional differences were not considered. . Therefore, this study will select the overall impact of the above-mentioned factors that have been studied in recent years on the three types of housing ownership in Hong Kong, taking into account the regional differences, using the household statistics of the 18 district councils in Hong Kong from 2001 to 2019 to analyze.

The theme of the research is based on the premise that the

choice of housing use rights may be affected by social or family-level characteristics (such as personal income, education level or environmental factors). Use the characteristics of the census data of the 18 district councils in Hong Kong to evaluate its impact on the choice of housing use rights. The main purpose of this research is to assess factors affecting choices of housing use rights in Hong Kong, mainly around the social characteristics of the geographical background and the family factors of the family life cycle. This is because the propensity to own a house depends to a large extent on family and social characteristics (Dieleman & Everaers, 1994). . After this part, this study first reviewed the housing ownership literature and selected variables. Then, the study describes the methods used in the study, then describes the results and discusses them. Finally, it is found that household economic characteristics may be the main factor influencing the choice of housing ownership, and pointed out the significance of these findings for policy making and future housing ownership.

However, the shortcomings of the research are that it has not been able to purchase micro data on a household basis for personal reasons, and only uses the statistical data which include 18 district council districts in Hong Kong to conduct the research. Please refer to it.

## 2. Homeownership in Hong Kong

Hong Kong's housing development model takes the form of a dual-track system. Market housing is separated from the public rental housing supply system. Public housing units account for 43%. They are mainly rented and sold as a supplement. Hong Kong's public housing policy after the construction of PRH can be divided into four stages. 1) 1973-1987: The ten-year housing construction plan was launched, and housing conditions were significantly improved; 2) 1987-2001: House purchase was encouraged, the self-ownership rate increased, and the waiting time for public housing was shortened; 3) 2002-2013: Taking the market as an example leading, reducing the supply of public housing, and housing prices have repeatedly hit new highs; 4) Since 2014: supply-led, but the construction progress cannot meet the housing demand, and the waiting period for public rental housing was increased.

Hong Kong government issued the implementation of the "Ten-Year Housing Project" in 1972, which planned to build 400,000 public housing units during the ten years from 1973 to 1982 to provide housing for 1.8 million Hong Kong residents. The housing plan includes low-income citizens into the public housing policy system, and each person has a living area of not less than 3.25 square meters. But the plan was only 55% completed until the end of 1983, that is, 220,000 units were built. The "housing plan" was delayed for five years before it was basically completed. From April 1980 to March 1987, the Housing Authority built a total of 273,700 public housing units, including 197,400 public housing units and 76,300 home

housing units. The public housing population has grown substantially. The public housing rental population is 2.2 million, and the home housing population is 200,000. The proportion of public housing rental residents has increased to about 45%. Conditions of those housing have improved significantly. But at this time, the supply of public housing is oversupply, and the private market is underutilized.

In April 1987, the Hong Kong government issued the "Long Term Housing Strategy" brochure, which formulated the Hong Kong housing policy guidelines for the period 1987-2001. The strategy believes that as the income level of residents continues to increase, the old public housing with limited supporting facilities cannot meet the housing needs of tenants. The long-term housing strategy focuses on increasing the housing ownership rate and expanding the scale of public housing reconstruction. As a result, Hong Kong's housing policy has shifted from building PRH to encouraging people to purchase their own homes, so public housing policies are tilted toward the private market. From 1987 to 2001, an average of 27,000 public housing units and 13,000 HOS units were supplied each year, which basically met the construction goals. In the 1990s, the government launched a series of home ownership plans through the Housing Authority and Housing Association.

In addition to building new homes directly, the government has implemented different home ownership loan programs to help middle-income families buy private buildings. However, due to rising housing prices, the loan program did not attract middle-income groups to buy private buildings.

[Table 1-1] Home Ownership Scheme

| <b>Plan</b>                              | <b>Time</b> | <b>Object</b>  | <b>Content</b>  | <b>Supply situation</b>  |
|--|-------------|--|---|--|
| <b>Sandwich Class Housing Project</b>    | 1993- 2000  | Sandwich class who do not meet the requirements for public housing or HOS housing  | Buildings constructed are sold at 60-70% of the market price & Provide subsidized loans         | 8,900 units were completed in 1999 and 5,700 loans were approved |
| <b>Tenants Purchase Scheme</b>           | 1997- 2005  | Public housing tenants   | Public Rental housing families buy existing public housing units at the market price of 55%-70% | More than 150,000 public housing tenants purchase public housing |
| <b>Rent-and-buy plan</b>                 | 1998- 2002  | Residents affected by the reconstruction and demolition plan, as well as qualified civil servants  | Mortgage repayment subsidy, with a total height of 162,000 HK\$                                 |  |
| <b>First home loan program</b>           | 1998- 2002  | Families and singles who have not owned a residential property in Hong Kong in the past ten years (Income: Family <50,000 HK\$, Individual <20,000 HK\$; Assets: Family <1 million HK\$, Individual <350,000 HK\$) | Low-interest loans up to HK\$600,000  | More than 33,000 families and singles benefited                  |
| <b>Home Purchase Loan Scheme</b>         | 1998- 2002  | Public housing tenants, demolition and disaster-stricken residents, Applicants living in private premises  | Family interest-free loans or receive repayment grants of up to HK\$5,100 for 248 months        |  |
| <b>Redevelopment</b>                     | 1998- 2002  | Residents affected by redevelopment and demolition of cottage areas  | Mortgage repayment subsidy on a monthly basis   | 3,350 families own homes   |
| <b>Green Form Home Ownership Program</b> | 2016-       | Public housing tenants, demolition and disaster-stricken residents   | Lower housing price than HOS  | 7098 units   |

Data source : Hong Kong Housing Authority

In 1996, Hong Kong's housing prices climbed. In order to stabilize housing prices and change the housing conditions of citizens, the SAR government published the "85 thousand five plan" in October 1997, promising to build no less than 8.5 units (50,000 public housing, 35,000 private residences), and shortened the average waiting period of public rental housing to 3 years until the end of 2005, but it was stopped in 2002 due to the impact of the financial crisis.

The 1997 Asian financial crisis caused Hong Kong's property prices to fall by 60% from the 1997 peak until 2002. The supply of private housing exceeded demand. The government's expansion of housing supply caused social dissatisfaction with the decline in the housing market. Therefore, in November 2002, the government issued the "Declaration on Housing Policy," which stated that "to offer PRH for peoples in need, the construction and sale of subsidized public housing in the form of in-kind should be stopped, and the proportion of the overall real estate market should be greatly reduced. ". From increasing the proportion of house ownership to guarantee rental housing for groups in need of lodging, the government's intervention in the housing market is minimized.

In 2003, the Housing Authority published the construction and purchase of subsidized house such as the "Home Ownership Scheme", "Private Participation Scheme" and "Tenant Purchase Scheme" until 2006 when it began to sell surplus and repurchased units. In 2003, land auctions were completely suspended. From 2004 to 2010, land acquisition was used to transfer land, with an average annual supply of 61,400 square meters of residential land. In addition, the private housing market continued to be sluggish in the early 21st century,

and the demand for land was greatly reduced. The number of public housing constructions has shrunk, and the waiting time has remained below three years. From 2002 to 2011, an average of 15,000 public housing units were constructed annually, of which only more than 4,000 units were newly built in 2006 and 2007, which was a significant decrease from the construction of 49,000 public housing units in 2001. According to statistics from the Hong Kong Housing Department, there were 92,000 public housing applicants on the waiting list in October 2002, with an average waiting time of 2.3 years. By the end of 2011, there were approximately 165,000 applicants on the waiting list. The average waiting time was still maintained at 2.3 years, increased to 2.7 years at the end of 2013, but still below the 3-year target value. The price of private buildings exceeds the affordability of citizens. Housing in Hong Kong has been in short supply for a long time. In addition, affected by the Fed's quantitative easing policy, housing prices in the Hong Kong housing market have continued to rise. In addition, the supply of low- and medium-sized private real estate properties has decreased. To this end, the Hong Kong government has successively launched the "Buy At ease" plan and the Home Ownership Restoration Plan since 2010, and is committed to relieving the burden of residents purchasing houses, but on a small extent.

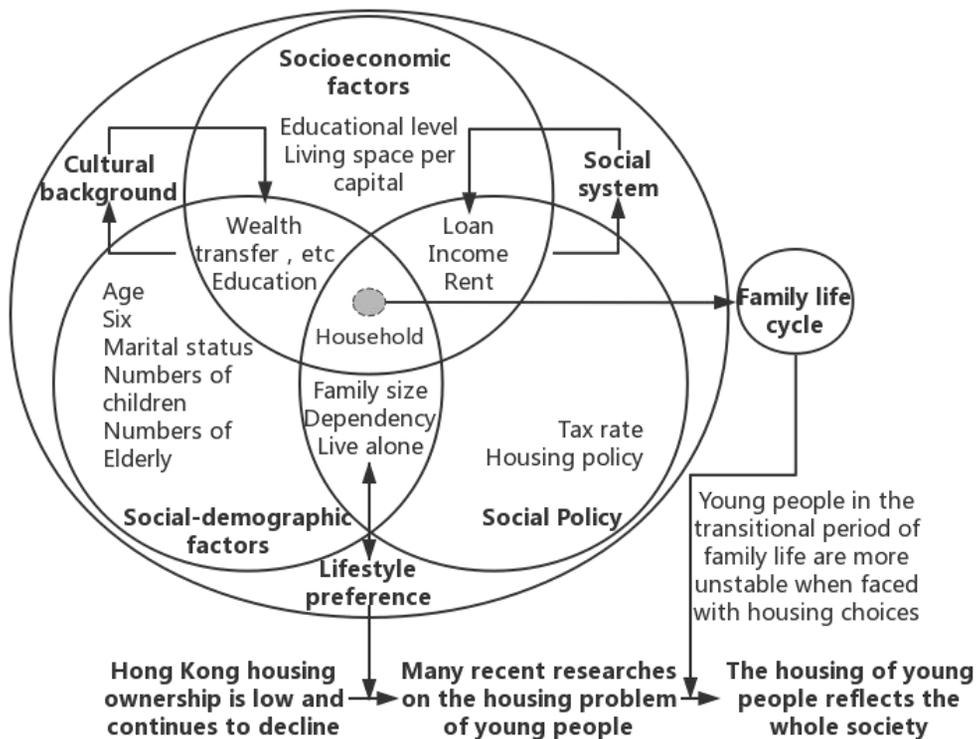
In order to reduce speculation, the Hong Kong government implemented the "Extra Stamp Duty" policy for the first time in November 2010, further increased the "Extra Stamp Duty" in 2012, and imposed a 15% "Buyer Stamp Duty" on Hong Kong nonpermanent residents. It was launched in 2013. "Double stamp

duty", the stamp duty rate for building transactions has been doubled across the board, meanwhile the apical tax rate has been adjusted from 4.25% of the transaction value to 8.5%. Although the Hong Kong government's several "demand management" measures have a certain inhibitory effect on housing prices, they have not reversed the serious disequilibrium between housing supply and demand.

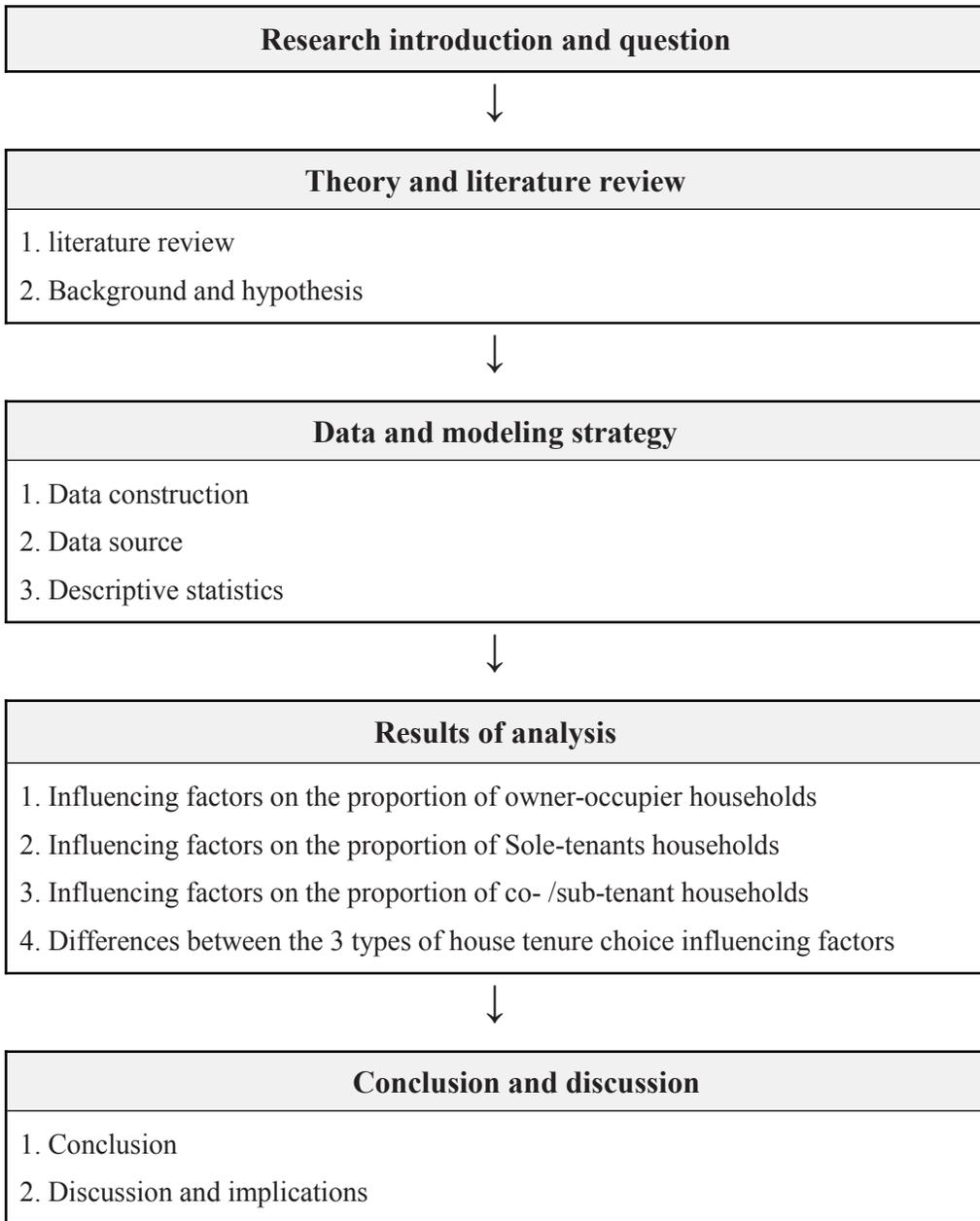
In the end of 2014, Hong Kong government launched the Long-term Housing Strategy, advocating a change in policy thinking and a supply-led approach, and proposed a total housing supply objectives of 480,000 units in the next ten years, with a public-private housing supply ratio of 60:40, that is, Public housing supply target of 29 million units (200,000 units of public rental and 90,000 units of affordable housing), private housing market supplement of 19 million units. However, from the perspective of policy implementation effects, the completion of the target number of houses to be constructed is relatively low. The number of public housing and HOS housing completed in 2015/16-2018/19 was 67,200 and 10,600, respectively, which is only 33.6% and 11.8% of the total supply target of public housing and HOS. In addition, the waiting list for PRH is getting longer and longer. The average time for general waiting applicants has been extended to 4.5 years, at about 268,500 households until June 2018.

### 3. Research framework and question

This study is based on the following question: Why the proportion of owner-occupy Households low and there is a continuous trend? From Empirical aspect ,That is to say why few agents choose owner-occupy house and what factors influences there house tenure choice? Main object of this research is to explore the factors that affect the rates of home tenure or provide references for housing policies.



[Figure 1-1] Conceptual framework of this study

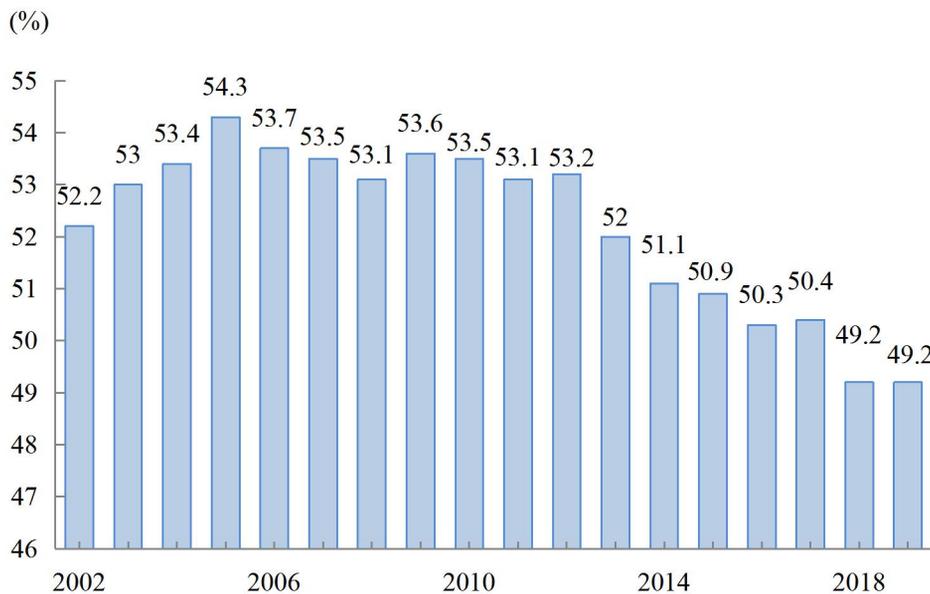


[Figure 1-2] Research structure

# Chapter II. Theory and literature review

## 1. Literature review

Although different countries have different homeownership rates, it is hard to determine the affecting factors of homeownership rates since of different social-cultural, policies and economic systems in different countries (Fisher and Jaffe, 2003). Due to the different cultures of different countries, the factors that affect house ownership are also different. But Andrews (Andrews & Sánchez, 2011) claimed that there are no obvious link within homeowner ownership and the developed wealth of a country. The homeownership rate shown in Figure 2-1 supports this claim.



[Figure 2-1] Home ownership rate in Hong Kong

Hong Kong has proved this claim because its extremely low home ownership rate is inconsistent with economic development. The increase in home ownership is attributed to multiple factors such as financial creation, freedom, stable, liquidity and some wealth advantages (Malpass, 2008). The socioeconomic and policy benefits associated with house ownership promote citizens to buy houses. At the same time, Ogunek (2017) divides these factors into three categories: sociocultural, economic, political and institutional aspects. One research explored that estate practitioners believe that real estate supply problems are mainly determined by some institutional reasons, like land use right adjustment and long period housing purchase procedures (Owusu-Ansah et al., 2019).

Pilkauskas (2012) summarized the three main reasons that play a function in the form of multi-generational housing based on current research: cultural needs, generational needs, and economic needs. Cultural needs are related to cultural differences related to the family (the preference for multi-generation cohabitation may vary between cultures); intergenerational needs refer to the need to reside with another generation of family members (e.g. the status of a single mother, or If they start to suffer from health problems, it is the condition of members of the older generation); economic needs are related to the way housing is obtained, involving fiscal policy or rising mortgage interest rates, these factors will prevent people from buying their own houses (Li & Shin, 2013). In addition to these factors affecting housing, research also focuses on issues related to family and intergenerational relationships in the context of multi-generational cohabitation (Albuquerque, 2011; Bengtson, 2001) both

of which are subjective. Views and comments on these types of arrangements, as well as the personal motivations for this type of cohabitation and the trajectory leading to it. In the context of Chinese culture, the way in which housing ownership is determined may be inconsistent with other districts. For instance, the experience of Wei, Zhang Wei et al. (2012) shows that China's housing decision is not only a consumption or investment, but also a social ideology reasons. Due to the uneven sex ratio, it focuses on competition for marriage or spouse. The study found that between 2003 and 2009, about 30% to 48% of the actual urban housing price increase in China owing to the imbalanced gender ratio (Wei et al., 2012). Further found that parents with single sons between the ages of 13 and 25 are more likely to purchase a second home, with a ratio of 13.5%(Yang et al., 2018).

These survey results show that given that the current housing prices in Hong Kong or China may be unaffordable, parents subserver for home ownership maybe more important. Fincher (2014) and Deng et al. (2019). are based on qualitative research methods found that the difference in the transfer of housing wealth between generations is the main factors for the difference in the proportion of house ownership among male and female in China. Explored that parents tend to purchase extra housing for sons or give money to purchase a house, while daughters are much less probability to get such wealth transfers. So, the proportion of female' s home ownership is generally low. Willing to fight against husband and father and enjoy common home ownership in order to benefit from the continued dividend of the housing market in Chinese cities.

However, in recent years, China's gender concept, housing-level marriage and other markets have undergone earth-shaking changes. Therefore, it is necessary to judge the relationship between Sex ratio and house ownership options based on the these data.

People's ability to choose housing ownership depends to a large extent on socioeconomic status, and socioeconomic status is closely related to education and there background(Colic-Peisker & Johnson, 2012). Home ownership is generally considered to be a sign of stable housing with a certain status in Hong Kong or other European countries. In contrast, the private and public rental house are considered not stable and degraded (Colic-Peisker & Johnson, 2012; Leung & Tang, 2014) .

For analyze the factors affecting the rates of house ownership, family life cycle theory is also used to study house ownership. A review of the literature shows that at the family aspect, family decisions-making between marriage situation and childbirth promote the choice of home ownership. Economists emphasize the speculation of housing ownership, while demographic researchers emphasize the action of ownership changes in the transition and formation of family. Convert in housing ownership of adults who are about to get married include the space-time dimension of the real estate market and the space-time dimension of the housing market (Clark et al., 1994).

In micro level, it is generally believed that the convert from renting to buying a house are sign of adult .Those housing choices are related to the formation of families or new households, for instance , marital status and childbirth .Some researchers believes that in the process of family life, there are two typical key moments

for becoming a house-owner: during marriage or pregnancy (Mulder & Lauster, 2010). Clark et al. (1994). In addition, Drew (2015) believes that due to human capital construction doings like education and career expansion lead to their delay of marriage, the United States has led to a decline in the ratio of youth home ownership. Other studies in the United States conduct that the lower marriage proportion significantly affects the home ownership rate (Fisher & Gervais, 2011). Similar social ideologies regarding family and house ownership are common in Asian societies (Ronald, 2004). Self-owned house is traditionally regarded as a prerequisite of marriage in China (Li & Wu, 2014). Couples use house obtain to show their traditional sense of promise to matrimony (South & Spitze, 1986), so many first-time home buyers are newly formed families (Flowerdew & Al-Hamad, 2004). Which shows that spouses prefer more stable family conditions, which may indicate their acquiescence to long-term marriage relationships. Other studies have pointed out that purchase their own house can prevent the tendency of young family to divorce, because their co-investment in home ownership places a greater financial burden on marriage to a certain extent (Hendershott, 1991; Lauster, 2008).

At the macro aspect, economic constraints have larger impact on the choice of house ownership. Youth must get over credit restrictions under the social system to obtain mortgages, wealth restrictions to save the down payment for housing, and income restrictions to satisfying debt-to-income ratio, etc (Barakova et al., 2003). When restrictions on secondary sales or refinancing of houses make housing ownership impossible, the impact of housing wealth on

family consumption will be restricted (Wong et al., 2018). At the same time, the factors that hindered young people from saving for housing during the Japanese real estate bubble were rising housing prices, which led to excessive consumption of non-housing products. This phenomenon has been documented by scholars (Yoshikawa & Ohtaka, 1989). In addition, during periods of unemployment and economic recession, young generations are tend to reside with parents than ordinary families (Lee & Painter, 2013). Strict housing Loan restrictions have also weakened the motivation and affordability of young people to buy houses. High down payment requirements will have a disproportionate impact on young people, who need more time to congest enough wealth. Testimony from 14 countries express that the house ownership rate and down payment conditions of young people have a significant negative impact (Chiuri & Jappelli, 2003). Which benefit to explain why many young people still cannot afford the cost of buying a house even in the low loan interest rate situations currently prevailing in many countries. Class differences in housing ownership have caused social and economic problems for young generations in Hong Kong. Young people who want to rent public housing are usually at low level of the socioeconomic conditions, while young people who want to buy high-quality private house are generally at the high position of socioeconomic level. Function of the property market has exacerbated social and economic inequality, while those who own houses have benefited from rising wealth. The past general trend is not only in Hong Kong, but around the world (Piketty, 2018). These renters are divided in the social class. The fact that the current mortgage cost is lower

than the rent makes this split worse. In addition, Hong Kong's present rent policy system doesn't cover private tenants. Because the rent confine or land use rights are not protected, so many tenants with low-income are often struggled to move from one place to another place. Which has caused a high degree of instability in tenant rents and housing location, and the search for ownership of home ownership has become more urgent in Hong Kong.

The greater difficulty is for people looking for housing in the public rental sector, because Hong Kong's public rental policy is controlled by strict asset and income survey methods and is mainly based on the points system, leading to long queues and favoring the elderly rather than the young. This means that for many disadvantaged young generations, it is necessary to obtain the support of their parents through rent-free living. This situation is usual in many other European countries. Such as UK, due to the economic downturn, young people have postponed the transition to personal home ownership and married life(Clapham et al., 2014; Kuhar & Reiter, 2012). But situation in Hong Kong is more troublesome because the average living area is relatively small, only 14.6 square meters, which forces people and their families to live in crowded apartments. It is not difficult to find that the trends and determinants of young people's living decisions in various societies have always been hot topics in the multidisciplinary literature on current youth transition or Hong Kong's urban or homeownership research. The existing literature has shoes both macro and micro aspects, which can help explain housing and living decisions of youth in developed and developing societies. Evaluate their research on the

temporal and spatial heterogeneity of young people' s transition to adult. The transition of young people's residence has attracted more and more academic and public concern. Although policy designers and decision planners face challenges in implementing innovation policies, scholars are required to provide knowledge generation to explain the ongoing dynamic process and nature. In general, Where to arrange the causal sequence to resolve the unbalanced transition of young people to independent living is the focus of academic debate, whether it is the micro-organizations that involve personal abilities and preferences, or the macro-aspect structure that determines the opportunities sexual factors. And situations encountered by individuals in deciding homeownership choices (Billari, 2004; Mandic, 2008; Mykyta, 2012).

It is worth noting that the youth home ownership problem actually reflects the overall housing selection problem of the society and should not be narrowly defined as the housing selection problem of a group of people. Because the family transition stage is significant stage in the choice of house ownership (Clark et al., 1994). Which is to say, it can be seen from the family life cycle theory that people in the transitional stage of the family appear to be more prominent when facing the problem of housing ownership selection. Therefore, the overall housing selection problem of the society through the study of youth housing actually reflects other aspects to a certain extent. Difficulties faced by other groups in society in this regard.

Housing ownership choice are sequence decisions of housing choices covering a person's life. Therefore, the approach to housing

may change due to various life changes or other voluntary and involuntary changes; this theory takes into account the past, present, and future housing conditions, which usually change between life stages and between life stages. Great changes have taken place. The choice of individual housing changes the housing path that is deeply embedded and influenced by the social structure. Clapham (2005) explored the definition of housing choice as "the interaction mode (practice) of house and house in timing and space"(Clapham, 2005). His concept of housing choice is based on social constructivism to analyze housing problems. It considers people's ideas, attitudes, desires, meanings and norms, as well as people's participation in the ever-changing social structure and housing environment. The choice of housing use rights is intently interrelated to the life cycle decisions of individuals or families. At the same time, the percentage of homeowners in a country has an impact on the country's economic and social aspects. Therefore, the small rental market, high prices, home ownership ideology cause young people to put off leaving their homes. This fact will also affect the social marital status and birth rate patterns. While the models conduct in the economic literature are multiple, ranging from the classic binary choice model to the duration model. Thus, the real reasons of tenure are still unclear, due to the method of estimating the determinants of tenure changes is different based on the definition of the dependent variable. Although modeling strategies are usually limited by available data and analysis purposes, in some cases, researchers often choose between different strategies.

Although extensive research has been conducted on the global

demand for housing ownership, few studies in Hong Kong use panel data to analyze housing trends over a period ,especially the aspects that affect housing choices. Most researches are in view of cross-sectional analysis, at a specific point in time or at different points in time. Therefore, the reasons leading to the rates of house ownership are largely unknown. Meanwhile related research shows that Hong Kong riots in recent years are closely related to housing(Yu, 2021) .Therefore, it is necessary to analyze the affecting factors on the Hong Kong background holistically, and analyze the factors affecting the selection trend of housing ownership that change over time.

## **2. Background and hypothesis**

**Hypothesis of demographic characteristics :** Based on the results of Hong Kong's 2019 population statistics, the population of Hong Kong in 2019 is about 7,507,400. As the population born with baby boomers in the 1980s gradually go in old age, population aged 65 and over in the overall population increased from about 12% in 2001 to about 17.6% in 2019(census, 2016). Proportion of unmarried people between the ages of 20 and 49 has increased in the past 20 years. Among them, the proportion of men between the ages of 30 and 39 has remained stable at 20%; the ratio of women has risen from 17.8% in 2001 to 19% in 2019.

According to the conditions of public housing application, public rental housing is queued according to the quota and points system, giving priority to the elderly and family applicants. Elderly people over 60 years old or families living with relatives over 60 years old

have higher priority in the application process and the waiting time is shorter, while young people applying for public housing on an individual basis are in the waiting process. Has the lowest priority, and young people have low incomes and cannot afford private housing rents. This means that it will be more difficult for youth in Hong Kong to own independent space by applying for public housing. At the end of 2019, there were about 150,000 individual applicants from families and seniors, and 110,000 individual applicants from non-elders. The average time for waiting families and seniors was 5.4 years (Authority, 2019).

As for the subsidized sale of housing for young people and low- and middle-income groups, about 62 times the excess applications for the "Sale of HOS Flats 2019" reflects the extremely high demand for subsidized-sale flats from low- and middle-income families (Authority, 2019). In fact, the "Home Ownership" program has been in short supply since its implementation. However, due to the suspension of various home ownership programs since 2003, only 5,700 newly completed subsidized-sale units were completed between 2003 and 2014. The supply of housing was too small and large. Most home ownership schemes have ceased.

According to demographic data from 2001 to 2016, the percentage of males in the 25-34 age group living in their parents' housing increased from 51% in 2001 to 61% in 2016, and the percentage of females rose from 30% in 2001. % Increased to 39% in 2016. Among the older middle-aged and young people in the 34-44 age group, the proportion rose from 12% to 15%.

In addition, according to census statistics in 2020, Hong Kong

people first marriage age for male and female , but it was 26.2 and 29.1 in 1991 respectively, both under 30. In 2019, the first marriage ages for male and female were 29.9 years and 31.6 years, respectively, an increase of 3.7 years and 2.5 years from 10 years ago. The first marriage age for male and female in Hong Kong has increased significantly, this trend seems continue. Because of employment put off and unstable employment, recently, the average age of the young generation to create independent families or married families due to late marriages and non-marriage tendencies to form married families was around the beginning of the 1930s, and married families were later than now. Therefore, those in their 20s and 30s who enter society through marriage or get married through marriage belong to the younger generation. And as a research object, the population between the ages of 20 and 39 is considered to affect the house ownership rates.

According to the existing literature on marital status and housing choice, it is assumed that in order to release positive signals for marriage or to improve the family living environment after giving birth to children, married people in Hong Kong are more likely to purchase a house and to rise to the third level. The “subsidized home ownership housing class” and the fourth tier of the “private permanent housing class” . Single residents are more willing to rent public housing or temporary housing, so single Hong Kong people occupy a larger proportion of the first “temporary housing class” and the second “public rental housing class” . However, after analyzing Hong Kong's housing stratification data, it is found that the people living in subdivided housing units do not meet this assumption.

From the perspective of marital status, more than half of the people renting in split housing units are married, about 39.55% are never married, and about 8.8% are divorced, separated and widowed. The renting phenomenon of more than half of married people is significantly different from that of the mainland.

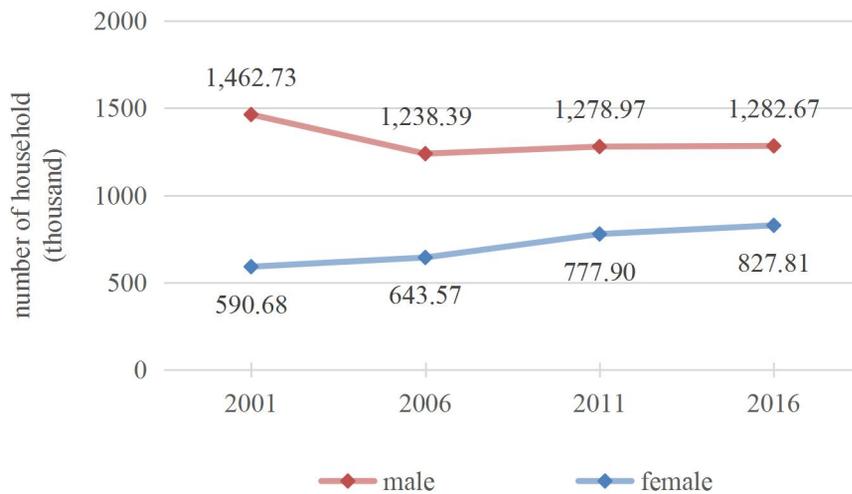
In mainland China, marriages are increasingly pursuing the purchase of self-owned houses, and the proportion of renting houses after marriage is relatively low. Most of the mainlanders living in "house in house" live in first- and second-tier cities. Among them, the groups who have not graduated for a long time, have low work qualifications, and are not yet ready to marry and have children, are especially represented by young people from "Beijing", "Shanghai" and "Guangzhou". Most married people would rather apply for housing loans to support the purchase of houses, rather than long-term renting in a "house in house" with a long age and a small area. Housing is not only a place of residence, but also a medium for residents to obtain local public suppliers such as education, transportation, medical, and environmental quality, it is responsible for the important function of the city's allocation of public resources (Zheng et al., 2016). Due to unbalanced allocation of public resources and concentration of quality public products and services in cities, most mainlanders who work and live in cities are eager to own their own houses after marriage. In Hong Kong, because the housing price-to-income ratio is too high, low- and middle-income groups cannot afford the high housing prices. Therefore, a considerable number of Hong Kong people still choose to rent in split housing units after marriage.

In the definition of the family business cycle, when a new family is formed, under normal circumstances, due to the formation of the family, there is a demand for the purchase or rental of houses. Generally speaking, married families have a higher demand for housing. Stable housing. Compared with unmarried people, they are more willing to own a house. Especially in traditional Chinese concepts, owning a house is the most basic requirement for marriage stability.

Therefore, the higher the proportion of the married population, the higher the home ownership rate of the family, and the expected effect is positive. Therefore, as the research object, the marital status is considered to affect the right to use housing.

**Hypothesis of family characteristics :** Similar ideologies regarding family and house ownership are common in Asian societies (Ronald, 2004). For example , Chinese housing is traditionally counted as the first condition of marriage (Li & Wu, 2014). ,Couples used home purchases to express their promising of marriage traditionally(South & Spitze, 1986). Therefore, marriage may also be a determinant of the choice of family tenure. Helping their children get married is the main motivation for Chinese families to purchase multiple houses. In particular, families with unmarried sons are more motivated to invest in more houses to improve competitiveness in marriage market of their son(Chai & Feng, 2020) This is not surprising, because there are indeed differences in the socio-economic status of male and female(Bimber, 2000). This may be more likely to influence the choices of the house owner. Wah (2010)

reveals the inequality suffered by women in the family and housing in Hong Kong.. Lau and Wei (2018) argues that in Hong Kong, Shanghai and Tokyo and other big cities, women are excluded from housing ownership stems from huge gender inequality.



[Figure 2-2] Households headship by gender in Hong Kong

However, in the past 18 years or so, the gender ratio (the number of men per 1,000 women) has continued to decline, from 1,021 in 2001 to 910 in 2019. Since 1996, the female population in the 20-39 age group is usually larger than male. Since 2001, the population of female in the 40-44 age has also exceed that of male. According to the main statistical report on Hong Kong men and women in 2016, this was caused by a large number of women from mainland China coming to Hong Kong and a wide group of women foreign workers living in Hong Kong. During this period, from 2001 to 2016, the overall household head ratio of women aged 30-64 has

increased, and the number of households headed by women continues to exceed that of households headed by men. In contrast, female heads of households have fewer tenants than male heads of households. The same period. In 2016, there were 109,030 single-person households headed by women living in PRH or subsidized housing ownership, an increase of 22.3% over the 89,123 households owned by men. Therefore, it is assumed that the gender ratio affects housing ownership in Hong Kong.

The second is to include information about family factors, similar family scale, life cycle or other demographic information, involving the dependency rate of children and the elderly in the family, family size and proportion of living alone. Like most developed societies, Hong Kong has experienced major family divisions in recent years, bring out a trend towards personalized life courses in East Asia. The number of families living alone increased from 16.5% in 2001 to 19.95% in 2019 in Hong Kong. Living alone is not only related to the transformation of marriage and partnership, however the rising of social and logical individuals is also reflected in the corrosion of family and group support networks, the enhancement of self-reflection, and the individualization of risks (Beck & Beck-Gernsheim, 2002). Institutional constraints (Beck & Beck-Gernsheim, 2002). That is, the welfare system, labor market, etc. Has a significant affect on adult life and their entire life process, affecting the distribution of single households (Buchmann & Kriesi, 2011).

Although single-person families are not uncommon in Hong Kong, this group as the main type of family started late, developed rapidly and has a high degree of urbanization. In many countries, the biggest

driving force for single-person families is the increasing number of elderly people living alone, especially widows, because the number of residences in multi-generational families has decreased and the aging of society has intensified. However, the emergence of single elderly people cannot conceal the fundamental growth of young single families, especially in cities. For example, in Japan, in 2003, single-living households under the age of 35 make up for 48.8% of independent households in that age group, however, by 2013, this proportion had risen to 54.2%. In Tokyo, this proportion is 66.8%, while the proportion of people reaching retirement age is 42.4% (Kobayashi, 2015). Therefore, even in Tokyo, there are more young single families than elderly families. But in Hong Kong, after urban single youths experienced intense and continuous expansion from 2001 to 2006, the population living alone aged 25-44 dropped from 13.75% in 2006 to 10% in 2019. Meantime, the proportion of single-family over 45 years old reached 30.7% in 2016, partly reflecting the increasing aging of existing single-person households.

[Table 2-1] Percentage of living alone by age (%)

| Age   | 2001  | 2006  | 2011  | 2016  |
|-------|-------|-------|-------|-------|
| <25   | 0.50  | 0.55  | 0.45  | 0.65  |
| 25-34 | 5.60  | 6.70  | 5.45  | 4.90  |
| 35-44 | 4.65  | 7.05  | 6.40  | 5.60  |
| 45-54 | 4.55  | 5.70  | 6.65  | 7.70  |
| 55-64 | 6.05  | 6.60  | 7.65  | 8.85  |
| >65   | 12.40 | 12.75 | 13.75 | 14.15 |

From 2001 to 2019, rents doubled, but wages rose by less than

40%. In a sense, rising rents and housing prices have made living alone an expensive housing option. Therefore, the cheaper option is the public housing sector. For example, the number of public rental housing for single-family households, such as apartments under the housing ownership scheme (assisted housing ownership), has increased dramatically. Rental houses restricted by the points and quota system have not been disclosed .

The plan only reserves about 2,000 units each year. For 100,000 non-elderly single applicants (number in 2010), the opportunities to enter the public rental industry are very limited. Young single applicants are subject to an age-based distribution system for dual disadvantaged groups. This effectively prevents it from entering the industry for single applicants under 30. This explains why in the public rental industry (mainly single tenants), the proportion of single young people is insufficient (the proportion of 34-year-old single households did not exceed 13% in 2016). In this context, the so-called "subdivision" apartments have begun to sprout in the last ten years. According to a 2016 government survey, more than 27,600 people live in such units, accounting for 31%.

[Table 2-2] Percentage of Living with parent(s) only by age (%)

| Age   | 2001  | 2006  | 2011  | 2016  |
|-------|-------|-------|-------|-------|
| <25   | 93.25 | 93.90 | 95    | 95    |
| 25-34 | 40.90 | 43.85 | 47.70 | 50.15 |
| 35-44 | 12    | 14.10 | 16.05 | 16.80 |
| 45-54 | 4.05  | 5.20  | 6.65  | 8.35  |
| 55-64 | 1.00  | 1.75  | 2.10  | 3.20  |
| >65   | 0.15  | 0.15  | 0.20  | 0.65  |

At the same time, although the standard of living in Hong Kong is very low compared to other cities, the proportion of age groups living with parents seems to be gradually expanding. However, compared with the high rents and mortgages required to live alone, parental assistance or parental housing rights inheritance may be an attractive option. Therefore, it is assumed that the proportion of living alone affects the choice of house ownership.

Existing research shows that the homeownership rate is negatively correlated with family size, which may be related to the smaller the family size, the more families that need their own housing (Segal & Sullivan, 1998). However, another factor that cannot be ignored, the larger the scale, the more urgent the need for large families to solve the housing problem, and the greater their motivation to own a house. Therefore, the impact of family households numbers on the housing ownership rate of city households may be complicated and it is impossible to determine the expected action.

The life cycle of the family has entered a phase of contraction, and the average number of families is on a downward trend. From the perspective of the family life cycle, the families in the five population waves have basically passed the stable period, entering the stage of shrinking, empty nest, and disintegration. Depending on Statistics from the HK Census and Statistics Department have revealed the impact in first wave of population in the 1930s since 1981, and the family average numbers has continued to decline. It is expected that by 2049, Hong Kong' s population will experience negative growth and the average family size will remain stable for a

long time. At around 2.7 people in present. In the future, the demand for small and medium-sized housing such as empty-nest elderly and singles will increase. In the 18 years from 2001 to 2019, the number of family size increased from 2,053,400 to 2,614,000, an increase of 12.7 %. During the same period, the average people of household number dropped from 3.2 to 2.8. Specifically, ratio of households with one or two members rose from 40.6% in 2001 to 44.8% in 2019. Conversely, those with six or more members The proportion of families dropped from 5.5% in 2001 to 3.3% in 2019. The proportion of families composed of couples and unmarried children dropped sharply from 54.4% in 2001 to 36.7% in 2019. The proportion of single-person families dropped from 14.5% in 2001 Increased to 20% in 2019. Due to the low fertility rate, the proportion of two-person households consisting of only one couple has also increased from 14.1% in 2001 to 15.5% in 2019. The number of households is growing quicker than than the population.

[Table 2-3] Average numbers of family (person)

| <b>Year</b> | <b>Number of households</b> | <b>Average annual increase in the first five years</b> | <b>Average number per family (family size)</b> |
|-------------|-----------------------------|--|--|
| 2001        | 2,053,400                   | 39,600   | 3.2  |
| 2006        | 2,226,500                   | 34,600   | 3.1  |
| 2011        | 2,368,800                   | 28,460   | 3.0  |
| 2016        | 2,431,500                   | 12,540   | 2.9  |
| 2019        | 2,614,000                   | 36,500   | 2.8  |

The Hong Kong government proposed a youth symbiosis project in 2011 policy pronouncement. This conception of "living together" also includes the elements of establishing interpersonal networks and communities. Aims to provide affordable housing to meet the personal development and housing needs of young people. It was established through cooperation with non-governmental organizations. In addition, in Hong Kong, the most universal structure of informal house is SDU, it is formed by sub-divided single family apartment into two or more inner connections and external rentable housing (Department, 2018). The Hong Kong Subdivision Unit (SDU) research report pointed out that Hong Kong has an informal housing market. Low-income families can live in smaller, low-quality housing ownership. The poorer the housing location, the lower the rent and the more "affordable" it is (Leung et al., 2020). Middle- and high-income families obtain more room to regulate the housing need, like adjusting in owning and renting, also entering better or worse quality housing, that is, their housing demand has a higher income elasticity. However, low-income families cannot afford to buy a house whenever how high the rent is, but they still have to rent a house. It has been observed that when house rents increase relative to income, low-income families will further reduce the size and quality of houses, that is, shared houses or living space, thereby reducing housing consumption (Leung et al., 2020). However, the per capita floor area of Hong Kong is very low, much lower than those developed countries. Even through city standards, the average living area of Hong Kong citizens is lower than similar cities around the world. In 2016, assessed the average space of 14m<sup>2</sup>/person in Hong

Kong. Smaller than 21m<sup>2</sup> and 18m<sup>2</sup> in the United Kingdom and Japan, This shows the housing consumption and housing congestion in Hong Kong. Since Hong Kong's high-density and high-density residential units are an extremely serious problem, this problem deserves the government, society and scholars to attach great importance to it.

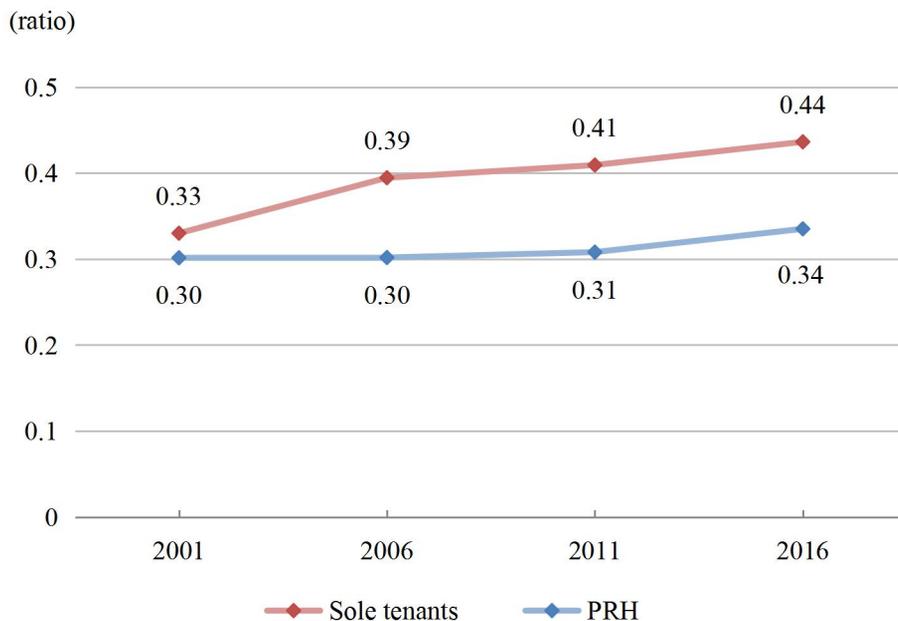
In addition to the aging population(Anderson & Hussey, 2000; Sagaza, 2004) and the persistence of intergenerational life brought about by the traditional filial piety culture, adult children also live with elderly parents and look after them(Chu et al., 2011). More and more literature studies whether house ownership is related to childbirth. Mulder (2006) pointed out that having children can encourage people to own houses, because childbearing usually requires ensuring a stable family environment. In addition, the number of children and house ownership seem to be complementary (Xxx & Iwata, 2012). Hong Kong's "ageing population continues to deepen, the birth rate is still low, and the ratio of children under 15 years of age has declined. As the elderly dependency ratio increased rapidly from 2001 to 2019, it increased from 155 to 255. The total dependency ratio (the proportion of the population aged 65 and over to the population of the 15-year-old age group) increased from 377 in 2001 to 429 in 2019, increasing to 64 per 1,000 people. Therefore, it is assumed that the population over 65 and children under the age of 13 is a factor that affects the rates of housing use rights.

**Hypothesis of economic characteristics** : Including the family and the potential cost of buying a house, that is, the amount of regular repayment of actual borrowings, and budget constraints such as

monthly income. In theory, the higher the income, the lower the mortgage interest rate. More families should be willing to buy houses (Xxx & Iwata, 2012).

According to the Hong Kong Monetary Authority's residential mortgage statistics survey data for the same month of the year, the average loan of newly approved mortgage loans from 2001 to 2019 in January of each year declined slightly in the two or three years after the world financial crisis, and remained basically stable for the rest of the year. The upward trend. The average loan amount increased from 1.40 million HK\$ in 2001 to 3.68 million HK\$ in 2019. In 18 years, it has increased to about 2.5 times that in 2001, with an average annual growth rate of 8.35%. The loan interest ratio has shown a downward trend in volatility, especially after the Hong Kong Monetary Authority has issued several credit round tightening steps in October 2009. Mortgage ratio dropped from 64.2% in January 2009 to 50.1% in January 2019. to a certain extent, alleviated the financial crisis caused by the increase in average loan amount. On the other hand, the loan contract period also showed a trend of extension, from 213 months in 2001 (equivalent to 17.75 years) to 312 months in 2017 (equivalent to 26 years), and the average monthly repayment amount. However, it dropped from 11,951.22 HK\$ in 2001 to 11,847 HK\$ in 2019. Banks and financial institutions raised the threshold for mortgage loans while relax the repayment time, so lowering or maintaining the monthly repayment limit. The investment demand for high-priced and high-area private housing is not a small blow, but for speculators of small and medium-sized units, if the entry threshold is still within an acceptable range, the monthly repayment

amount will be slightly reduced and The extension of the repayment period, On the contrary, it is more conducive to investment in residential investment and housing for self-occupation.



[Figure 2-3] Sole tenants and PRH households ratio

Generally, if cities become wealthier and the average wages rise, the proportion of home ownership will rise(Chai & Feng, 2020). The proportion of private residential dwellings in Hong Kong has increased, the number of households living in self-owned properties has decreased. In the 18 years from 2001 to 2019, the proportion of private residential units among all inhabited housing units increased from 44.5% in 2001 to 56.4% in 2019. The proportion of PRH units increased from 24.9% in 2001 to 29.1% in 2019. Proportion of other type units basically stable. In 2019, the population living in private permanent houses accounted for 50.6% of the total population, an

increase of about 4% and 2% from 2006 and 2011 respectively. People living in PRH and subsidized housing accounted for 29.1% and 14.6%, both of which were down about 2 percentage points from 10 years ago. However, the number of family households living in self-owned properties rose from 24.9% in 2001 to 54.3% in 2004 and then dropped to 50.6% in 2019 year by year. The proportion of households live fully rented units increased from 38% to 45%. In the 18 years from 2001 to 2019, the situation of subletting and co-leasing has dropped significantly from 8.7% in 2001 to 4.16% in 2019.

Income has always been an important indicator of house ownership, and related studies have confirmed that income increases can promote self-owned houses. But Li and Du (2020) used multiple logit models to estimate and analyze the micro data of the 1996–2016 census in Hong Kong and found that due to intergenerational differences, the impact of income on housing ownership is gradually decreasing.

The income of Hong Kong households has increased year by year, but the price gap between private and public housing is large. In 2019, the median monthly household income of households was RMB 30,278, an increase of 39% from 2011 and an increase of 31% from 2001. After deducting inflation, it has achieved real growth of approximately 5.3% and 4.2% in the past 18 years and 8 years, respectively. The median monthly rent paid by domestic households in PRH units is 1,500 HK\$, as well as that of private housing units is 10,000 HK\$. 34.3% of households living in home ownership have mortgages or loans. The median monthly mortgage payment and loan repayment of households with mortgages or loans is \$10,500 for

those living in private permanent houses, and the median mortgage payment and loan repayment to income ratio is 19.0%, while who lives in the subsidy for home ownership is 5,480 HK\$ and 15.5%. The median rent-to-income ratio of households renting private housing units is 30.7%, while the relevant data for PRH is 9.3%(HK census, 2016).

[Table 2-4] Asset conditions for PRH application (HK\$)

| <b>Family size</b> | <b>Maximum monthly household income limit is 5 times the income limit(move out if the limit is exceeded)</b> | <b>Maximum household net asset value is 100 times the limit(move out if the limit is exceeded)</b> |
|--------------------|--|--|
| 1                  | 57,700   | 1,154,000  |
| 2                  | 88,000   | 1,760,000  |
| 3                  | 115,000  | 2,300,000  |
| 4                  | 139,600  | 2,792,000  |
| 5                  | 169,600  | 3,392,000  |
| 6                  | 186,650  | 3,733,000  |
| 7                  | 213,500  | 4,270,000  |
| 8                  | 238,700  | 4,774,000  |
| 9                  | 263,250  | 5,265,000  |
| ≥10                | 287,250  | 5,745,000  |

Note: (1) Statutory contributions under the mandatory provident fund or provident fund scheme can be deducted when reporting income.(2) For all 1-3 households with family members over 55 years old, the net asset limit will be calculated based on the limit for a 4-member family

The Hong Kong Housing Authority pointed out that according to the application data until December 2016, the current average time for common applicants waiting is 4.7 years, and the average time for elderly single-person waiting is 2.6 years. Meanwhile, the latest public housing income and total net asset value limits were

announced, which took effect on January 6, 2018, as shown in the table.

According to statistics, the average number of households in a family was 2.9 in 2016 and 2.8 in 2019. In 2019, the median monthly income of all households in public rental housing and households engaged in economic activities were HK\$15,000 and HK\$19,250 respectively, and the median rent was HK\$1,500, accounting for about 10% of income. The median monthly income of all households in subsidized home ownership housing and households engaged in economic activities is HK\$27,075 and HK\$30,500 respectively, and the median rent is HK\$6,000, accounting for approximately 20.6% of the income of all households in private housing. Median monthly income of family engaged in economic activities is 34,525 Hong Kong dollars and 40,125 Hong Kong dollars, respectively, and the median rent is 10,000 Hong Kong dollars, accounting for 30.7% of income. In 2016, 1.22 million households owned self-owned properties, of which two-thirds required mortgage payments or loan repayments. Median monthly domestic household mortgage payment and loan repayment (HK\$) was 9500 Hong Kong dollars, accounting for household income. The median rate is 18% (2016 mid-term demographic data). Depending on statistics issued by the HK Census and Statistics Department in 2000, the average length of stay in public housing is 11.2 years. This data has not been updated after 2000. Although the Hong Kong Special Administrative Region government regularly reviews the income of public housing residents, and stipulates that those who have lived in public housing for 10 years or more are long-term tenants, and their income or assets

exceed the specified limit, they must pay higher rents or move out of public housing. However, the Hong Kong government did not have a viable forced eviction system for public housing residents whose income exceeds the standard before January 2018. Public housing tenants can continue to live in public housing as long as they do not sublet public housing in violation of regulations or purchase private properties in Hong Kong. The Housing Department verifies the income limit, public housing rent and public housing household income every two years. Family income exceeding the limit is required to pay 1.5–2 times the public housing rent. However, due to the low rents of public housing, even if the rent is doubled, it is much lower than renting private buildings and purchasing real estate. Therefore, once public housing residents are approved to move in, as long as their income changes within a certain range of income levels, most of them can live long-term.

Therefore, in order to test the assumptions about housing expenditure and housing ownership, I included housing loans and the average monthly housing rental expenses into consideration.

**Hypothesis of educational characteristics :** According to existing research in different countries, due to the long-term stability of education level, education level is often apply as an index to measure socioeconomic condition (Chai & Feng, 2020). The longer the education, the higher the level of formal education. Higher, usually its housing grade is higher.

According to a survey report of subdivided apartments of Thematic Household Survey Report No. 60 issued by Hong Kong in

2016, in 2015, there were about 19,900 people (including about 4,400 foreign domestic workers and short-term residents in Hong Kong) living in buildings over 25 years old (excluding public housing), which accounted for approximately 2.8% of the total population of Hong Kong. Among them, 17.7% of households are under the age of 15; this group does not belong to the working population in Hong Kong and most of them are children of middle-aged and young households. 10.1% of households are 15-24 years old, 13.3% of households are 25-34 years old, and 38.6% of households are 35-44 years old, that is, 51.9% of households are young and middle-aged. Most of the young “subdivided housing” households have limited types of work and low income, so it is difficult for them to move out of the “subdivided housing” and improve the quality of living in the short term. In terms of education level, the education level of the households in the sub-houses is relatively low. 60.3% of the Households living in split housing units had only secondary education, 31.6% of the households had a primary school education or below, and less than 10% of the residents had a tertiary education. Although the living quality of sub-house units is not high. The per capita living area is only 5.8 square meters. On average, each house is divided into 3.5 compartments. Only 63.1% of sub-house units have independent kitchens and 91.1% have independent toilets. However, due to the low rent of sub-houses , the rental income The ratio of households is 32.3%, which is more affordable for households, so there are still 200,000 people living in them. Therefore, it is assumed that the level of education will affect the choice of housing use rights.

### 3. Data and modeling strategy

This research aims to investigate the reasons for the decline in ownership of self-occupied homes in Hong Kong, and the reasons for the differences in housing ownership choices over time. To this end, the 2001–2019 population and household statistics divided by district board districts are used (this statistical survey investigated about 99% of the population in Hong Kong, does not include ①inmates of institutions; ②people living on board vessels) and estimated a series of LS models on the division of house use rights. The analysis is for the 18 district council districts in Hong Kong. In a sense, I conducted a series of comparative statistics to reveal the changes over time of population, family, economic status, and education's influence on the choice of housing ownership. I admit that an analysis based on life history may more fully describe the differences in housing choices. But unlike some other European countries, Hong Kong does not have such data. I use household statistics from different years to depict the housing ownership choices of different households in different regions. Regardless of its limitations, including the lack of information on population movements, the quality of the Hong Kong census is relatively high; in addition, the consistency of the definitions of variables in the various censuses facilitates comparisons across periods.

The types of housing use rights that constitute the dependent variable include: fully leased housing, owner-occupied housing ownership, and accommodation provided by employers and collective residential areas. Demographic characteristics and family

characteristics are the main research variables. Based on the information available in household statistics, other independent variables including economic status, education level and a series of variables have been determined (Table 2-5) .

[Table 2-5] Basic statistics of variables

|                             | <b>Classification</b>                          | <b>Variable</b> | <b>Unit</b>   | <b>Definition</b>  |
|-----------------------------|--|-----------------|---|--|
| <b>Dependent variable</b>   | Domestic households by tenure of accommodation | OWNER-OCCUPY    | %   | Percentage of owner-occupier households : refers to the number of owner-occupier households per 100domestic households |
|                             |  | TENANT          | %   | Sole tenants ratio: without sharing it with other household(s) or sub-renting  |
|                             |  | OTHERS          | %   | Co-tenant/Main tenant/Sub-tenant/Rent free ratio   |
| <b>Independent variable</b> | Demographic characteristics                    | AGE20_39        | %   | Proportion of population aged 20-39  |
|                             |  | MARRIED         | %   | Married rate over 15 years old   |
|                             |  | SEX             | ratio   | Sex ratio: refers to the number of males per1000 females in the population   |
|                             | Family characteristics                         | LIVE ALONE      | %   | Percentage of household Live alone   |
|                             |  | SIZE            | AVG   | Number of household members in a domestic household  |
|                             |  | DEPENDENCY      | ratio   | Refers to the number of persons aged under 15 and over 65 per 1000 persons aged between 15 and 65                      |
|                             | Household Economic characteristics             | LOAN            | HK\$  | Median monthly domestic household mortgage payment and loan repayment  |
|                             |  | RENT            | HK\$  | Median monthly domestic household rent   |
|                             |  | INCOME          | HK\$  | Median monthly domestic household income   |
|                             | Educational characteristics                    | EDU             | %   | Educational attainment : Proportion of college degree or above   |
| FULL-TIME STU               |  | %               | Proportion of Persons studying full-time courses in educational institutions in Hong Kong |  |

Data source: Population by Census 2001-2016 &Population and Household Statistics Analysed by 18 District Council District 2001-2019 (census).

Based on the previous assumptions about the literature review and the housing ownership situation in Hong Kong, 11 variables were selected, including demographic, family, economic and educational characteristics. Among them, according to the definition of house ownership in Hong Kong and the situation of house use rights, the three dependent variables are determined as self-owned house, full rent, co-living and other types of house ownership in transitional houses.

Based on Hong Kong' s social ideological factors and the status quo that has changed compared with previous studies, social characteristic variables have been determined, including the proportion of the population aged 20-39, marital status, and gender ratio.

Based on the characteristics of the research data and the literature, the family characteristic variables (living alone, family size, elderly and child support rate) and household economic characteristics (monthly income, monthly rent payment, monthly loan payment) are determined.

Educational characteristics based on mainstream literature research are also included as independent variables.

**Data source:** According to household statistics from 2001 to 2019, the residential areas of Hong Kong households are mainly divided by Hong Kong Island, Kowloon and the New Territories. Among them, there are 4 districts under Hong Kong Island, 9 districts under the New Territories, and 5 districts under Kowloon. The distribution proportions of the three types of households in 18

regions are as follows.

[Table 2-6] Housing ownership in 18 district councils in Hong Kong

| <b>2019 Domestic households by district and tenure of accommodation</b> |                   |                        |          |                     |          |               |          |
|---|-------------------|------------------------|----------|---------------------|----------|---------------|----------|
| <b>Tenure of accommodation</b>  |                   |                        |          |                     |          |               |          |
| <b>District Council district</b>  |                   | <b>Owner-occupiers</b> |          | <b>Sole-tenants</b> |          | <b>Others</b> |          |
|   |                   | <b>number</b>          | <b>%</b> | <b>number</b>       | <b>%</b> | <b>number</b> | <b>%</b> |
| Hong Kong Island  | Central & Western | 52,700                 | 58.6     | 32,000              | 35.5     | 5,400         | 6.0      |
|   | Wan Chai          | 33,900                 | 48.3     | 30,700              | 43.7     | 5,600         | 8.0      |
|   | Eastern           | 111,200                | 58.6     | 71,400              | 37.6     | 7,200         | 3.8      |
|   | Southern          | 43,800                 | 50.5     | 38,200              | 44.0     | 4,800         | 5.5      |
| Kowloon peninsula   | Yau Tsim Mong     | 70,900                 | 55.5     | 47,200              | 36.9     | 9,800         | 7.6      |
|   | Sham Shui Po      | 59,200                 | 38.5     | 90,800              | 59.0     | 3,900         | 2.5      |
|   | Kowloon City      | 71,000                 | 48.1     | 71,300              | 48.2     | 5,500         | 3.7      |
|   | Wong Tai Sin      | 61,100                 | 42.1     | 79,800              | 54.9     | 4,400         | 3.0      |
|   | Kwun Tong         | 75,700                 | 30.9     | 160,800             | 65.6     | 8,800         | 3.6      |
| New Territories   | Kwai Tsing        | 59,100                 | 33.9     | 111,100             | 63.7     | 4,100         | 2.4      |
|   | Tsuen Wan         | 64,000                 | 57.7     | 43,300              | 39.1     | 3,600         | 3.2      |
|   | Tuen Mun          | 98,300                 | 55.0     | 75,100              | 42.0     | 5,400         | 3.0      |
|   | Yuen Long         | 114,500                | 51.3     | 100,500             | 45.0     | 8,300         | 3.7      |
|   | North             | 61,200                 | 56.7     | 42,300              | 39.2     | 4,400         | 4.1      |
|   | Tai Po            | 66,900                 | 64.8     | 31,300              | 30.4     | 4,900         | 4.8      |
|   | Sha Tin           | 130,000                | 55.3     | 97,600              | 41.5     | 7,600         | 3.2      |
|   | Sai Kung          | 100,900                | 65.1     | 49,800              | 32.2     | 4,200         | 2.7      |
|   | Islands           | 27,600                 | 40.1     | 38,500              | 55.8     | 2,800         | 4.1      |
| Overall   |                   | 1,302,000              | 49.8     | 1,211,700           | 46.3     | 100,700       | 3.9      |

Data source: HK census

## Chapter III. Research results

### 1. Descriptive analysis

[Table 3-1] Basic statistics of variables

| Variable      | Unit  | Mean     | Median   | Max      | Min      | SD      |
|---------------|-------|----------|----------|----------|----------|---------|
| OWNER-OCCUPY  | %     | 52.9     | 55.8     | 68.0     | 29.2     | 9.8     |
| TENANTS       | %     | 41.3     | 38.7     | 66.8     | 17.1     | 11.2    |
| OTHERS        | %     | 5.9      | 4.5      | 22.2     | 0.5      | 3.6     |
| AGE20_39      | %     | 33.3     | 32.4     | 44.3     | 27.4     | 3.4     |
| MARRIED       | %     | 58.8     | 58.7     | 66.0     | 52.7     | 2.3     |
| SEX           | ratio | 921.7    | 925.5    | 1,016.0  | 738.0    | 42.0    |
| LIVE_ALONE    | %     | 16.9     | 15.7     | 31.5     | 8.1      | 4.6     |
| SIZE          | AVG   | 2.9      | 2.9      | 3.4      | 2.5      | 0.2     |
| DEPENDENCY    | ratio | 365.9    | 370.5    | 475.0    | 257.0    | 46.4    |
| LOAN          | HK\$  | 8,816.6  | 8,400.1  | 20,109.7 | 4,599.0  | 2,557.0 |
| RENT          | HK\$  | 2,917.7  | 1,866.2  | 15,611.5 | 900.0    | 2,904.8 |
| INCOME        | HK\$  | 21,773.2 | 20,700.0 | 44,100.0 | 11,000.0 | 6,448.2 |
| EDU           | %     | 26.9     | 25.9     | 53.2     | 10.0     | 9.5     |
| FULL-TIME STU | %     | 17.7     | 17.4     | 25.2     | 12.6     | 2.5     |

Panel multicollinearity test : Variance inflation factor (VIF) was used to conduct multicollinearity test for each variable in the three regions, and the results were shown in Table 3-2

[Table 3-2] VIF values of 3 house ownership panel data

| Model    | OWNER-OCCUPY |       | TENANTS |       | OTHERS |       |
|----------|--------------|-------|---------|-------|--------|-------|
|          | VIF          | 1/VIF | VIF     | 1/VIF | VIF    | 1/VIF |
|          | 2.6          | 0.39  | 2.7     | 0.37  | 2.9    | 0.34  |
|          | 1.6          | 0.61  | 1.6     | 0.62  | 1.5    | 0.69  |
|          | 1.4          | 0.71  | 1.5     | 0.68  | 1.5    | 0.68  |
|          | 7.1          | 0.14  | 7.1     | 0.14  | 7.2    | 0.14  |
|          | 6.7          | 0.15  | 6.8     | 0.15  | 6.9    | 0.14  |
|          | 1.9          | 0.52  | 2.0     | 0.51  | 1.7    | 0.60  |
|          | 5.3          | 0.19  | 5.2     | 0.19  | 5.3    | 0.19  |
|          | 6.3          | 0.16  | 7.1     | 0.14  | 6.6    | 0.15  |
|          | 5.0          | 0.20  | 4.7     | 0.21  | 5.5    | 0.18  |
|          | 4.3          | 0.23  | 4.3     | 0.23  | 4.3    | 0.23  |
|          | 3.7          | 0.27  | 3.8     | 0.27  | 4.0    | 0.25  |
| Mean VIF | 4.02         |       | 4.11    |       | 4.18   |       |

The variance factor was used to conduct multicollinearity test on the variables in the three regions, and the VIF values obtained were all less than 10, indicating that there was no obvious multicollinearity among the variables and the multicollinearity test was passed.

[Table 3-3] Unit root test of panel data

| <b>Variable</b> |                       | <b>LLC</b>   | <b>IPS</b> | <b>Fish-ADF</b> | <b>Fish.PP</b> |
|-----------------|-----------------------|--------------|------------|-----------------|----------------|
| <b>level</b>    | OWNER-OCCUPY          | -1.13        | -1.16      | 55.46           | 87.46 *        |
|                 | TENANTS               | -3.37 *      | -2.48 *    | 75.41 *         | 86.23 *        |
|                 | OTHERS                | -3.87 *      | -2.57 *    | 60.87 *         | 58.42          |
|                 | AGE20_39              | -8.83 *      | -6.59 *    | 120.82 *        | 182.46 *       |
|                 | MARRIED               | -7.89 *      | -7.81 *    | 129.56 *        | 145.55 *       |
|                 | SEX                   | -3.49 *      | -2.92 *    | 65.39 *         | 77.98 *        |
|                 | LIVE_ALONE            | -4.55 *      | -1.06      | 43.97           | 44.94 *        |
|                 | SIZE                  | -5.04 *      | -1.38      | 54.64           | 54.83          |
|                 | DEPENDENCY            | 1.068        | 1.23       | 32.27           | 28.00          |
|                 | LOAN                  | 3.18         | 4.13       | 9.09            | 10.44          |
|                 | RENT                  | -2.19        | 3.81       | 45.66           | 15.67          |
|                 | INCOME                | 5.14         | 8.63       | 1.12            | 0.88           |
|                 | EDU                   | -7.44 *      | -2.76 *    | 54.16           | 123.31 *       |
|                 | FULL-TIME STU         | -2.22        | 1.19       | 24.12           | 40.66          |
|                 | <b>1st difference</b> | OWNER-OCCUPY | -13.14 *   | -15.37 *        | 249.42 *       |
| TENANTS         |                       | -15.48 *     | -15.28 *   | 243.89 *        | 615.03 *       |
| OTHERS          |                       | -17.76 *     | -17.73 *   | 284.30 *        | 684.87 *       |
| AGE20_39        |                       | -15.52 *     | -15.27 *   | 242.45 *        | 852.66 *       |
| MARRIED         |                       | -19.49 *     | -20.25 *   | 326.06 *        | 1024.67 *      |
| SEX             |                       | -16.35 *     | -14.46 *   | 230.21 *        | 1116.71 *      |
| LIVE_ALONE      |                       | -21.95 *     | -20.88 *   | 358.99 *        | 581.69 *       |
| SIZE            |                       | -17.41 *     | -15.19 *   | 232.04 *        | 258.92 *       |
| DEPENDENCY      |                       | -12.60 *     | -10.46 *   | 179.20 *        | 283.17 *       |
| LOAN            |                       | -11.08 *     | -8.28 *    | 130.39 *        | 148.68 *       |
| RENT            |                       | -9.40 *      | -9.36 *    | 149.89 *        | 157.99 *       |
| INCOME          |                       | -16.65 *     | -16.42 *   | 468.10 *        | 313.99 *       |
| EDU             |                       | -16.74 *     | -13.87 *   | 213.71 *        | 260.53 *       |
| FULL-TIME STU   |                       | -15.45 *     | -15.42 *   | 250.19 *        | 823.76 *       |

Note: \* represents, p value<0.01

**Unit root test** : Common methods have LLC test (Levinlin-Chu), IPS test (Im-Pesaran-Shin), Fisher-ADF, and Fisher-PP. The test results of this study are shown in Table 3-3. The results show that each variable is not completely stationary on the horizontal level, but after the first-order difference, the original hypothesis of the existence of unit root is significantly rejected, that is, there is no unit root, so the variables are stationary on the same order.

From the unit root test results in the above table, it can be seen that the panel data is first-order single-integrated. In order to avoid spurious regression, the long-term equilibrium relationship between variables is tested, and Kao (1999) is used to conduct a co-integration test. It is found that the three panel data are co-integrated. Showing that there is a long-term equilibrium relationship in the variables, and the regression equation can be established.

## 2. The impacts of variables

[Table 3-4] Serial correlation, Cross-sectional, Heteroskedasticity

| <b>Serial correlation test</b>         |             | OWNER          | TANANTS       | OTHERS         |
|--|-------------|----------------|---------------|----------------|
| AR(1)                                  | WD          | 7.602(0.0135)  | 8.749(0.0088) | 10.591(0.0047) |
|  | HR          | -1.16(0.248)   | 2.01(0.044)   | 1.51(0.132)    |
|  | Q           | 6.87(0.009)    | 7.08(0.008)   | 16.73(0.000)   |
|  | LM          | 2.61(0.009)    | 2.64(0.008)   | 4.11(0.000)    |
| AR(2)                                  | Q           | 6.95(0.031)    | 7.19(0.027)   | 17.55(0.000)   |
|  | LM          | 2.53(0.012)    | 2.53(0.012)   | 3.01(0.003)    |
| <b>Cross-sectional dependence test</b> |             |                |               |                |
| Pesaran's test                         | CD start=   | 1.305( 0.1919) | 0.775(0.4385) | 1.587( 0.1126) |
| <b>Heteroskedasticity test</b>         |             |                |               |                |
| Modifies Wald test                     | $X^2(18) =$ | 1134.92(0.000) | 661.31(0.000) | 649.15(0.000)  |

Before the model regression, a Hausman test was first performed, and it was found that the test rejected the null hypothesis, so the fixed effects model (FE) was selected. Second, the modified Wald test is used for the heteroscedasticity test, and the Wooldridge test is used for the autocorrelation test. (Autocorrelation test), Pesaran's CD test is used for cross-sectional independence. Cross-sectional Independence. The results show that there is no cross-sectional correlation in the three sets of panel data, but there may be heteroscedasticity and serial correlation (Table 3-4).

Therefore, the panel fixed effects model is used as the reference model. At the same time, FGLS, PCSE and DK are estimated to produce 4 regression models. . When the time span  $T$  is greater than the number of cross sections  $N$ , the standard error will underestimate the true variability, so FGLS estimation is used; when the number of cross sections  $N \geq T$ , PCSE estimation is used; the method proposed by D&K (1998) is used to obtain heteroscedasticity- Sequence correlation-the standard error of the robustness of the cross-section correlation. According to the different test results, a more suitable estimation method is selected.

A total of 4 estimation methods were used and 12 models were produced. However, considering that  $T > N$ , models 2, 6, and 10 were selected for comparison in the comparative analysis of three kinds of house ownership influencing factors.

- Analysis of influencing factors on the proportion of owner-occupier households

[Table 3-5] Panel data estimation results of OWNER-OCCUPY

| <b>Dependent Variable : OWNER-OCCUPY</b> |                  |                    |                    |                    |                    |
|--|------------------|--------------------|--------------------|--------------------|--------------------|
|  | <b>Variable</b>  | <b>FE-1</b>        | <b>FGLS-2</b>      | <b>PCSE-3</b>      | <b>DK-4</b>        |
| Demographic characteristics              | AGE20_39         | 0.147*<br>(2.23)   | 0.003<br>(0.06)    | -0.067<br>(-1.15)  | 0.147*<br>(3.12)   |
|  | MARRIED          | 0.043<br>(0.34)    | 0.016<br>(0.37)    | -0.006<br>(-0.09)  | 0.043<br>(0.51)    |
|  | SEX              | -0.144<br>(-1.54)  | -0.099*<br>(-1.96) | -0.104<br>(-1.38)  | -0.144*<br>(-2.04) |
| Family characteristics                   | LIVE_ALONE       | -0.042<br>(-0.75)  | -0.065*<br>(-3.08) | -0.040<br>(-1.34)  | -0.042<br>(-1.51)  |
|  | SIZE             | 0.075<br>(0.41)    | -0.267*<br>(-2.62) | -0.298*<br>(-2.06) | 0.075<br>(0.58)    |
|  | DEPENDENCY       | 0.000<br>(-0.00)   | 0.000<br>(-0.01)   | 0.028<br>(0.94)    | 0.000<br>(-0.01)   |
| Household Economic characteristics       | LOAN             | -0.065<br>(-1.65)  | -0.039*<br>(-1.79) | -0.079*<br>(-2.50) | 0.065*<br>(-2.56)  |
|  | RENT             | 0.115*<br>(2.64)   | 0.091*<br>(4.92)   | 0.129*<br>(4.06)   | 0.115*<br>(5.78)   |
|  | INCOME           | -0.220*<br>(-4.28) | -0.075*<br>(-2.11) | -0.019<br>(-0.37)  | -0.220*<br>(-8.50) |
| Educational characteristics              | EDU              | 0.022<br>(0.62)    | 0.024<br>(1.13)    | 0.065*<br>(2.48)   | 0.022<br>(1.00)    |
|  | FULL-TIME<br>STU | -0.204*<br>(-3.94) | -0.172*<br>(-4.97) | -0.177*<br>(-3.36) | -0.204*<br>(-5.26) |
| Observations                             |                  | 342                | 342                | 342                | 342                |
| R <sup>2</sup>                           | within           | 0.3629             |                    |                    |                    |
|  | between          | 0.0003             |                    | 0.9863             | 0.3629             |
|  | overall          | 0.0104             |                    |                    |                    |

Note: \* represents, p value<0.1

In order to analyze the factors affecting the proportion of self-owned households, the selected 11 variables were used for

regression analysis with panel data. The results show that, except for the ratio of marriage, almost all the factors that affect the ratio of owner-occupiers are: monthly rent paid by households, monthly income, monthly loan repayment ratio, ratio of full-time students, ratio of men to 1,000 women, ratio of living alone, and family size .

Among all the factors, family economic characteristics have the greatest impact on the proportion of owner-occupied households. Among them, monthly rent payment plays a positive role, while monthly loan repayment and monthly income play a negative role. Family characteristics have little effect. In terms of demographic characteristics, the proportion of the population aged 20-39 plays a positive role, while the proportion of women per 1,000 men plays a negative role. Among the characteristics of education, the proportion of full-time students plays a negative role.

- **Analysis of influencing factors on the proportion of Sole-tenants households**

Analyze the factors that affect the proportion of sole-tenants, and select the same 11 variables for panel data regression analysis. It is found that the factors affecting the proportion of sole-tenants are as follows: the proportion of males to females, the proportion of living alone, the size of the family, the support rate of the elderly and children, and the proportion of full-time students.

Among all the factors, family characteristics have the greatest influence on the proportion of sole-tenants. Among them, the family size played a positive role and played a negative role. Percentage of living alone and dependency ratio. The second is demographic

characteristics. The variable of the ratio of males per thousands of females has a positive effect on promotion. Among the characteristics of education, the proportion of full-time students plays a positive role.

[Table 3-6] Panel data estimation results of TENANTS

| <b>Dependent Variable : TENANTS</b> |                 |                    |                    |                    |                    |
|-------------------------------------|-----------------|--------------------|--------------------|--------------------|--------------------|
|                                     | <b>Variable</b> | <b>FE-5</b>        | <b>FGLS-6</b>      | <b>PCSE-7</b>      | <b>DK-8</b>        |
| Demographic characteristics         | AGE20_39        | -0.416*<br>(-3.58) | -0.020<br>(-0.19)  | -0.020<br>(-0.13)  | -0.416*<br>(-2.46) |
|                                     | MARRIED         | -0.146<br>(-0.91)  | -0.158<br>(-1.18)  | -0.158<br>(-1.29)  | -0.146<br>(-1.56)  |
|                                     | SEX             | 0.472*<br>(2.35)   | 0.389*<br>(3.41)   | 0.389*<br>(2.95)   | 0.472*<br>(3.18)   |
| Family characteristics              | LIVE_ALONE      | -0.019<br>(-0.24)  | -0.087*<br>(-1.65) | -0.087*<br>(-1.81) | -0.019<br>(-0.37)  |
|                                     | SIZE            | 0.139<br>(0.34)    | 0.522*<br>(2.21)   | 0.522*<br>(2.11)   | 0.139<br>(0.49)    |
|                                     | DEPENDENCY      | -0.025<br>(-0.48)  | -0.086*<br>(-1.68) | -0.086*<br>(-1.86) | -0.025<br>(-0.78)  |
| Household Economic characteristics  | LOAN            | -0.012<br>(-0.17)  | 0.040<br>(0.89)    | 0.040<br>(0.92)    | -0.012<br>(-0.21)  |
|                                     | RENT            | 0.050<br>(0.57)    | 0.030<br>(0.87)    | 0.030<br>(0.71)    | 0.050<br>(0.78)    |
|                                     | INCOME          | 0.369*<br>(4.29)   | 0.032<br>(0.41)    | 0.032<br>(0.39)    | 0.369*<br>(6.66)   |
| Educational characteristics         | EDU             | 0.122<br>(1.11)    | 0.019<br>(0.40)    | 0.019<br>(0.37)    | 0.122*<br>(1.86)   |
|                                     | FULL-TIME STU   | 0.668*<br>(4.89)   | 0.747*<br>(10.58)  | 0.747*<br>(8.51)   | 0.668*<br>(6.80)   |
| Observations                        |                 | 342                | 342                | 342                | 342                |
| R <sup>2</sup>                      | within          | 0.5747             |                    |                    |                    |
|                                     | between         | 0.3973             |                    | 0.9620             | 0.5747             |
|                                     | overall         | 0.0364             |                    |                    |                    |

Note: \* represents p value<0.1

- Analysis of influencing factors on the proportion of co-tenant ,primary tenant ,sub-tenant households

[Table 3-7] Panel data estimation results of OTHERS

| <b>Dependent Variable : OTHERS</b> |                 |                    |                    |                    |                    |
|------------------------------------|-----------------|--------------------|--------------------|--------------------|--------------------|
|                                    | <b>Variable</b> | <b>FE-9</b>        | <b>FGLS-10</b>     | <b>PCSE-11</b>     | <b>DK-12</b>       |
| Demographic characteristics        | AGE20_39        | 0.653<br>(1.72)    | 0.803*<br>(3.87)   | 0.968*<br>(2.67)   | 0.653*<br>(2.12)   |
|                                    | MARRIED         | -0.159<br>(-0.32)  | 0.204<br>(0.71)    | 0.102<br>(0.22)    | 0.159<br>(-0.48)   |
|                                    | SEX             | -0.797*<br>(-2.34) | -1.277*<br>(-4.14) | -1.275*<br>(-2.30) | -0.797*<br>(-1.90) |
| Family characteristics             | LIVE_ALONE      | 0.26<br>(1.12)     | 0.247*<br>(2.26)   | 0.417*<br>(2.65)   | 0.260<br>(1.42)    |
|                                    | SIZE            | 1.898*<br>(2.67)   | 1.439*<br>(2.92)   | 2.472*<br>(3.46)   | 1.898*<br>(2.75)   |
|                                    | DEPENDENCY      | 0.574*<br>(2.29)   | -0.051<br>(-0.34)  | 0.120<br>(0.49)    | 0.574*<br>(4.98)   |
| Household Economic characteristics | LOAN            | 0.221<br>(1.37)    | 0.575*<br>(4.59)   | 0.363*<br>(2.02)   | 0.221<br>(1.26)    |
|                                    | RENT            | -0.331*<br>(-2.47) | 0.550*<br>(9.47)   | 0.546*<br>(6.29)   | -0.331*<br>(-2.26) |
|                                    | INCOME          | -0.531*<br>(-3.15) | -1.288*<br>(-9.80) | -1.062*<br>(-4.79) | -0.531*<br>(-2.73) |
| Educational characteristics        | EDU             | -0.447*<br>(-2.01) | 0.029<br>(0.30)    | 0.118<br>(0.57)    | -0.447*<br>(-3.08) |
|                                    | FULL-TIME STU   | -1.510*<br>(-5.00) | -0.823*<br>(-4.55) | -0.625*<br>(-2.16) | -1.510*<br>(-7.05) |
| Observations                       |                 | 342                | 342                | 342                | 342                |
| R <sup>2</sup>                     | within          | 0.4284             |                    |                    |                    |
|                                    | between         | 0.4014             |                    | 0.8031             | 0.4284             |
|                                    | overall         | 0.0696             |                    |                    |                    |

Note: \* represents p value <0.1

Analyze the factors affecting the ratio of Co-tenant/Main-tenant/Sub-tenant, and select the same 11 variables for panel data

regression analysis. The factors affecting the ratio of co-tenant, primary tenant, sub-tenant are the proportion of population aged 20-39, gender proportion, proportion of full-time students, proportion of population aged 15-65 under 15 and over 65, monthly rent, monthly income, monthly Loan repayment, family size, ratio of living alone.

Among all the factors, family economic characteristics have the greatest impact on the co-tenant, primary tenant, sub-tenant ratio, with monthly rents having a positive effect, while monthly income has a negative effect. The second is the educational factor. Among them, full-time students were negatively affected. About family characteristics, family size has a positive effect. In terms of demographic characteristics, the population ratio of AGE20\_39 has a positive effect on the ratio of males per 1,000 females.

### **3. Comparison of 3 housing ownership influencing factors**

The previous article analyzed the impact of the same factors on the choice of different housing listings. The reasons for the different factors that affect the choice of home ownership are summarized below. The OWNER-OCCUPY family rate is mainly affected by family economic characteristics (monthly income, monthly rent, monthly loan repayment), socio-demographic characteristics (proportion of men among 1,000 women), and educational characteristics (proportion of full-time students). The main factors affecting the proportion of sole-tenants (TENANTS) are education characteristics (proportion of full-time students), family characteristics (proportion

of living alone, family size, dependency ratio) and sociodemographic characteristics (proportion of males to 1,000 females).

[Table 3-8] Panel data estimation results of 3 house ownership rates

| Selected Model                           |                  | OWNER<br>FGLS-2 |                  | TENANTS<br>FGLS-6 |                   | OTHERS<br>FGLS-10 |                  |
|--|------------------|-----------------|------------------|-------------------|-------------------|-------------------|------------------|
|  |                  | Coef.           | t                | Coef.             | t                 | Coef.             | t                |
| Demographic<br>characteristics           | AGE20_39         | 0.003           | 0.06<br>(0.952)  | -0.020            | -0.19<br>(0.852)  | 0.803*            | 3.87<br>(0.000)  |
|  | MARRIED          | 0.016           | 0.37<br>(0.709)  | -0.158            | -1.18<br>(0.238)  | 0.204             | 0.71<br>(0.476)  |
|  | SEX              | -0.099*         | -1.96<br>(0.050) | 0.389*            | 3.41<br>(0.001)   | -1.277*           | -4.14<br>(0.000) |
| Family<br>characteristics                | LIVE_ALONE       | -0.065*         | -3.08<br>(0.002) | -0.087*           | -1.65<br>(0.099)  | 0.247*            | 2.26<br>(0.024)  |
|  | SIZE             | -0.267*         | -2.62<br>(0.009) | 0.522*            | 2.21<br>(0.027)   | 1.439*            | 2.92<br>(0.003)  |
|  | DEPENDENCY       | 0.000           | -0.01<br>(0.993) | -0.086*           | -1.68<br>(0.093)  | -0.051            | -0.34<br>(0.731) |
| Household<br>Economic<br>characteristics | LOAN             | -0.039*         | -1.79<br>(0.073) | 0.040             | 0.89<br>(0.373)   | 0.575*            | 4.59<br>(0.000)  |
|  | RENT             | 0.091*          | 4.92<br>(0.000)  | 0.030             | 0.87<br>(0.386)   | 0.550*            | 9.47<br>(0.000)  |
|  | INCOME           | -0.075*         | -2.11<br>(0.035) | 0.032             | 0.41<br>(0.679)   | -1.288*           | -9.80<br>(0.000) |
| Educational<br>characteristics           | EDU              | 0.024           | 1.13<br>(0.257)  | 0.019             | 0.40<br>(0.691)   | 0.029             | 0.30<br>(0.760)  |
|  | FULL-TIME<br>STU | -0.172*         | -4.97<br>(0.000) | 0.747*            | 10.58<br>(10.580) | -0.823*           | -4.55<br>(0.000) |

Note: \* represents p value <0.1

The proportion of co-tenant and sub-tenant households (OTHERS) is mainly education characteristics (the ratio of the

population with a college degree or above, the proportion of full-time students), family economic characteristics (monthly rent, monthly income) and family characteristics (the proportion of living alone, 15- per thousand people) Proportion of population under 15 and over 65 in population of 65 years old) Socio-demographic characteristics (proportion of population aged 20-39).

In order to further compare the results of different factors that affect the rates of different choice of housing use rights, and three results are put together for comparative analysis. As shown in Table 3-8. From the regression results, the proportion of the population aged 20-39 is significantly related to the proportion of co-tenants and sub-tenants. It is positively correlated with the household rate of OWNER-OCCUPY. Scilicet, when the proportion of the population aged 20-39 increases, the proportion of OWNER-OCCUPY families will also increase. There is a negative correlation with the sole-tenants ratio and the co-tenant and sub-tenant household ratio, that is, when the proportion of the population aged 20-39 increases, the sole-tenants ratio and the co-tenant and sub-tenant household ratio decrease accordingly. Therefore, according to the family wealth cycle theory, it can be concluded that people aged 20-39 may have certain difficulties in owning housing, but they can realize their own housing through the help of the previous generation or intergenerational transfer. wealth. However, due to the current age limit for applying for public housing and high rents in the private housing market, they have reduced the choice of sole-tenants housing.

The MARRIED variable, the OWNER-OCCUPY household rate,

the proportion of single-family households, and the proportion of co-tenant and sub-tenant households have no significant effect. A 2015 youth research report also reflected the situation of some married young people in Hong Kong who live in their parents' homes by saving housing expenses to save housing down payment. Therefore, contrary to previous literature, marital status may not have a significant impact on the lease term chosen by Hong Kong people.

When  $p < 0.1$ , the ratio of males per 1,000 females has a significant impact on the ratio of OWNER-OCCUPY families and the ratio of sole-tenants. When the proportion of men increases, the ratio of OWNER-OCCUPY households will decrease. This is contrary to previous studies on male wealth and house ownership, but the data survey in the previous hypothesis can prove to a certain extent that Hong Kong women's ownership in the housing category has increased.

The rates of living alone has a significant affect on the rates of OWNER-OCCUPY households, the rates of single-tenant households, and the proportion of co-tenant and sub-tenant households. However, it is negatively correlated with the OWNER-OCCUPY household rate and the single-tenant household rate, and is positively correlated with the co-rental and sub-tenant household rate. That is, when the proportion of the population living alone increases, it may promote Co-tenant/Main-tenant/Sub-tenant/ instead of OWNER-OCCUPY household rate and single-family household rate.

Family size has a significant impact on the OWNER-OCCUPY household rate and sole-tenant household rate. However, it is negatively correlated with the proportion of OWNER-OCCUPY

households and positively correlated with the proportion of sole-tenant households.

There is a statistically significant positive correlation between the proportion of people under the age of 15 and over 65 and the proportion of co-tenant and sub-tenant households. This correlation suggests that an increase in the dependency rate will increase the ratio of co-tenant and sub-tenant households. In addition, the proportion of people under 15 and over 65 among the population aged 15-65 is negatively correlated with the sole-tenant household rate. However, it is difficult to judge the impact of OWNER-OCCUPY household rate, which is contrary to previous studies in various countries. Dependency rate may no longer be the decisive factor in choosing home ownership options.

The monthly repayment amount is only significantly negatively correlated with the OWNER-OCCUPY family interest rate. There is a positive correlation with the rates of single tenants, and the rates of co-tenants and sub-tenants. In other words, when the family's monthly repayment amount increases, the OWNER-OCCUPY family interest rate will decrease, thereby promoting the choice of renting. According to previous surveys, although loan interest rates have fallen in recent years, it may not actually encourage more people who do not have a house to choose their own house.

The monthly rent payment is significantly related to the proportion of OWNER-OCCUPY households and the proportion of shared and sub-rented households. It is positively correlated with the rates of OWNER-OCCUPY households and the rates of sole-tenant households, and is positively correlated with the proportion of

shared and sub-tenant households. It is negatively correlated. It shows that when the monthly rent paid by the households rises, it will promote the increase of the OWNER-OCCUPY household rate and reduce the proportion of co-renting and sub-renting households. From the data survey in the previous hypothesis, the number of public rental housing tenants from 2001 to 2016 was higher than the proportion of private housing tenants. It can be said that the market share of public rental housing has been maintained in a relatively stable range, fluctuating within a 1.5% floating range. Based on the above speculation, rising rents in the private housing market may have little effect on the proportion of single-family households. Monthly income is significantly related to the choice of three types of housing use rights, negatively related to the OWNER-OCCUPY household rate, the proportion of co-tenants and sub-tenants, and positively related to the proportion of single-family households, but the impact is not significant. When the monthly income increases, the sole-tenant household rate and the sub-tenant ratio will increase, and the OWNER-OCCUPY household rate will decrease.

The monthly income of Hong Kong households has increased year by year, but the price gap between private housing and public housing is large. The median monthly household income in 2019 was 30,278 HK\$, an increase of 39% over 2011 and an increase of 31% over 2001. Excluding inflation, the past 18 and 8 years have achieved real growth of approximately 5.3% and 4.2%, respectively. The median monthly rent for PRH tenants is HK\$1,500, and the median monthly rent for private housing is HK\$1,000. 34.3% of households with houses have mortgages or loans. For families with

mortgages or loans, the median monthly mortgage repayment for mortgages or loans is US\$10,500, and the median income ratio of mortgage repayments and loan repayments is 19.0%, while those with home ownership subsidies For families, the prices were HK\$5,480 and 15.5% respectively. The median rent as a percentage in income of households renting private housing is 30.7%, while the corresponding figure for PRH is 9.3%. Scilicet, before the public housing income and asset limits were revised, when the median monthly household income of economically active households increased, single-family housing was mainly public rental housing for rent. With the increase of income, according to the proportion of housing expenditure, choosing public rental housing has an advantage in income freedom and gaining more discretionary income.

The ratio of the population with a college degree and above is not significantly related to the proportion of TANANT and OTHERS households, and the rates of OWNER-OCCUPY households. Compared with the ratio of the population with a college degree and above, the ratio of full-time students is negatively correlated with the ratio of OWNER-OCCUPY and shared rent, and positively correlated with the proportion of sole-tenant households. The families of tenants and sub-lessees may be basically related to the proportion of the population with a college degree and above, and the relationship between the two is the same. When the ratio of the population with a college degree or above and the ratio of full-time students increase, the ratio of sole-tenant households will increase, but the rate of co-renting and OWNER-OCCUPY households will decrease.

## Chapter IV. Conclusion and discussion

### 1. Conclusion

Compared with the growth rate of young families in other Asian countries, youth in HK prefer to live with parents instead of renting a house. This may be due to economic constraints. Although the proportion of young single families in Hong Kong has grown slower than the proportion of young single families in other Asian countries, it has also increased the proportion of OWNER-OCCUPY families. Due to public housing application restrictions and high market rents, it is difficult for them to choose to rent alone, and the living conditions of the co-tenant/maintainer/sub-tenant may not meet the requirements. With parental support or strong financial ability, they will choose to live with their parents or buy a house. In Asian cities that value social traditions, marriage rates may no longer significantly affect home ownership. Contrary to the trend of traditional housing economic status, the proportion of Hong Kong women in owner-occupied housing is increasing. This may to some extent reflect the upward trend of women's housing rankings.

The dependency ratio brought by the elderly and childbirth is only significantly positively correlated with the ratio of tenants/maintainers/sub-tenants. It is worth noting that from statistical data, for some families, the increase in members has not promoted the proportion of self-occupied households. Due to Hong Kong's PRH policy, the increase in family monthly income cannot increase the proportion of OWNER-OCCUPY HOUSE. Although families living in public housing enjoy greater freedom in income

distribution, judging from the occupancy rate of poor families, public housing policies may be flawed. The improvement of the education level of Hong Kong society will not necessarily increase the proportion of OWNEROCCUPY HOUSE.

## **2. Discussion and implications**

Household income is one of the important indicators for judging whether Hong Kong citizens have the ability to buy a home. When household income increases, the housing demand structure changes. Households with increased income can have more choices in the nature of the house (such as housing type, geographic location, etc, but this indicator is compared with owner-occupied house ownership in model testing. Significant negative correlation This may reflect that Hong Kong' s social housing system, especially public rental housing, has a comparatively thorough policy coverage for the group it wants to cover-low-income people in HK, and relatively high level of the protection effect has also been maintained. While there are some issue. There are two main points: First, the transfer is fair. The existing policy does not punish wealthy households with excessive income rates. The rent is still below the market rent after the penalty is paid, resulting in the unreasonable secondary distribution of PRH quota, Resulting in a situation where the income of some public housing residents is higher than that of informal residents. In this regard, the Housing Authority should ensure the authenticity and accuracy of the data and redefine the calculation method of the waiting list; establish a more complete public housing rotation mechanism and appropriately increase the fines for wealthy families.

The second is distribution efficiency. The current public housing waiting time announced by the Housing Authority is mostly lower than the actual time.

Second, the government can relax the rules on the use of PRH to reinforce the housing demands of low-income youth. The supply of PRH in Hong Kong is insufficient. Because their application system prioritizes the elderly over 35, the poor, and low-income singles, the application list is long and youth are given lower precedence. However, the Harmonious Family Priority Plan launched in 2007 specifically targets youth. In the plan, young family members can apply for public housing units to take care of parents or older relatives (gov, 2016). Compared with ordinary applicants, young applicants enjoy a six-month priority processing period during the application process. Given that the housing demand caused by marriage may be an overlooked driver of housing prices, it is not significant from the statistical results. In order to assist young people who are preparing to get married and return home without revitalizing the property market, Hong Kong government need premeditate the housing program for young couples. The Home Ownership Scheme is a supply-side public housing scheme that currently accounts for about one-fifth of the urban population. The increase in PRH designed to absorb the demand for one purchases triggered by marriage may also help control the overheated housing market.

Third, from the statistical results, the increase in the proportion of the youth population has a significant affect on the subdivision of housing and self-owned housing. The government can initiate

appropriate tax incentives related to home ownership and intergenerational transfers so home ownership doesn't increase inequality.

Forth, family size of Hong Kong citizens is showing a trend of shrinking. With the intensification of the aging of the population, there will be more and more demand for small and medium-sized housing in the future. The low matching degree of supply and demand also makes the gap between the lowest price and the highest price of the same type of units increase significantly, especially represented by small and medium-sized units. Better act in concert with government authorities that guide population and housing policies may essential to more accurately estimate Hong Kong's long-term housing demand and supply. Moreover, policies need be integrated into social economic to reduce disequilibrium and intergenerational poverty.

Home ownership has always been a concern of many countries. Western research assesses the factors that affect people's choice to purchase a house, but in Hong Kong, little research on the combination of Chinese cultural background and the Western-like housing market and it is worth studying. This article describes the results of panel data analysis and the variables related to the factors that impact the choice to purchase a house in Hong Kong. In this research 11 factors that affect Hong Kong's home purchase choices were classified for clear comprehension. Results express that the important factor influencing homeowners' self-occupation in Hong Kong is family economic factors, after family characteristics. The rapid increase in house prices in Hong Kong is gradually eliminating

housing affordability, specially for low- or middle-income families. Heed must be focus on those potential factors that have led to the decline in housing ownership in Hong Kong. The meaning of research is to offer relevant information to housing stakeholders (governments, developers, and potential buyers) by identifying key factors that need to be strengthened to deal with housing ownership. Obviously, due to rising upfront costs, many families will need help to resolve the wealth constraints that affect home ownership.

The result of the data analysis provides 4 main characteristics (socio-demographic characteristics, family structure, family economics and education level) from the 11 variables initially identified. These factors further provide a distinct concept on the restriction of house ownership. Despite these factors does not cover all side that affect home ownership. But in the background of Hong Kong, they may be important factors. It is not clear whether the government' s policy changes so far will affect people' s subjective views on factors affecting home ownership. For promote the proportion of home ownership in Hong Kong, policy makers need to have a deep understanding of the factors that hinder families from buying homes. In this concept can make more effective policies or plans, or appropriately evaluate existing home ownership plans. It is recommended that the government and policy makers use new ways of thinking based on the results of this research to deal with the challenge of housing ownership. In addition to the impact on practice and policy, the research also makes a new comparative analysis of the existing literature on home ownership. This hopes to provide a new direction for people to have their own houses in Hong Kong.

### 3. Limitations

The data set used in this article is actual statistical data of 18 districts in Hong Kong, that is, static population data. For the failure to obtain micro-statistics, the data results will have certain flaws.

Due to the limitations of the spatial weight data that can be collected for Hong Kong' s complex terrain and regional divisions, the scope of the model in this study is limited, and only the ordinary panel model is used instead of the study. Future work needs to use spatial panel models and actual population data sets.

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## 국문 초록

# 홍콩 주택 소유권 비율에 영향을 미치는 요인 연구

홍콩 정부가 수년간 많은 주택 소유 계획을 세웠음에도 홍콩의 주택 소유는 항상 상대적으로 낮은 수준을 유지해 왔으며, 점차 하락 추세가 나타나고 있다. 최근 몇 년간의 연구에서 홍콩 젊은이들의 주택문제가 반복적으로 언급되고 있다. 가족생활주기론에 따르면 가족의 과도기에 있는 젊은 층은 주택 소유의 선택과 전환에 직면할 때 주택 소유 문제가 더욱 심각해질 것이다. 청년들의 주택 소유 문제는 사실 전체 사회의 문제를 반영한다. 따라서 본 연구에서는 Stata 15.1을 활용하여 홍콩 18개 구의회 자료를 분석하고 사회적 인구, 가족, 경제적 특성과 교육적 특성을 분석한다. 조사 결과 홍콩의 주택 소유율에 영향을 미치는 주요 요인은 가족의 경제적 특성인 것으로 나타났다. PRH 제도로 인해 일부 집단의 소득이 증가하더라도 홍콩의 주택 소유율을 촉진하지는 않을 것이다. 정부는 일부 자가주택이 없는 저소득층과 중산층의 주거수요를 보장하기 위해 PRH 출입절차를 엄격히 적용해야 한다. 가족규모 추세에 따라 소규모 보조주택을 개발하고, 청년층 및 청년층을 위한 보조주택이나 PRH를 구체적으로 구축해 향후 정책의 방향성을 제시하길 바란다.

**키워드 :** 주택 소유권, 비율, 영향 요인, 패널, stata15.1

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