Housing and Wealth Accumulation: Evidence from China

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Abstract

Homeownership is the most prevalent tenure in most countries. One of the main purposes of households in accessing homeownership is to accumulate wealth. Homeowners are not only found to accrue housing wealth but also own more non-housing wealth than tenants. The patterns of accumulating wealth through homeownership and its socio-economic consequences in modern economies, however, have not been fully understood and examined. Using data from the 2013-2017 China Household Finance Survey and the 2015-2017 Chinese Housing Consumption Survey, this research investigated the relationships between homeownership and wealth and its components. It explored diverse mechanisms derived from different theoretical perspectives and linked homeownership with wealth inequality and housing strategies in urban China.

Through a combination of the Differences-in-Differences model, Logit model, fixed-effect model and Tobit model, the empirical results from this thesis suggest that the transition of households from renting to owning is positively related to wealth holdings after controlling for relevant, confounding variables. Households accumulate housing wealth mainly through housing price appreciation and mortgage repayments, with housing price appreciation dominating. With long-term housing price increases, housing wealth accumulation has transformed from relying on saving through mortgage repayments to being more dependent on capital gains. There is a trade-off between mortgage repayments and residual savings. When controlling for socioeconomic characteristics and time-constant variables, homeowners do not own more non-housing wealth than tenants. The widely recognised notion that homeowners own more non-housing wealth than tenants comes from the result of selection. In other words, households who attain homeownership are wealthier before they become homeowners than households who remain in rental markets. Tenants do not compensate for their disadvantage in housing assets by augmenting more non-housing wealth. The favourable status of wealth holdings by homeowners relative to renters, therefore, principally arises from the accumulation of housing wealth through housing price appreciation rather than from the fixed commitments of mortgage repayments, changed saving behaviour and the accumulation of non-housing wealth through homeownership, at least for the time before 2022.

Growing home ownership has typically been connected with spreading wealth and reducing wealth inequalities. The results reported in this thesis, however, indicate that associated with

housing prices increasing ahead of income since 2015 in China, the accumulation of wealth through homeownership has begun to act as a possible mechanism of increasing wealth inequalities by concentrating more wealth in developed regions which attract more capital, and in the hand of homeowners, multiple-property owners, and older generations. The changes in housing price dynamics and wealth accumulation patterns also promoted the use of speculative strategies among households and, in consequence, housing policies inherited from the savings era may not be best designed to cope with challenges caused by rising housing prices. Corresponding with these findings, this thesis thus proposes policy reforms on housing, land and tax.

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Author’s declaration

I declare that, except where explicit reference is made to the contribution of others, that this thesis is the result of my own work and has not been submitted for any other degree at the University of Glasgow or any other institution.

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Abbreviations

ABW	Asset-based Welfare
ATC	Average Treatment Effect for the Control
ATE	Average Treatment Effect
ATT	Average Treatment Effect for the Treated
CHCS	Chinese Housing Consumption Survey
CHFS	China Household Finance Survey
CIA	Conditional Independence Assumption
CMI	Conditional Mean Independence
CPH	Capped-Price Housing
CRH	Cheap Rental Housing
DID	Differences-in-Differences
ECH	Economic and Comfortable Housing
HABW	Housing Asset-based Welfare
HPF	Housing Provident Fund
MOHURD	Ministry of Housing and Urban-Rural Development
NBSC	National Bureau of Statistics of China
OLS	Ordinary Least Square estimation
PRH	Public Rental Housing
SOH	Shared-ownership Housing
SRH	Shantytown Renovation Housing

Chapter 1 Introduction

1.1 A world of homeownership

A growing number of countries have regarded an increased homeownership rate as a desirable goal for government housing policies, such as in Australia (from before WW1), the USA (in the 1935 Housing Act), the post-WW2 housing strategies of the UK government (Maclennan, Long, & Leishman, 2021), and in former socialist countries of eastern Europe (Ronald & Elsinga, 2011).

At the micro-level, comprehensive evidence of the socio-economic, demographic, and political consequences of housing has been distinguished in economics, sociology, geography, political science, psychology, medical science, and other disciplines (Dietz & Haurin, 2003; Zavisca & Gerber, 2016). In these studies, a multidimensional conception of housing status including tenure, quality, and quantity is employed. More specifically, housing is found to have both direct and indirect effects on physical health (E. Baker et al., 2013; Daniel et al., 2021; Dockery et al., 2013; Howden-Chapman et al., 2012), subjective well-being (Coates et al., 2015; Zumbro, 2014), and mental health (Aubry et al., 2012; Waterston et al., 2015). Meanwhile, housing is also associated with wide socio-economic outcomes such as employment (van Ham et al., 2013), and education achievement (Barnes et al., 2011; von Simson & Umblijs, 2021). Furthermore, housing status is linked to a range of demographic outcomes relating to the transition to adulthood (Mulder, 2013), marriage and divorce (Farzanegan & Gholipour, 2016; S. Wei & Zhang, 2011), and fertility (Mulder & Billari, 2010). Nonetheless, most of these studies of housing effects recognise the difficulties in moving beyond revealing strong correlations and removing confounding influences to draw strong conclusions about the causalities involved (E. Baker et al., 2016).

Recently, based on the evidence found in the micro-level studies, an emerging area of research investigates the impacts of housing (in terms of housing activities, housing attributes, and resource allocation system) on financial stability, wealth inequality, and economic productivity, thereby expanding the consequences of housing from the micro-level to metro- and macro-level and highlighting the multifaceted and high-level role that housing plays in national and metropolitan/regional economies (Duca et al., 2021; Maclennan, Long, Pawson, et al., 2021).

Turn to focus on homeownership. Homeownership, in some studies, is believed to have a variety of positive effects on children's health (Clair, 2019), school performance (Aaronson, 2000; Barker & Miller, 2009; Blau et al., 2019), children's behaviours (Blau et al., 2019; Grinstein-Weiss et al., 2012). It has also been argued that homeownership could bring positive benefits to individual subjective well-being (Andersen, 2011; Lindblad & Quercia, 2015; Manturuk, 2012; Rohe & Stegman, 1994). Additionally, homeownership is argued to generate positive externalities such as increased maintenance, household and neighbourhood stability, greater civic engagement, and increases in social capital (Aarland & Reid, 2019; Coulson et al., 2003; Coulson & Li, 2013; Hilber & Mayer, 2009).

In both Searle and Köppe's (2014) and Lersch and Dewilde's (2018) reports, the asset-based welfare (ABW) theory was mentioned in detail. Sherraden and Gilbert (2016) argue that compared with income, the ownership of assets can provide additional benefits to individuals to escape from poverty, as acquiring, holding and using assets leads to behaviours that benefit households (Prabhakar, 2019). These behavioural changes include greater confidence, stronger families, more positive social relations (Sherraden, 2005; Sherraden & Gilbert, 2016), a move towards longer-term planning and saving (Rowlingson & McKay, 2011; Watson, 2009), better social outcomes (Sherraden, 2003), and increasing political participation (Paxton, 2003; Prabhakar, 2009). Assets, in this sense, could be used to cushion income loss or to invest in education, business or realise other long-term goals (Oliver & Shapiro, 2010; Sherraden & Gilbert, 2016).

Housing asset-based welfare (HABW) argues that homeownership is thought to provide security in retirement as well as offer a basis for consumer spending (Prabhakar, 2019). The subsidised provision of a long-term safety net through early life-cycle entry to homeownership was assumed to alleviate the need for governments financial support from state welfare provision in later life. Four ways through which housing can provide people with a flow of income have been identified in Lennartz and Ronald (2017) and Ronald et al. (2017): imputed rent; equity release products; downsizing; renting out rooms or selling extra homes.

In a similar vein, the effects of homeownership have long been plagued by endogeneity, mostly arising from the unobservable household characteristics and neighbourhood effects. How many of these benefits are an outcome of homeownership as opposed to self-selection is quite unclear. Few studies disentangle the likely critical interaction and selection aspects

of parental income, housing tenure and neighbourhood effects. The literature on homeownership possibly suggests that homeownership does not bring micro benefits and also suggests that there are no strong cases to say that expanding homeownership is good for the economy as a whole (Dietz & Haurin, 2003; O'Sullivan & Gibb, 2012). A rethinking of the possible negative impacts of homeownership on certain dimensions such as labour market participation, financial risk and personal health outcomes is still necessary.

For most households, housing's consumption value dominated the history of the housing market, whose main function is to provide comfortable, accessible shelter. Increasingly it is considered a preferred and essential vehicle for the storing and accumulation of household wealth (Doling & Ronald, 2010; Forrest & Murie, 1995b; Marcuse, 2016; Morris et al., 2020). Consequently, housing wealth represents the largest share of household wealth in most countries, ranging from around 80% in Chile, Latvia, Lithuania, and Greece to less than 40% in the United States and New Zealand (OECD, 2022a). The share of housing wealth in total assets is even more conspicuous among the middle class, accounting for 60% in most OECD countries (Causa et al., 2019). It absorbs typically 20-25 per cent of household incomes, accompanied by the largest share of household debts (Maclennan, Leishman, & Goel, 2021).

The finding that homeowners have higher net worth than renters is well-documented (Belsky et al., 2005; Boehm & Schlottmann, 2008; Causa et al., 2019; Di et al., 2007; Grinstein-Weiss et al., 2013, 2015; Wind & Dewilde, 2019). In most countries, homeownership helps homeowners accumulate housing wealth mainly through housing price appreciation and savings concomitant with paying down outstanding mortgage principal (Di et al., 2007). Apart from accumulating more housing wealth, homeowners also tend to own more non-housing wealth than renters (Boehm & Schlottmann, 2008; Di et al., 2007; Grinstein-Weiss et al., 2013), possibly via favourable initial wealth status (Lersch & Dewilde, 2018; Vestman, 2019), and preferred tax treatments (L. S. Goodman & Mayer, 2018; Herbert et al., 2014; Somerville et al., 2007). Advantages in both housing and non-housing wealth for homeowners persist even through housing recessions (Belsky et al., 2014; L. S. Goodman & Mayer, 2018; Grinstein-Weiss et al., 2013).

Although it has become widely recognised as a key element in determining household wealth, the extant literature regarding the role housing plays in wealth accumulation shows inconclusive findings. Some studies claim no evidence for the wealth-building effect of

homeownership (e.g., Sodini et al., 2016). In some cases, and circumstances, renting could even result in more wealth (Beracha & Johnson, 2012; Kaas et al., 2019; Rappaport, 2010). For example, the accumulation of housing wealth may crowd out non-housing wealth, exerting a negative effect on non-housing wealth (Kaas et al., 2019).

Furthermore, the accumulation of wealth through homeownership is not without any risks (L. S. Goodman & Mayer, 2018). Most of those queries concerning ownership risks arise from the housing busts in some countries and regions in the later 1970s and early 1980s, the Asian Financial Crisis, and the Global Financial Crisis when housing wealth fell sharply and quickly and exposed households to large financial risks. A large number of households went into foreclosure, especially black households and households from low-income backgrounds. Indeed, it has been suggested that whether and to what extent a homebuyer will materialise the potential benefits of owning while avoiding financial risks depends on market conditions, the timing of purchase, the holding period, location and neighbourhood, and mortgage terms (Belsky et al., 2005; L. S. Goodman & Mayer, 2018; Newman & Holupka, 2016).

Further, the accumulation of wealth through homeownership may have cultivated households' speculation activities (Maclennan, Long, & Leishman, 2021; Soaita et al., 2019). With house prices rising ahead of income and experiencing long-term increases, homeowners appear to have moved on from 'passive' accumulation of unearned house price gains to more 'active' and 'pro-active' sales and leveraging behaviours (Smith & Searle, 2010).

In addition, the accumulation of wealth through homeownership may be a key determinant of wealth inequality and distribution (Christophers, 2021). Rising home-ownership rates have had the effect of spreading middle-class wealth so that the effects of wider ownership on equalising wealth, in aggregate, usually outweigh the rising wealth gaps between owners and renters (M. Kuhn et al., 2020). Most scholarly studies note that expanding homeownership did reduce wealth inequality in the 1980s and 1990s (Arundel, 2017; Soaita et al., 2019), but this trend went into reverse by 2010, in the context of a rise in house prices increasing ahead of incomes (Arundel, 2017; Foster & Kleit, 2015; Lundberg & Waldenström, 2018).

Inflation of housing values promotes both growing wealth for market-insiders and rising barriers for new entrants, especially for young people and low-income households in metropolitan regions, thus widening the wealth gap between owners and tenants (Arundel &

Ronald, 2021; Lennartz et al., 2016). Housing-wealth inequalities entailed by the spatial divergence between high-gain versus low-gain submarkets (Arundel & Hochstenbach, 2020; Coulter, 2017; van Ham et al., 2014) and socio-economic discrepancies in the form of high concentration of housing wealth at the top distribution of wealth and income (Causa et al., 2019) also play a role herein. Property owners in metropolitan areas continuously capture the rising 'scarcity rents' from the incomes by policies privileging winner areas (Maclennan & Miao, 2017; Piketty, 2018), likely exacerbating spatial polarisation and widening the wealth gaps among owners across different areas. Some research focuses on the effects of homeownership on wealth accumulation for low-income households as claimed, questioning whether homeownership is an effective way to accumulate wealth for them (Turner & Luea, 2009). They argue that the financial returns to homeownership for minority or lower-income households may not be as great as for white or higher-income households (Herbert & Belsky, 2008; Norris et al., 2007; Shlay, 2006; Turner & Luea, 2009). These wealth inequalities within generations could also trigger a 'wealth effect' over the life course through financing early entry into homeownership of young adults (Hills et al., 2013), leading to a self-accumulating and self-reinforcing process (Arundel & Hochstenbach, 2020; Piketty, 2018).

The effect of homeownership on wealth accumulation and this relationship's wide impacts represent the central topic of this thesis. In particular, the investigation is concerned with the impacts in China. Through privatisation started in 1988 and marketisation began in 1994 and the development of financial systems (Duda et al., 2005), China transformed from a country of tenants to a country of homeowners. China became a country with a high rate of homeownership within a very short period. Macdonald et al. (2012) reported that property prices in China increased by about 16% at a compound annual growth rate from 2005 to 2011 and the average annual growth rate of housing prices was 17.45% from 2002-to 2016 calculated by the National Bureau of Statistics of China (NBSC). The continual one-way upward trajectory in housing prices since 2003 in China has fostered a strong belief that purchasing houses is one of the safest and the most profitable forms of investment (L. Li & Wu, 2014; J. Zhao & Li, 2017). In addition, the lack of property tax in China attracts households to invest more in real estate, with more than 20% of Chinese households owning multiple homes (Y. Huang et al., 2020a), higher than that in most developed countries (Gan, 2018). Previous research has shown that the ratio of housing assets to total household wealth was 35.4 per cent in 1995, 57.9 per cent in 2002 (S. Li & Zhao, 2008) and reached 75 per cent in 2012 (Xie & Jin, 2015). While the dominant role of housing assets in household

wealth portfolios is well known in mature homeownership countries, the proportion in China is still startling (L. Gan et al., 2014).

With China's economy developing, capital gains are one of the main sources of wealth accumulation at the micro-level. Appreciation of property holdings such as houses, savings, stock and bonds has surpassed that of disposable income (Piketty et al., 2019). The national evidence shows that private wealth was relatively small in 1978, accounting for about 100% of national income, by 2015 it amounted to 4.5 times national income (Piketty et al., 2019). Specifically, they argue that saving flows explained 50 to 60 per cent of the rise in the wealth-income ratio between 1978 and 2015, while the increases in relative asset prices of houses, stock, and bonds accounted for the remaining 40 to 50 per cent rise in the wealth-income ratio (Piketty et al., 2019). Of all these capital gains from assets, housing plays an important role.

1.2 Research aims and objectives

Though some firm findings about the relationship between homeownership and wealth accumulation have been identified in the existing literature, there are still some gaps that need to be closed. Firstly, previous studies mainly focus on how homeownership is closely related to total wealth or net wealth. However, the decomposition of net wealth into housing wealth and non-housing wealth (especially financial wealth and business wealth) is ignored in most prior research. The decomposition of wealth is instructive for understanding the aggregate impact of homeownership on wealth as the separate effects of homeownership on housing wealth, financial wealth and business wealth might change the aggregate effects of homeownership on overall wealth. It is a reasonable assumption that the aggregate conclusion is likely to conceal some important findings that could be revealed by fractional studies.

Moreover, the transmission mechanisms through which homeownership could influence wealth accumulation have rarely been comprehensively examined in prior studies. Why and how homeownership could influence wealth accumulation (housing wealth and non-housing wealth) has been incomplete and has not been fully empirically examined. More specifically, how much of the housing wealth comes from the repayments of principal and how much of the housing wealth comes from housing price appreciation have not been empirically investigated. In the case of the effect of homeownership on non-housing wealth, the

mechanisms mentioned in prior research only include the crowding-out effect caused by risk aversion (Kaas et al., 2019) and the changes in saving behaviours (Lersch & Dewilde, 2018), who argue there are negligible and insignificant effects of the changes of saving behaviours in accumulating non-housing wealth. Therefore, there is a dearth of empirical evidence to examine the possible mechanisms whereby homeownership impacts wealth accumulation (including housing wealth and non-housing wealth). This analysis is also pertinent to explore the source from which the favourable status in wealth holdings of homeowners over renters comes.

Secondly, the effect of homeownership on wealth and the corresponding transmission mechanisms may be affected by institutional contexts. Much of the existing literature on the wealth outcomes of homeownership is concerned with advanced economies, particularly North America and Europe. There is a need for broader evidence from developing country settings. As Ferguson et al. (2013, p.438) put it, the lack of evidence outside of North America and Western Europe is '*an important gap in the literature*'. Specifically, western economies mainly consider socio-economic factors on wealth accumulation whilst without taking institutional characteristics into account. China's special social environment offers a good opportunity to take into consideration some institutional features such as job types (due to the socialist system), housing types (due to the dual housing systems), and hukou status (residential registration system, including migration status and agricultural status). In addition, as far as the great geographic disparities in China are concerned, spatial characteristics also shed some light on the effect of homeownership on wealth. Given the differences in institutional contexts, financial regulations, and cultural tradition, the possible mechanism may be distinct in China.

Nonetheless, and incommensurate with the uniqueness of China's contexts, the overall effects of homeownership on wealth accumulation, let alone the impacts of homeownership on separate parts of total wealth (in particular financial wealth and business wealth) have drawn little attention from policymakers and academics in China. The transmission channels connecting housing and non-housing wealth can only be found in the literature on the effect of housing wealth/housing prices on participation in financial investment and business investment. An important research gap existing in both international and Chinese contexts is against the backdrop of rising housing prices rising ahead of income, how the accumulation of wealth through homeownership influences wealth inequality and housing strategies employed by households. The importance of this research is reinforced when

housing policies are not best designed to cope with the challenges caused by rising housing prices.

In light of the diverse empirical results and research gaps identified above, this thesis aims to contribute to existing knowledge on the impact of homeownership, using China as a case study. Specifically, this research investigates the relationships between homeownership and wealth, its components, and their effects on wealth inequality and housing strategies in urban China, by exploring diverse mechanisms derived from different theoretical perspectives. Built on the evidence provided in existing studies, this thesis adopts a quantitative approach and examines large-scale longitudinal data on homeownership and wealth outcomes across separate but mutually reinforcing analyses.

The overarching question addressed in this thesis is:

- Whether comparable households accumulate more wealth upon entering homeownership?

Key objectives and the corresponding research questions are identified as follows:

First, to contribute to the existing literature on the wider impacts of homeownership, by employing quantitative methods and causal modelling and disentangling mechanisms to establish robust claims about the causal impacts of homeownership on wealth accumulation:

- How is net worth affected by the transition into homeownership in urban China? [RQ 1]
- In what ways has housing wealth been accumulated in urban China? [RQ 2]
- How does the transition into homeownership influence the accumulation of non-housing wealth, especially financial and business wealth? [RQ 3]

Second, to elucidate the impacts of the accumulation of wealth through homeownership on wealth inequality and housing strategies in the presence of rising housing prices:

- Under the circumstances of rising housing prices, how are homeownership and housing wealth accumulation linked to wealth inequality in China? [RQ 4]
- Under existing conditions, what role does the accumulation of wealth through homeownership play in households' housing strategies? [RQ 5]

1.3 Thesis outline

The overall structure of this thesis takes the form of ten themed chapters, including this introductory chapter. To achieve the above objectives and answer those research questions, this thesis is organised in the following way.

Chapter 2 sets the broader context for the housing market in China. It begins by giving a brief overview of the history of the housing market since 1949, which highlights how the welfare-based housing system was gradually transformed into a market-oriented housing system. After the major turning point of the housing reform, China transformed from a country of tenants to a country of homeowners. The discussion then goes on to consider the current, post-reform, housing provision system and the reasons for the favourable status of homeownership over renting are presented. Following this, this chapter examines housing tenure distributions by region, age, gender, migration, hukou status, and income. Chapter 2 ends by exploring housing price trends after the housing reforms and the four pathways for accessing homeownership in urban China.

Next, Chapter 3 reviews the evidence for the impacts of homeownership on household wealth and its components and provides an understanding of the theoretical framework and econometric models to be used in the research. It starts by highlighting that existing literature on the effects of homeownership on wealth is divided into empirical analysis using panel data, cross-sectional data, and simulation analysis. It then provides an overview of the evidence on the impacts of homeownership on household wealth. Based on the partitions of net worth, the chapter then presents a detailed discussion concerning how housing wealth is built and accumulated through homeownership and the influential factors involved. Following the discussion of housing wealth accumulation, Chapter 3 reviews the literature on the relationship between homeownership and non-housing wealth. As important parts of non-housing wealth, the channels through which housing characteristics and housing outcomes influence financial investment and business start-ups or investments are illustrated. Chapter 3 ends by focusing on inequalities in access to homeownership and housing weal.

Chapter 4 details the core theoretical framework and research methodology used in the thesis. This chapter starts by laying out a theoretical framework and the corresponding hypotheses. This framework aims to address research questions systematically and facilitate a better understanding of this relationship. The new framework resonates with the mainstream

literature, and it also determines the design and methodology of this research. Considering the practical needs, Chapter 4 provides a synopsis of the technical problems relevant to the current study and discusses how this thesis would possibly address these problems. Following this, the research methodology used to realise the framework, verify these hypotheses and resolve technical problems is introduced. In light of the data's characteristics, different models are required. Chapter 5 introduces the data sources that are employed in the empirical analysis, the China Household Finance Survey (CHFS) and the Chinese Housing Consumption Survey (CHCS), and describes data features, the data cleaning process, and a descriptive summary of the data used.

The empirical analysis is carried out in Chapters 6 to 9. Chapter 6 presents evidence of the effects of the transition into homeownership on net wealth by using data from CHFS. Chapter 7 mainly explores shifting housing accumulation patterns in the global context and then integrates China's case into the global context. The Chapter further examines the importance of housing price appreciation and fixed commitments on housing wealth and how housing characteristics and households' characteristics would impact housing wealth accumulation, by using data from CHFS and CHCS.

Chapter 8 then goes on to carry out the analysis of the impact of homeownership on non-housing wealth accumulation (including financial wealth and business wealth), by using data from CHFS. This chapter further examines mechanisms through which the relationship between homeownership and financial wealth and business wealth could be constructed: collateral effect, wealth effect, and crowding-out effect. Finally, Chapter 9 explores, with housing prices outstripping income, how housing transforms from spreading wealth and reducing wealth inequality to a mechanism that contributes to wealth inequality in three major forms: location, tenure, and intergenerational transfers. It also examines how passive strategy, active strategy and pro-active strategy are deployed by households in China, using data from CHCS.

The final chapter, Chapter 10, draws upon the entire thesis. First, it summarises the findings of the empirical analyses and highlights the overall contribution of the thesis. Following that, policy implications are illustrated. The thesis concludes with reflections on the limitations of the study and the important avenues for future research.

Chapter 2 The housing market in China

2.1 Introduction

This chapter details some aspects of the housing market in China, providing the context for the empirical analysis. Before 1988, social renting was the major tenure in urban China. After the national housing reform in 1988, more and more households were able to attain homeownership through the privatisation of social renting housing and the following commercialisation of the housing market. In 2003, owning became the dominant form of tenure in China (Cao & Keivani, 2014) and China has quickly become one of the countries with the highest homeownership rates in the world. Alongside the high rates of homeownership, housing becomes the largest asset in China's household wealth, with a share of 75% (Xie & Jin, 2015). Nonetheless, as housing prices rise ahead of incomes, an increasing number of households have been excluded from accessing homeownership. The affordability of homeownership has become a challenge, as in other OECD countries, facing low- and middle-income households, especially in metropolitan areas.

Any research concerning housing in China requires a discussion about housing reforms, which involved the transition from a welfare-dominated system to a market-led approach. Following this common practice, this chapter briefly illustrates this process in Section 2.2. Inherited from the housing reform, a multilevel housing supply system has been developed in urban China, which will be discussed in Section 2.3. Owning and renting are composed of different types of houses in this supply system. This section also presents how and the extent to which owning is favoured over renting. As a result of housing reform, a multiple housing supply system and the privileging of homeownership, the high rate of homeownership characterises China's housing market, thus Section 2.4 describes the tenure distribution in China. The regional, age, gender, migration, hukou, and income profiles of homeowners are examined in this section. Housing price trends in urban China since 2000, and the pathways for current households to achieve homeownership, which is fashioned by a combination of savings, parental support, informal borrowings, and formal borrowings are investigated in Section 2.5. Section 2.6 finalises this chapter.

The discussion in this chapter suggests that the short-period development of the housing market in China explains the dearth of long-term longitudinal empirical analysis in existing studies. Furthermore, it underpins the understanding of housing wealth accumulation

patterns in China, which will be examined in detail in Chapter 7. It also explains the windfalls experienced by older generations are unlikely to occur for current households, thus generating inter-generational wealth gaps, which will be discussed further in Chapter 9.

2.2 Housing reforms in urban China: a brief historic overview

2.2.1 Welfare-based housing allocation system: 1949-1978

Consistent with socialist ideology and the central-planning economy system (J. Chen et al., 2013; Putterman, 1995; Y. Zhao & Bourassa, 2003), the new government of the People's Republic of China commenced the nationalisation of land and the slow abolition of private ownership after assuming power over the nation in 1949 (M. Zhou & Logan, 1996). Starting from 1956, the central government decided to adopt 'state management' as the major form of socialist transformation and transferred private housing into state ownership in 1966 (X. Zhang, 1997). This process was sustained until 1976, the ending of the Cultural Revolution (Y. Huang, 2004). Urban land was state-owned and the construction, distribution and management of housing in urban China were state-owned and controlled, with only a small number of residual old or smaller houses being self-occupied (M. Zhou & Logan, 1996). New housing construction was highly constrained, accounting for only 0.78% of GNP annually between 1949 and 1978 (State Statistical Bureau, 1990).

Under this system, houses were allocated firstly to state-owned enterprises and other public sectors (work units or *danwei* in Chinese) and then work units allocated these houses to their employees as welfare benefits at a nominal level of rent at less than 1% of household income (Cao & Keivani, 2014; Logan et al., 1997; Y. P. Wang & Murie, 1999). Allocation of these homes was based on a series of criteria such as years of working experience, number and ages of family members, household registration (hukou) status, occupational rank, and political status (Davis, 1993; Gibson, 2009; Y. Huang & Clark, 2002; Shaw, 1997; M. Zhou & Logan, 1996). For instance, after the *hukou* system was introduced in 1958, rural populations were restricted from working and living in cities (J. Chen et al., 2013). Public housing was accessible only to registered urban residents (about 12-18% of the national population from the 1950s to the 1970s) (J. Chen et al., 2013). People living in these houses were not homeowners and were not eligible to purchase, resell, inherit, or transfer the allocated houses.

The socialist housing supply and allocation system, however, suffered from problems of unequal distribution, poor management and expanding demand for housing (S. Wang & Zhou, 2017). Meanwhile, the huge scale of low-rent subsidies has placed significant financial burdens on both the government and working units (Q. Zhang et al., 2020). During that period, the annual income from rents was about RMB1 billion, whereas the government spent an average of RMB25 billion on new housing construction and another RMB10 billion on maintenance (D. R. Cui, 1991). Additionally, the tight link between work units and housing services also led to a low level of labour mobility (Bian & Logan, 1996; A. Chen, 1996; Dorcey et al., 1992), which interrupted the implementation of economic reforms.

2.2.2 Trial stage of the housing reform: 1978-1988

Given the problems existing in the welfare-based allocation system and its inherent conflict with marketisation (Y. Wang & Murie, 1996), the 1979 housing reform, as an indispensable component of the economic reforms in 1978, aimed to transfer this system from a work unit-based, welfare distribution scheme to a privatisation, commercialisation and marketisation scheme for housing provision, allocation and consumption (J. Lee & Zhu, 2006; Y. P. Wang & Murie, 1999; Y. Zhao & Bourassa, 2003).

Pilot reform projects then followed. In 1979, Xi'an and Nanning were selected as pilot case studies in the first round. New houses could be sold to sitting tenants at construction costs. However, this round of pilots ended up in failure in 1982 because of the high purchase cost of housing, the inflexibility of payment methods, and the requirement of being unable to resell (Y. P. Wang, 1992). It has been argued that based on the average salary level at that time, it would cost a household about 10 to 20 years' salary for a housing unit (Y. Wang & Murie, 1996), while the mortgage market was absent during this time. In addition, rents paid by sitting tenants to work units were still low enough to offset any benefits generated from entering homeownership.

Changzhou, Siping, Shashi, and Zhengzhou were selected for the second-round pilot implementation (1983-1985) (Yang & Chen, 2014). Different from the first experiment, the breakthrough of this stage was that homebuyers were expected to pay just one-third of total housing costs, while municipal governments or employers were required to subsidise the residual two-thirds (Y. Wang & Murie, 1996). In addition to this significantly subsidised purchase price, the legal basis for the property rights of the purchased house was recognised by law. This property right could be transferred through family inheritance or division, albeit

the prohibition of sale on an open market remained. Nonetheless, the heavy financial burdens on the municipalities and employers limited its application.

In 1986, the Housing System Reform Leading Group of the State Council was found to progress the reform of the national housing system (Yang & Chen, 2014). Under the guidance of the State Council and based on the actions introduced in previous stages, Yantai, Tangshan and Fengbu were selected as the pilot cities for the third round. The third round was characterised by rising rents and an instalment payment scheme.

At this stage, rents were raised to a level at which housing costs (including fees caused by depreciation, maintenance, management and interest, and property tax) could be reasonably covered. However, a special housing subsidy coupon whose value approximated the rent increase was issued. Tenants were encouraged to purchase houses based on housing characteristics and working years (Zhao & Li, 2017). The guiding rule for the sale price was that the price of a new apartment should be equal to or less than three times the average household annual income in a city (Zhao & Li, 2017). If it was an older house, the price should be adjusted according to a depreciation formula with a 75-years duration (Zhao & Li, 2017). A new pilot measure -an instalment payment scheme- was implemented, allowing employees to pay 30 per cent of the housing costs as a first instalment, with the residual part being paid off in instalments over 10 to 15 years (Y. Wang & Murie, 1996), which represented the origin of mortgage debt in China. While urban land was still owned by the state, individuals could be granted the usage of rights of land attached to residential housing for up to 70 years (J. Wu et al., 2012). This pilot was successful. By the end of 1988, most of its approaches and reform procedures were ready to be scaled up to nationwide implementation (Y. Wang & Murie, 1996).

2.2.3 Nationwide implementation stage of the housing reform: 1994-1998

Along with the privatisation of public housing, work units continued to build or purchase new housing for employees with increased rents paid by these tenants. Although work units continued to dominate housing provision during this period, more ambitious policy objectives and market-oriented policy instruments began to be introduced into the urban housing reform after 1994 (L. Deng et al., 2011; Duda et al., 2005; Mei & Liu, 2014; Pudney & Wang, 1995). This followed publications of ‘The Decision of the State Council on Deepening Urban Housing System Reform’ (SC [1994] No. 43) (The State Council, 1994). This nationwide housing reform was characterised by further rising rents, the sale of public

housing, the construction of affordable housing, and the emerging financial market. It was decided that the final goal of housing reform was to create a new urban housing system that suited socialist market economies: dual systems of housing provision (Yang & Chen, 2014), a housing system that aimed to guarantee access to urban housing for both poor and rich families. The first was 'commodity housing' (also called commercial housing or market housing), which was mainly provided for the high-income group at market transaction prices. The second was the provision of 'Economic and Comfortable Housing' (ECH), which targeted low-and-medium income households.

To promote privatisation, the government further increased rents to make social renting less attractive. It has been argued that the difference between the market value and the price charged by the work units was more than twice the average annual wages of a household (Iyer et al., 2009). As a consequence, more than 60% of urban public housing was sold to individuals by 2000, and this proportion rose to 80% at the end of 2002 (Y. P. Wang, 2001).

This period was characterised by the initial development of commodity housing. In 1988, the government started to introduce state-owned and private companies to take part in housing supply at market prices (Logan et al., 2010). As a result, total housing investment increased from RMB162 billion to RMB301 billion, an increase of 85.8% from 1990 to 1995 (Yang & Chen, 2014). This type of housing aimed to satisfy the needs of high-income households.

Additionally, the establishment of housing finance and insurance underpinned the implementation of national commercial housing (J. Chen et al., 2011; Dorcey et al., 1992). Initiated in 1991 in Shanghai, the Housing Provident Fund (HPF) was disseminated nationally in 1994 by the State Council as a mandatory savings and loan program for housing based on employment (Xu, 2017). The HPF required employees and employers to contribute a given percentage (principally 5%) of employees' income into the HPF account. The savings in HPF could be used by employees for purchasing, building, and maintaining houses. When the employee retires, the balance of principal and the interest will be settled at one time and returned to the employee himself (The State Council, 1994). HPF has also been used to provide policy loans for state-owned enterprises and investors to build houses (Xu, 2017).

At almost the same time, in 1994, mortgage debt was first introduced in China (L. Deng et al., 2009). The mortgage debt had highly strict lending criteria: mortgages were only

available to borrowers with savings equivalent to 30 per cent of total house prices; the maximum amortisation for a mortgage was only 5 years (L. Deng et al., 2009). Under these stringent restrictions, the majority of urban borrowers were unable to purchase a house with the help of a mortgage.

Concurrently, to assist low-income households to overcome the barriers to achieving homeownership, a pilot housing provision system that consisted of ECH was introduced in China (Logan et al., 2010). ECH can only be obtained by applicants who were registered with a local hukou record, and their household income should remain at the low-income level (Logan et al., 2010). In addition, this kind of house was not allowed to be resold within the first 5 years after purchase.

According to the State Council's 'Directive on the Further Deepening of Urban Housing Reform and Accelerating Housing Construction' (SC [1998] No.23) (The State Council, 1998), the welfare-based housing allocation system was officially terminated in 1998. This was, in part, a response to the economic and fiscal pressures of the Asian Financial Crisis. Work units were no longer allowed to develop new residential housing units or allocate renting housing units for their employees, although in actuality, subsidised sales of workplace housing still existed until 2000 (Adams, 2009). Instead, employees were encouraged to purchase houses in the private housing market.

2.2.4 Market-oriented housing system: 1998-present

The process of the nationwide housing reform was officially completed in 1998, finally transforming the Chinese welfare-based housing provision system into a market-orientated housing market. As a consequence of the privatisation of public housing and the massive provision of commodity housing, China has transformed itself from a country of public renters to a nation of homeowners.

The financial market made a great process. The HPF debts, which were only restricted to real estate developers, were made available to individual households for home purchases at lower interest rates in 1998 (Xu, 2017), playing an increasingly important role in promoting homeownership in China. Nevertheless, commercial mortgage loans play a dominant role (Evergrande Research Institute, 2019). The commercial mortgage lending criteria were modified in 1998, by the People's Bank of China, requiring a maximum loan-to-value ratio of 70 per cent and the maximum duration for a mortgage was extended to 20 years and was

extended to 30 years in the subsequent years (L. Deng et al., 2009; Y. Deng et al., 2005). Mortgage rates for long-term mortgages were required to follow bank lending rates set by the central bank. Currently, all residential mortgages in China are adjustable rate mortgages, which indicates the changes in benchmark rates would be applied to all existing mortgage loans in the market, from the beginning of the following year. Combined with HPF across the country, the dual debt product allows borrowers to jointly apply for a mortgage and HPF housing debt to support their housing purchase.

Since 1998, the investment in the housing sector and supply of commodity residential housing in China has experienced a persistent increase. Commodity housing became the dominant form of urban housing by 2003 (The State Council, 2003). The enormous increase in housing stock occurred with increasing improvement of living conditions, in terms of floor space per capita, housing services, and facilities.

During this period China also successively launched several affordable housing programs to help low- and moderate-income households own or rent decent homes, including Cheap Rental Housing (CRH, defined as a housing property that was leased at a symbolically low level of rent to meet the basic housing need of the bottom income group of the urban population (Yang & Chen, 2014)) and Capped-Price Housing program (CPH, a dual-restriction commodity in which both the selling price and the apartment size are restricted) (Yang & Chen, 2014). However, affordable housing provision largely lagged behind market housing provision due to the fiscal burden imposed on local governments from 2004 through 2010 (Dang et al., 2014), the reliance of city governments on land-related revenue (Cai & Wu, 2019; Y. Huang, 2012; Z. Wei & Chiu, 2018), and more importantly, the tendency of Chinese neo-liberalism to favour market outcomes during this period.

From 2005, a series of interventions in the housing market was made by the central government and its ministries to manage and cool the housing market, including the restriction of maximum loan-to-value ratios, restrictions on loans for second and third houses, and housing purchase restrictions[1] in some big cities. In 2011, the pilot property tax was implemented in Chongqing and Shanghai and a plan to expand this pilot to more cities has been put on the agenda in 2021. Nonetheless, this expansion plan has been interrupted by

[1] Housing purchase restrictions refers to the fact that residents with local hukou can buy up to two flats in the city where they live; non-local residents who can provide a local certificate of tax payment or a certificate of social insurance payment for some years can buy one flat only (V. J. Li et al., 2017).

the decrease in housing prices since the start of 2022 (Ministry of Finance of the People's Republic of China, 2022).

Aiming to reduce the negative impacts of the global economic slowdown since 2008 and tackle the huge housing inflation (J. Chen et al., 2013), the government also put affordable housing issues back on the agenda as a means to maintain social stability starting in 2010 (Zou, 2014). This year, a new type of public sector housing, Public Rental Housing (PRH) was introduced. The support for PRH was also accompanied by Shantytown Renovation Housing (SRH) project and Shared-ownership Housing (SOH) project.

In recent years, more and more importance has been attached to the private rental market, especially in large cities. The scarcity of affordable rentals may contribute to a shortage of low-cost labour. The diversity of labour, in particular single persons and childless couples, poses a requirement for the diversity of the houses. Local governments also issue guidelines to promote the development of the local residential rental market and encourage developers to provide rental housing for long-term residents, as a means to provide fast access homes for mobile workers and resolve the housing un-affordability problem in metropolitan areas, since a well-functioning rental housing market may facilitate metropolitan economic development. (J. Chen et al., 2022). Meanwhile, a strong private rental housing sector can relieve local governments' financial burden on PRH programs (J. Chen et al., 2022). It has been reported that local authorities, such as Shenzhen, intend to increase rental housing supply by setting aside land plots for the construction of rental housing, renovating some existing business buildings into rental homes, providing preferential tax treatment for rental housing business, and introducing more innovative financial instruments such as corporate bonds and asset-backed securities, to ensure adequate funding for rental housing companies (The State Council, 2016). Additionally, equal rights to public services including access to residential permits and education for both tenants and homeowners, namely tenure neutrality, have also been discussed by policymakers (The State Council, 2016).

2.2.5 Land reform and housing in rural China

Land and housing markets in urban and rural China are separate (Y. Wang et al., 2020). The Household Responsibility System introduced around 1980 is a key element of the current land regime in rural China, through which collectively-owned rural farmland is contracted to individual rural households for agricultural production. Every rural household is also eligible to apply for one piece of residential land to construct housing for self-occupancy.

Only under strict conditions can residential land be transferred within the same collective organization and formal rules strictly forbid rural residential properties from being traded with anyone who is not a member of the same village (Bian & Lu, 2014; Y. P. Wang et al., 2012).

The lagging marketisation of rural housing means there is no 'formal' housing market, and the house's sale value is based on self-evaluation. Rural housing has continued to be privately owned, built, and inherited by rural households on the collectively-owned hand. Institutional and policy factors continued to constrain the development of rural housing markets. Rural housing values in locations without active housing markets are most likely dependent on construction costs (Sato et al., 2013).

This means that rural households are effectively excluded from the market system though there is now a growing informal sector of small property rights housing (Hamnett, 2021). Although some new reforms impacted rural areas, for instance, in 2013, the central government proposed establishing a unified urban and rural construction land market and residential property registration for rural housing was started in 2016, the urban-rural disparity still exists in China. Driven by industrialisation and urbanisation, the value of rural land and real estate at the urban-rural fringe is increasing, and in the absence of the opportunity to sell properties, the informal rental market for rural houses has gained popularity in recent years, becoming an important side-line for many rural households in these areas (Hamnett, 2021).

2.3 Housing provision system in urban China

2.3.1 Multiple housing supply system in urban China

Shaped by housing reform, a diversified multilevel provision system has been formed in urban areas (Chen et al., 2014), as plotted in Figure 2-1.

Owner-occupied housing

Owner-occupied housing in urban China is quite diversified. In general, there are three types of sources that constitute owner-occupier housing in China. The first source comes from special-access housing, which is subsidised by the government in various forms. Special-access housing encapsulates those purchased with a discount through special housing

programs, such as ECH, CPH, and privatised public housing. ECH and CPH are restricted to locally originating residents (Song et al., 2008; W. Wu, 2006; L. Yu & Cai, 2013). It is hard to define the spatial distributions of these housing projects since every city has its spatial features and existing studies are drawn from specific case cities (Dang et al., 2014). Nevertheless, they note that sub-districts with a higher land price, a high ratio of old houses, and greater subway accessibility have a lower probability of being designated for affordable housing development.

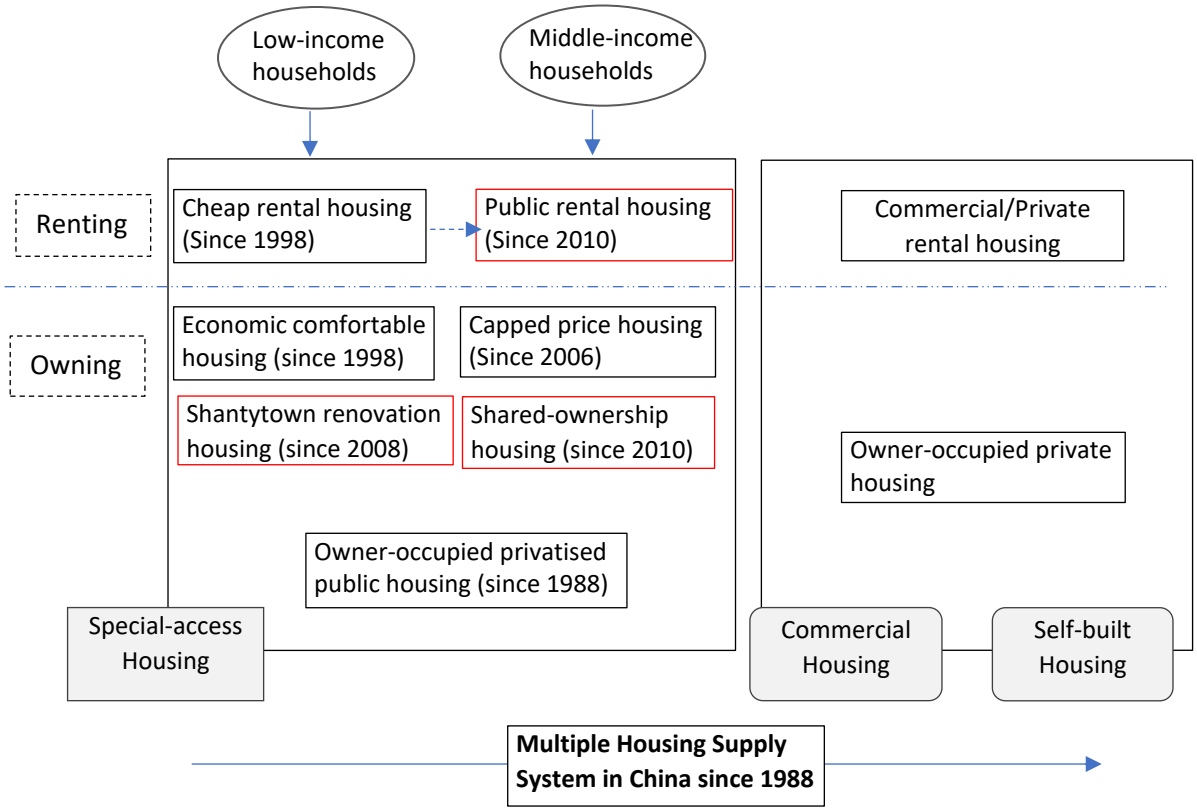

Figure 2-1. Current housing provision system in China
Source: Reorganise and summarise based on Yang and Chen (2014, p.91).

The special-access housing also includes homes that are given by governments and developers for free or comparably lower-price as compensation and resettlement (Z. Yu, 2020), typically SRH. SRH refers to property that is sold or allocated to relocate households as compensation for displacement, as a direct result of urban regeneration (W. Shi et al., 2016). The renovated houses are characterised by poor housing conditions; a lack of basic public services, including utility supply systems of water, electricity, heating, and sewage; bad roads and transportation systems; and the vulnerable social status of people living in shantytowns (Ni et al., 2015). Since 2008, the renovation of shantytowns is one of the top affordable housing projects in promoting residents' well-being. Each municipal government means to set up a mission to lead the renovation project (Ni et al., 2015).

Original homeowners can usually get two types of compensation from governments: in-kind compensation and monetised compensation: Those who choose in-kind compensation are moved to so-called relocation neighbourhoods (on-site or off-site), which are provided by local governments. Residents who get monetised compensation, instead, may purchase dwellings from the housing market based on their preference and economic situation and the magnitude of compensation (X. Li et al., 2018). However, the SRH program has been suspended since 2018 (Pang, 2018). In a case study of Nanjing, Ye et al. (2017) found that residents in a newly SRH are characterised by high rates of unemployment, low income, and poverty. Although these disadvantages are mainly caused by low-and moderate-income households' demographic and socioeconomic disadvantages, the peripheral physical and social locations exacerbate their vulnerabilities (Ye et al., 2017).

The special-access housing also includes Shared-ownership Housing (SOH). SOH was first launched in 2010 in Shanghai. The local governments held a share of the property rights and the buyers the remainder. The policy has several restrictions, including that buyers and their families cannot already own homes, single people making purchases must be at least 30 years old, and a family can only apply for one home. These units cannot be legally traded in the housing market (Z. Yu, 2020), at least for some years (normally 5 years). The subsidised homeowners have to share their capital gains with the government (Cheung & Wong, 2019).

The second source of owner-occupied housing is commercial housing, which includes houses being delivered to the market by real estate developers (Yang & Chen, 2014). Commercial housing is particularly important for wealth accumulation due to free trade in the housing market since homeowners almost always have full user and disposal rights to the units.

The third source of owner-occupied housing is called self-built housing, including self-build housing after 1949 or old private housing stock that was built before 1949. Self-build housing is most common in the urban villages and outskirts of metropolitan areas, where land is often collectively owned by villages and townships rather than the state. Self-build housing tends to be of low quality, has limited facilities for heating and sanitation (Logan et al., 2009), and is often, individually constructed (Z. Yu, 2020). More importantly, self-built housing is not freely tradable in the housing market. Consequently, self-build housing is rarely a good choice for wealth accumulation (Z. Yu, 2020).

An informal sector of small property rights housing built on the collective land owned by village collectives has emerged. Small property rights housing is typically developed in urban villages in metropolitan areas (S. He et al., 2010; Lai et al., 2017; Paik & Lee, 2012; Qiao & Upham, 2014). Such housing is sold by township or village-level governments and is considered to have few state-sanctioned property rights (L. Gan et al., 2014). Buyers include but are not limited to migrant workers, early-career white-collar workers and entrepreneurs and real estate speculators (S. He et al., 2019). The small property rights housing cannot be transacted in the formal housing market, although the government started to support their legality in the housing market in 2018. This small property right housing has provided accommodation for more than a quarter of a billion people (S. He et al., 2019). This accounted for about 8% of new housing constructions from 1995 to 2010 (Y. Wang et al., 2020), characterised by low prices (Lai et al., 2017).

Rental housing

In contrast to the rapid development of the ownership market, the rental market has always been at the periphery of housing policy, accounting for a small share of tenure in China since 1998. Residential rental market suppliers include house-leasing companies, real estate developers, housing intermediary agencies, and individual owners. Most rental houses are provided by individual households from private housing and commercial housing. According to Evergrande Research Institute (2019), rental housing provided by individual owners accounts for 83 per cent of the whole rental market. In some cases, landlords let their houses to tenants by placing advertisements on popular websites, such as *58Tongcheng*, *Anjuke*, and *Fangtianxia*. This type of housing mainly provides accommodation for rural to urban migrants and new graduates. In other cases, housing-leasing companies, for example, *Danke Apartment*, *Ziru, and Xiangyu*, play a role here. The leasing company takes apartments on lease/rent from individual owners, carries out renovations, provides furniture and appliances, and often rents it out on a single-room basis to white-collar workers. The lease term is usually 1 year and can be extended easily.

Another form of rental is long-term letting apartments provided directly by house-leasing companies, real estate developers, or housing intermediary agencies. Since 2011, some real estate developers such as *Vanke* and *Longfor* have been encouraged to provide long-term letting apartments for some individuals or households. These individuals or households are more likely to be distributed at the middle and top of the distributions of wealth and income.

Between 2011 and 2019, about 900 enterprises were created as long-term letting firms or their subsidiaries (Zhang, 2020). Nonetheless, a slowdown has been identified since 2020, partly due to the economic and social shock caused by the COVID-19 pandemic (J. Chen et al., 2022).

Regarding rental housing supported and allocated by the government, CRH was started in 1999. CRH has been merged into PRH in 2014 as a special segment of PRH. PRH was introduced with the main purpose of solving the temporary and interim accommodation needs of migrants, new workers and house-poor households (Li, 2011). PRH was more than just a welfare project. To some extent, governments also expected PRH to work as a crucial policy tool to benefit the preferred specific target groups such as local civil servants, highly educated people and skilled labour (Y. P. Wang & Murie, 2011). In some cities, such as Shenzhen and Chongqing, tenants in PRH could buy their rented dwellings after a few years. It has been argued that PRH was a good substitute for homeownership, offering decent housing to the newly emerged middle class (W. Shi et al., 2016). Nevertheless, it has long been criticised that PRH projects in China are usually built on the urban fringe without enough public amenities, such as hospitals, schools or shopping centres (He & Liu, 2014; Zou, 2014). This situation is more apparent in some big cities, for instance, Beijing (Dang et al., 2014), Nanjing (Ye et al., 2017; Zeng et al., 2019), Guangzhou (Y. Lin, 2018; Z. Wei et al., 2017; Z. Wei & Chiu, 2018) and Changchun (Ma et al., 2018).

2.3.2 The privileging of homeownership and the disadvantaging of renting

When looking through the development of the housing market in China since 1998 and the housing provision system, the favourable standing of homeownership over other tenures (mainly private renting) can be identified, especially in recent decades. Corresponding with homeownership being equivalent to middle-class orientations regarding lifestyle, achievement and prosperity in western countries (Gurney, 1999), homeownership in China is also viewed as a source of security and prestige by residents (Yang et al., 2017; L. Zhang, 2012). Owning a home after a period of no property rights is a massive aspiration of the middle class. In this sense, homeownership could be regarded as a positional good, in which an object is only valued by the possessor because it is not possessed by others. In China's context, it also turns out that owning a house could improve a male's relative attractiveness and competitiveness for marriage (S. Wei & Zhang, 2011).

Homeownership in urban China is inextricably tied to *hukou* status and is correlated with access to public services, such as schools, health care, welfare provision and cultural facilities (X. Gan et al., 2016; Y. Huang & Yi, 2011). In first-tier cities (Beijing, Shanghai, Guangzhou and Shenzhen), *hukou* is hard to acquire for some households where immigration levels pose great challenges to local governments. Purchasing a house provides a comparably easy way to gain resident status with local *hukou* rights, in turn providing access to public amenities. A notable example can be taken from education. Educational resources are unevenly distributed within and across Chinese cities. While schools are predominantly public, differences exist between regular schools and 'key schools', with the latter usually being highly resourced. Since 1986, a school catchment zone policy has been adopted, which means a student's school is dependent upon the location of parents' *hukou* registration (Y. Huang et al., 2020b). Due to the high demand for key elementary and key middle schools, local governments add additional requirements such as homeownership into the criteria, while renters living in the catchment zone are not eligible to study in these key schools (Y. Huang et al., 2020b; Q. Wu et al., 2016).

Homeownership is further stimulated by the deliberate design of major tax systems in China. In advanced economies, tax relief for access to homeownership mainly consists of the deduction of interest payments and/or maintenance and improvement fee, tax exemption of capital gains and imputed rent, property tax, and grants to buyers (Lunde & Whitehead, 2021). In most cases, tax relief on costs concomitant with the purchase of a home is often reserved for first-time homebuyers (Arena et al., 2020).

The retention and transaction taxes of housing in China involves nine categories, with details presented in Table 2-1. Table 2-1 shows that the housing tax system in China is featured by 'emphasis on increments but less stock, on transactions but less retention'. Holding a house involves two taxes – property tax and urban land use tax, which are currently exempt for non-business housing. The transaction of housing involves value-added tax, value-added tax surcharge (including urban maintenance and construction tax and education fee surcharge), deed tax, personal income tax, land value-added tax, and stamp duty.

For buyers, mortgage interest for the first home purchase can be deducted from personal income, although a cap on the deduction is applied (maximum: 1000 yuan per month and 240 months). The maintenance and improvement fee, however, is not eligible for deduction from personal income. Although China piloted property tax in Shanghai and Chongqing,

owners still do not need to pay this type of tax for self-occupancy. When owners want to sell their houses, the taxes they need to pay include value-added tax and value-added tax surcharge, land value-added tax and capital gains tax. Nevertheless, the sale of self-occupancy and self-built housing could be exempt from value-added tax. Capital gains garnered by holding for more than 5 years and the sold house being the only house for the household could be exempt from capital gains tax. The deduction from capital gains tax also includes interest, maintenance and improvement fee, and taxes produced in the transaction (value-added tax and its surcharge, stamp duty, and land value-added tax).

Combined, there is no property tax (until now), mortgage interests along with maintenance and improvement fees can be deducted from income, and capital gains tax on the sale of the only residential house does not have to be paid allowing households to buy and hold additional housing without enduring the annual costs from property taxes as is in Western economies (Y. Huang et al., 2020a). It can also serve to incentivise homeowners to be speculative through trading up. This makes a home purchase a comparably profitable investment, even when there is no capital appreciation in the future. Relying on the favourable tax system, investment in housing acquires a privileged status over other investment portfolios.

The demand for owner-occupied housing can be augmented by positional, cultural and ideological influences that, other things being equal, argue that there is some inherent virtue in owning rather than renting and sociologists label this the disadvantaging of renting (Christophers, 2021). In China, the ideological denigration of 'renting' could be partly attributable to a dearth of the protection of tenants' rights in terms of rental and services provided by landlords and public institutions. Economic denigration is also concomitant with low yields on rental investment for developers and landlords, resulting in a shortage of high-quality commercial/private rental houses. All these factors lead to the concentration of tenants with low socioeconomic status (Y. Huang, 2003; Logan et al., 2009; Y. Wang & Murie, 1996) in renting and others choosing ownership.

The rental market in China is very much underdeveloped due to loose regulations since the national housing reform (C. Cui et al., 2020). The experience of Germany and the Netherlands shows that the protection of tenants' rights is vital for a developed rental market (Scanlon et al., 2014). Although the government recently started to promote the rental market and experimented to use rural collective land and fiscal budget to develop rental housing

(The State Council, 2016), in general, a low-quality of housing and insufficient amenities, a lack of tenant rights and unexpected rent increases have been notorious in this type of housing for a long time. A survey conducted by the *Lianjia Research Institute* on tenants in Beijing found that 42.5% of the interviewed tenants said that the existing rental houses were old and poorly functional; 37.8% of the tenants said the lease period was too short and they needed to move frequently; 31% of the interviewed tenants have encountered a landlord default; 28.7% of the respondents thought the community environment was poorly managed (Evergrande Research Institute, 2019). Additionally, overcrowding has greatly decreased tenants' well-being when sharing a house with other tenants.

Table 2-1. Tax system for residential housing in urban China

Process	**Tax**	**Time**	**Calculation Formula**	**Objective**	**Exemption**
Retention	Property tax	Owning	Purchased value*(1-10% to 30%) *1.2%	Holder	Owner-occupied housing
		Leasing	rent*4%	Holder	/
	Urban land use tax	/	Occupied land area*RMB2-20 per square meter per year	Holder	Owner-occupied housing
Transaction	Value-added tax	Selling	Transaction value*5%	Seller	Owner-occupied and self-built housing
		Leasing	[Rent/ (1+5%)] *1.5%	Holder	/
	Urban maintenance and construction tax	/	Value-added tax*7%	Seller	Holding more than two years
	Education fee surcharge	/	Value-added tax*5%	Seller	Holding more than two years
	Deed tax	Selling	Transaction value*1% to 5%	Buyer	/
	Property income tax	Selling	(Transaction value - house costs - taxes produced when purchased - maintenance fee - mortgage interest) *20%	Seller	Living for more than 5 years and the only house for the household
		Leasing	When rents are less than 4000 yuan: [Rents - taxes-maintenance fee - 800] *10% When rents are more than 4000 yuan: [Rents - taxes-maintenance fee] *(1-20%) *10%	Holder	/

(Continued)

Table 2-1. (*Continued*).

Process	**Tax**	**Time**	**Calculation Formula**	**Objective**	**Exemption**
Transaction	Land value-added tax	Selling	If value-added is less than 50% of costs, (Transaction value-costs)*30%	Seller	/
			If value-added is more than 50% of costs and less than 100% of costs, (Transaction value-costs)*40% - costs*5%		
			If value-added is more than 100% of costs and less than 200% of costs, (Transaction value-costs)*50% - costs*15%		
			If value-added is more than 200% of costs, (Transaction value-costs)*60% - costs*35%		
	Stamp duty	Selling	Transaction value%0.05%	Seller and buyer	/
		Leasing	Rents*0.1%	Landlord and tenant	/

Source: Author's tabulation based on The Chinese Institute of Certified Public Accountants (2019).

2.4 Rate of homeownership in urban China

Having discussed the housing reform and the housing supply system and favour for homeownership, this section addresses the rates of homeownership in China. China experienced a considerable expansion of homeownership in the last three decades (Y. P. Wang et al., 2012). Before the national housing reform in 1994, nearly 70% of households in urban China were living in public rental housing, 2.2% rented private housing and the remaining 28% owned their homes in various forms, such as inherited housing (J. Chen & Hu, 2019). The homeownership rate increased from around 20 per cent in 1980 (Y. Huang, 2004) to 46 per cent in 1996 (Y. Huang & Clark, 2002) and 78 per cent by 2002 (Walder & He, 2014). According to NBSC, homeownership in urban China reached a rate of 89.3% in 2010. Of this 89.3%, only 38% of homeownership was achieved through the market, with the rest resulting from either privatisation (40.1%) or inheritance (11.2%). According to a nationwide 1 per cent population survey in 2015, 79.2 per cent of Chinese households in urban areas owned their homes (F. Wu et al., 2020). Of these, 30.8 per cent had accessed ownership via market purchase (of new-built or second-hand property), 34.1 per cent had acquired ownership through self-build, and 14.3% had benefited from the privatisation of public housing before 1998 or purchased affordable housing programs such as ECH and CPH after that date (F. Wu et al., 2020). The latest data reveal that the homeownership rate was about 89.7% in 2015 and 89.68 per cent in 2018 (Trading Economics, 2019).

Rates of homeownership reported may vary because homeownership is defined differently. In most prior studies of homeownership rates in advanced economies, homeownership is equivalent to owner-occupation. That is, the rate of homeownership is defined as the proportion of households that own their main residence/principal residence (e.g., Fatica & Prammer, 2018). Nonetheless, owner-occupation could be distinct from homeownership. If the household owns one home but rents another residence in which they live, then the rented property would be their principal residence. In that case, from the perspective of owner-occupation, these households will be defined as renting. However, since this kind of household owns properties, they are homeowners.

Adapting the definition suggested by Ioannides and Rosenthal (1994, p.127) on housing sub-tenure choice, housing tenure can be split into four groups: households whose current (residence) dwelling is their only home (owner); those who own their current dwelling and also own other residential property (owner-owner); households who rent their current

residence and do not own property (renter); and, finally, those who rent their current residence and also own other property (renter-owner). Following this, owner-occupation includes ‘owner’ and ‘owner-owner’, while homeownership not only comprises ‘owner’ and ‘owner-owner’, it also incorporates ‘renter-owner’. The difference between ‘owner-occupation’ and ‘homeownership’ rests on ‘renter-owner’. According to the definition of ‘owner-occupation’, these households would be considered ‘renters’, whereas based on the definition of ‘homeownership’ these households would be regarded as ‘homeowners’.

In the context of China, this difference has also been explained by what Y. Huang et al. (2020b) highlight, the phenomenon of ‘owning-renting’. There is a segment of homeowners who own properties, but they do not live in any of their owned homes (instead some owners live in rental units owned by others). As they suggest, four mismatches underpin this phenomenon: a mismatch between housing consumption and investment needs (the households cannot afford to purchase a house where they live due to high housing prices, but they do not want to miss the opportunities of receiving capital gains. Therefore, they choose to purchase a house in places where they could afford, in most cases, in nearby cities or hometowns); split households with family members living elsewhere (the main income bearers work in other cities whereas other family members stay in their hometowns); ‘key schools’ zone policy (some key high schools restrict entry to the children of households who own a house close to the school. When this policy was relaxed in recent years, some parents who do not own a house around the key schools choose to rent a house in the neighbourhoods); a mismatch between current housing needs and future needs (housing is an important indicator of financial situation. To secure young adults’ capability in the marriage market, parents choose to purchase a house for their children).

These mismatches mean that some households could be homeowners but not owner-occupiers. Normally speaking, the rates of homeownership, when defined by ownership, would be higher than the rates of homeownership when referring to owner-occupation. Figure 2-2 and Figure 2-3 present the rates of homeownership based on owner-occupation and homeownership in China. The figures suggest that the rates of homeownership based on homeownership are higher than the rates of homeownership based on owner-occupation. Compared with the small differences in rural areas, significant disparities in rates of homeownership exist in urban China, with quite smaller rates of homeownership measured by households who live in their own house than the rates measured by whether households own houses.

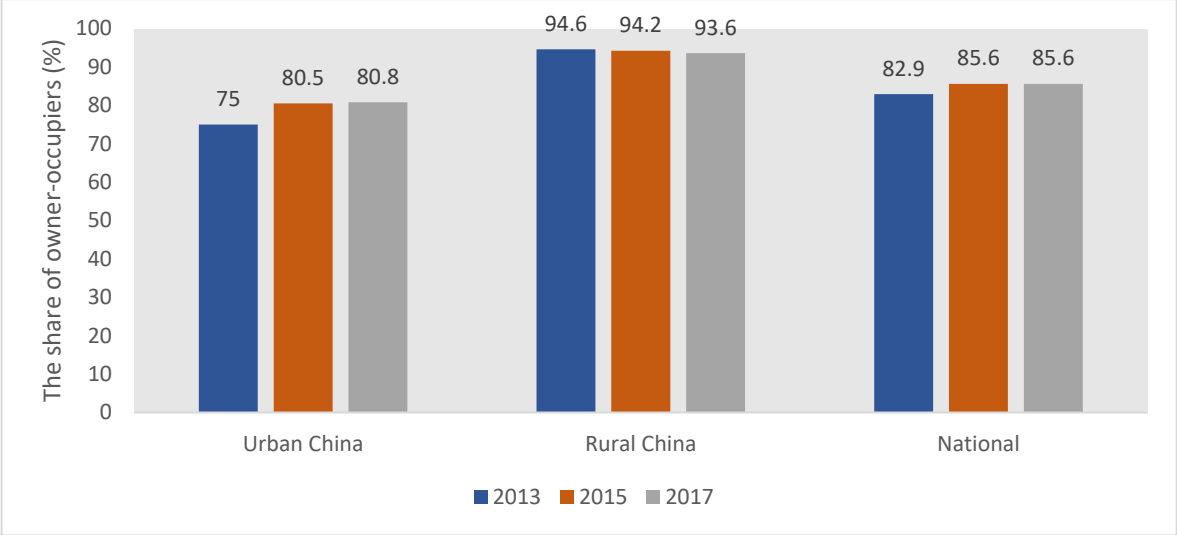

Figure 2-2. The rates of homeownership based on owner-occupation
Source: Gan (2018).
Note: The ratio of households living in their own housing to the total number of households

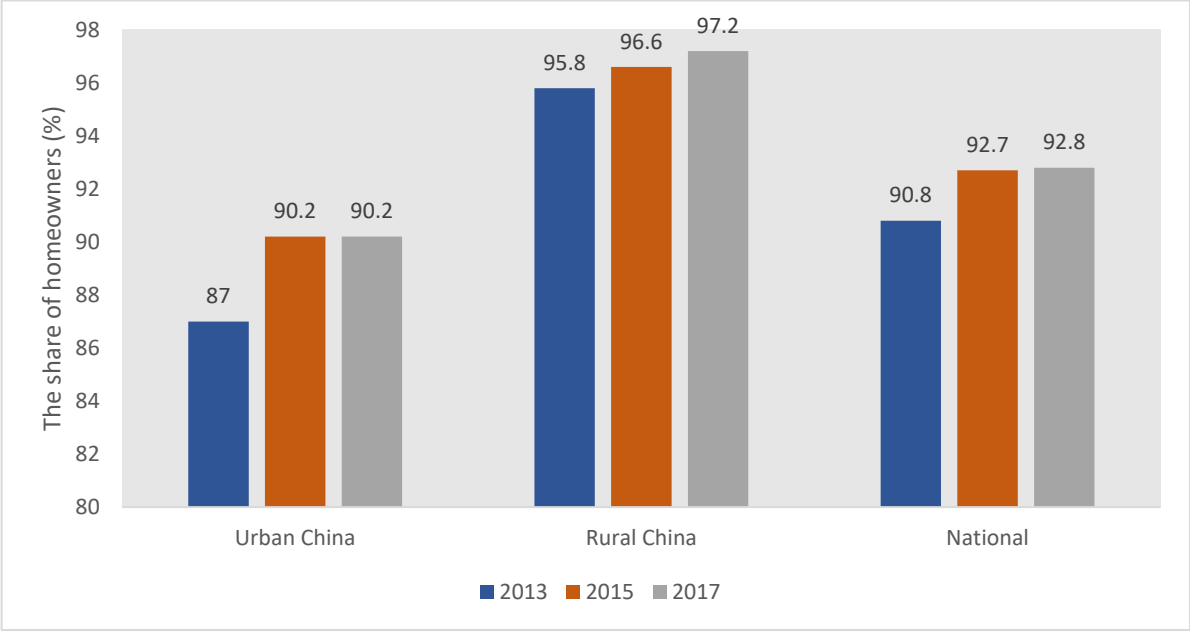

Figure 2-3. The rates of homeownership based on ownership
Source: Gan (2018).
Note: The ratio of households that own at least one house to the total number of households

For this moment, just focus on the rates of homeownership based on homeownership (whether households have houses). Homeownership is not equally distributed. Figure 2-4 displays the rate of homeownership across groups by city level, birth profile, gender, migration, hukou status, and income. The first picture reveals that the rate of homeownership is lowest in first-tier cities, with an almost equal rate of homeownership between second-tier cities and other cities. Considering a large number of rural migrants and the high

concentration of new graduates in first-tier cities in China, the rate of homeownership in first-tier cities may further decline in the near future.

The second picture of Figure 2-4 displays the birth profile of the rate of homeownership. The rates of homeowners for household heads who were born before 1940, between 1940 and 1950, between 1950 and 1960, between 1960 and 1970, and between 1970 and 1980 are similar, fluctuating around 90%. Compared with these groups, the rates of homeownership for household heads who were born between 1980 and 1990, and after the 1990s are relatively lower. Due to the short period of the housing market in China, it is almost impossible to compare the rate of homeownership among the young generation with that of the older generation when they were of the same age.

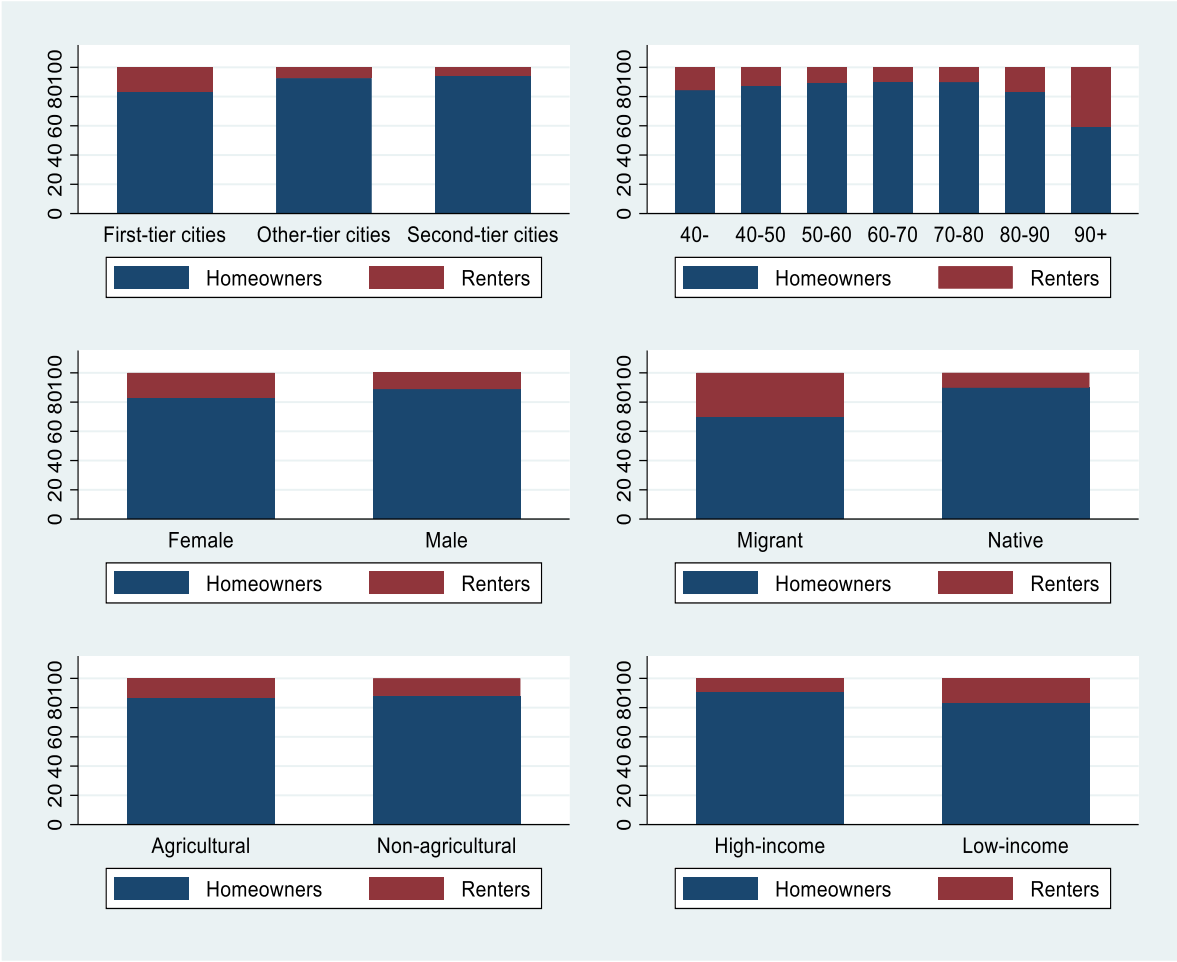

Figure 2-4. Homeownership across groups by city level, birth profile, gender, migration, hukou status, and income
Source: Calculated by the author through using CHFS and CHCS.

The third picture displays the difference between male heads and female heads, which suggests that households with male heads are more likely to own houses than households

with female heads. The biggest gap (nearly 20 percentage points) exists between household heads who are native and household heads who are migrants, as shown in picture four. The fifth and sixth pictures suggest that there is little difference between household heads with agricultural hukou and non-agricultural hukou, between low-income households and high-income households.

2.5 Housing prices in China

2.5.1 The changes in housing prices in urban China

National housing prices in China

Figure 2-5 plots a comparison between the housing purchase price and total household income in the period 2000-2020. The left axis on the figure represents the housing purchase price of a $90m^2$ sized house, based on the price of newly built commercial residential buildings, and the right-hand axis represents total household income. It shows that the housing price per square meter in 2020 is about 3.34 times the housing price in 2000, after being deflated using 1999's CPI (5.12 without inflation adjustment).

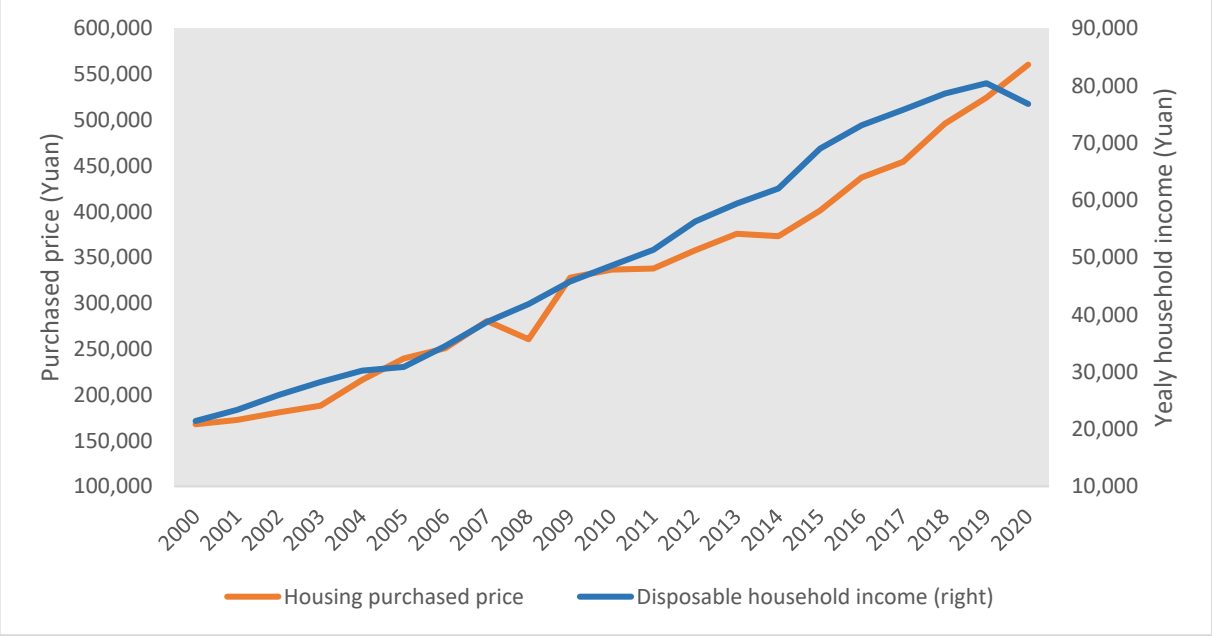

Figure 2-5. Housing purchase price and household income
Source: NBSC
Notes: 1) Housing purchase price refers to the price of a $90m^2$ sized house, based on the price of newly built commercial residential buildings. 2) Disposable household income is calculated by multiplying the average disposable income in urban areas by the average household size. 3) Deflated using CPI in 1999 (CPI 1999=100).

Correspondingly, Figure 2-6 displays the annual growth rates of CPI, disposable income per capita, and housing prices per square meter. The up-to-date data indicate that the nominal housing prices from 2000 to 2020 rose at an 8.67% annual growth rate, and after being adjusted by the CPI in 1999 the average annual growth rate changed to 6.4%. This figure also shows that housing prices experienced great fluctuation before 2009, with the annual growth rate ranging from negative to about 25%. Between 2010 and 2014, although housing prices still increased, the growth rate decreased persistently. The growth rate of housing prices has rebounded since 2015. The Bank for International Settlements (BIS) also provides relatively comprehensive property price indicators for China from Q1 2005 to Q4 2021 (Bank for International Settlements, 2022), as presented in Figure 2-7. In general, a sustained increase in housing prices has been found from Q1 2005 to Q4 2021, including a downward shift in growth rates between 2010 and 2014.

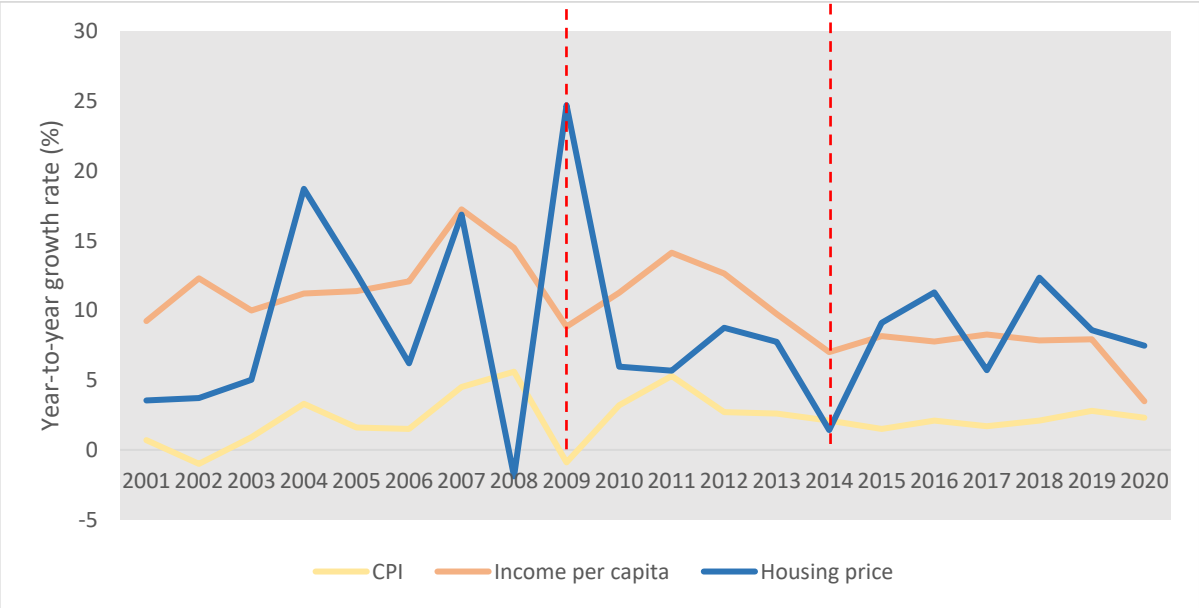

Figure 2-6. Annual growth rate of CPI, income per capita and housing price
Source: NBSC

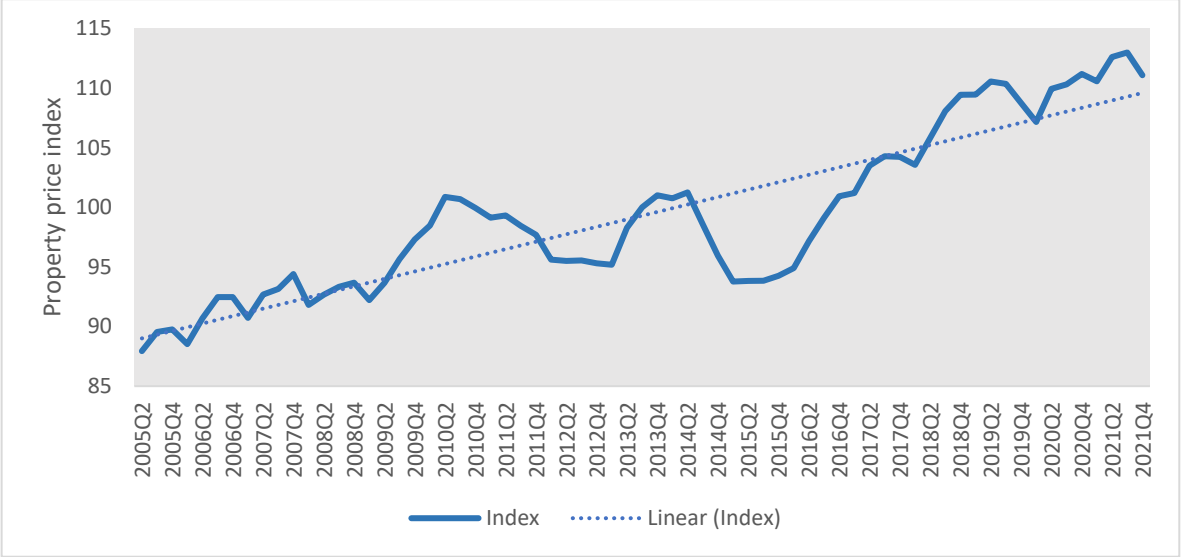

Figure 2-7. Quarterly residential property prices in China
Source: National sources, BIS Residential Property Price database, http://www.bis.org/statistics/pp.htm.
Notes: 1) Index 2010=100, not seasonally adjusted. 2) Coverage includes Q1 2007-Q4 2015: newly built commercial residential buildings in 70 cities in China; from Q1 2016: Existing buildings in 70 cities in China.

Although a full discussion of the reasons for the changes in housing prices in China may lie beyond the scope of this study, some summary points can be made. When combining the trend of housing prices with income per capita, Figure 2-6 also indicates that although the average growth rate of housing prices is high and fluctuating, income per capita generally increased faster as a consequence of the strong growth of the economy. This trend nonetheless was reversed in 2015, with housing prices subsequently rising ahead of income. Before 2015, the average housing price growth rate was 8.5% in nominal terms and 6.22% in real terms, while the average income per capita growth rate was 11.53% and 9.04%, respectively. After 2015, the average growth rate of housing prices was 9.08% (7.02% in real terms) and the corresponding growth rate of income per capita was 7.24% (5.22% in real terms). It has been reported that from 2000 to 2015, China's housing market boom was largely in line with the economic fundamentals, as real GDP grew by 9.7%, accompanied by solid growth of total factor productivity (3.9%) and urban population (3.7%) during this period, respectively (T. Lee, 2021). Since 2015, however, the fundamental determinants of housing demand have deteriorated, but with housing prices continuing to soar. From 2015 to 2019, the growth rate of real GDP, total factor productivity, and the urban population fell to 6.6%, 2.7%, and 2.8% respectively (T. Lee, 2021).

The latest data further shows the housing market experienced negative shocks from the COVID-19 pandemic and the recent (see below) deleveraging campaign. Figure 2-8 displays

monthly average new dwelling prices in China's 100 major cities since January 2019 (month-on-month), provided by the China Index Academy. There was an upward trend in housing prices before June 2020. After that, housing prices showed a decreasing trend until March 2021. Prices started to increase again from April 2021, however, this rise was interrupted by the Bank of China's deleveraging strategy that began in August 2021, which triggered a liquidity crisis for some major property developers. This policy shift established the intriguing 'three red lines policy' which aims to constrain property developers' debt. The first 'red line' is the imposition of liability to asset ratio of less than 70 per cent; the second is net debt to equity ratio of less than 100 per cent; and the third is cash to short-term debt ratio of more than 1, which would guarantee the companies have enough cash to cover short-term debts. If developers breach the rules, they face caps on their ability to raise new debt. It has been reported that almost half of China's 30 biggest developers were in breach of at least one of the 'three red lines policy (A. Lin et al., 2021). The property market has been shaken since then as real estate giant Evergrande struggles to keep up interest payments on time (Hale, 2022). A large negative influence on housing prices has been imposed by the risks of defaults by property developers.

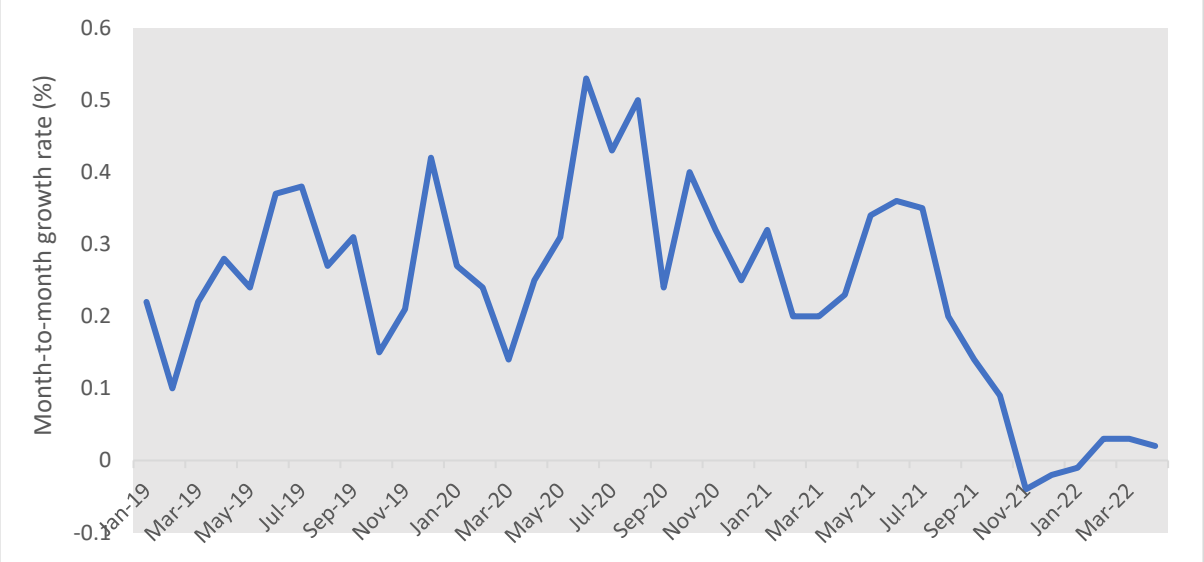

Figure 2-8. Housing prices since COVID-19
Source: China Index Academy

Housing prices at the regional scale

After a scrutinization of average housing prices at the national scale, an examination of regional housing prices could provide more detailed and useful information. Housing prices in China exhibit great disparities across regions and cities. There is an increasing disparity

in the growth rate of housing prices between coastal and inland regions (Shih et al., 2014). The data in prior studies showed that the average annual real growth of housing prices was 13.1% in first-tier cities, 10.5% in second-tier cities, and 7.9% in third-tier cities during 2003-2013 (H. Fang et al., 2015).

Figure 2-9 plots housing prices of newly built commercial residential buildings across six tiers[2] since September 2020. As this figure presents, housing prices in first-tier cities are much higher than prices in other tiers. This figure also indicates that the housing market in first-tier cities is more subject to economic crises, such as the aforementioned deleveraging campaign that occurred in August 2021, while housing markets in other tiers are less likely to be influenced by these factors. Housing prices in other tiers are relatively stable during this period.

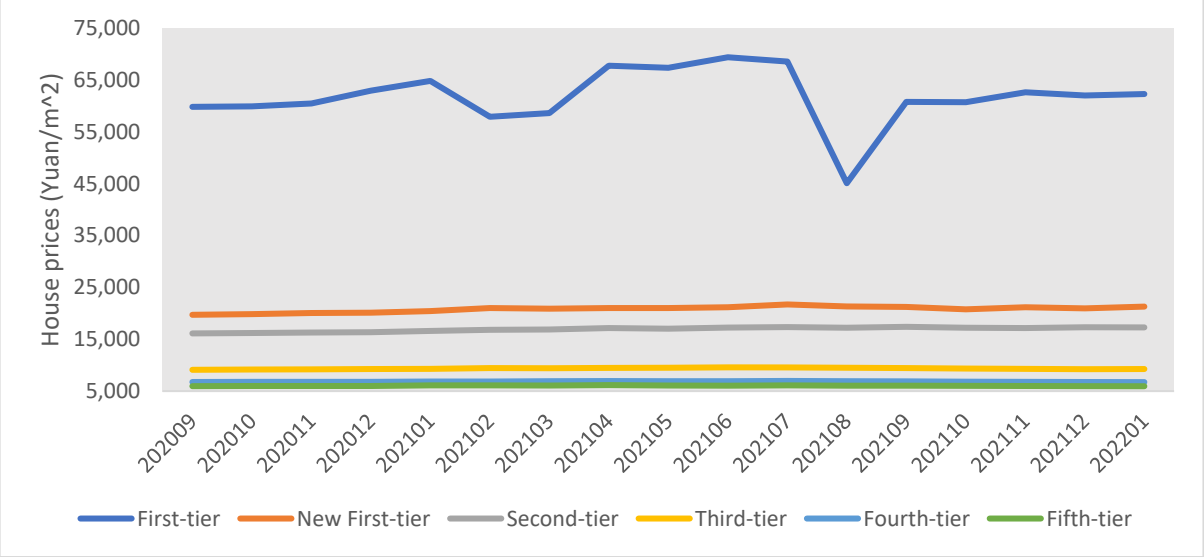

Figure 2-9. Prices of newly built commercial residential buildings across city tiers
Source: China Real Estate Academy

The IMF, in 2021, produced research on the extent to which the major 'world cities' have been converging with each other in price change patterns and delinking themselves from the rest of their national urban systems (Alter et al., 2018; Katagiri, 2018). Figure 2-10 makes a comparison of nominal housing prices between the four first-tier cities and the whole nation

[2] In this dataset, the first-tier cities include 4 municipalities; 15 municipalities are included in the new first-tier cities; The second-tier cities consist of 29 municipalities; The third-tier, fourth-tier, and fifth-tier cities are constituted of 103 municipalities, 65 municipalities, and 48 municipalities, respectively.

since 2008. This figure shows housing prices in first-tier cities *de facto* decouple themselves from the prices in other cities, especially in Shenzhen.

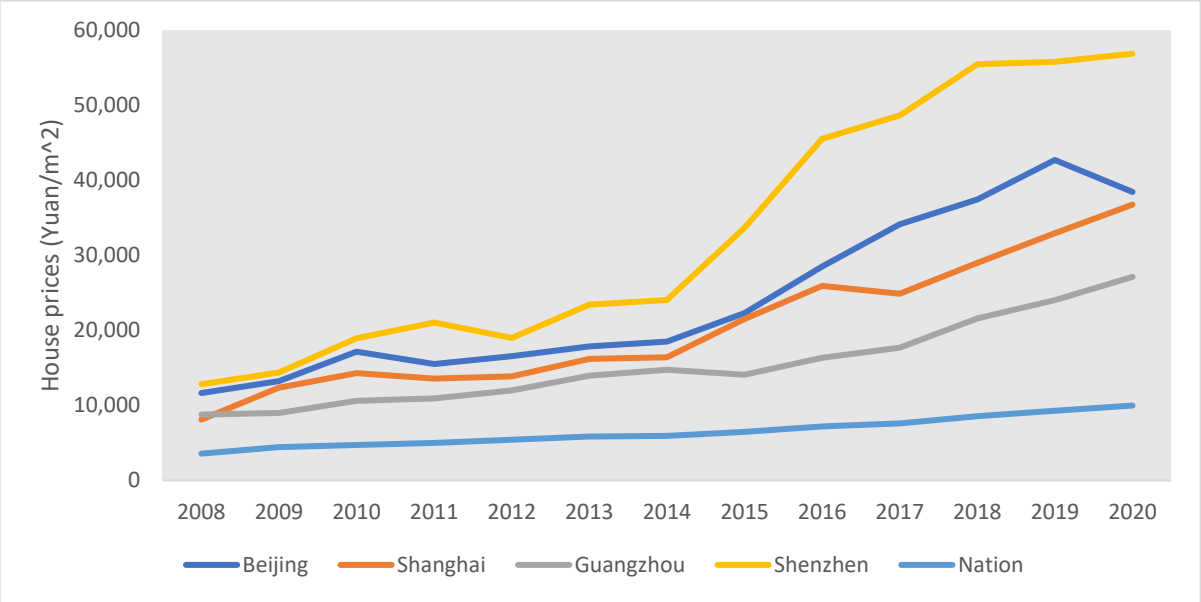

Figure 2-10. Nominal housing price in first-tier cities
Source: NBSC

2.5.2 Pathways to homeownership

Rising house prices have led first-home buyers to rely on multifaceted channels to finance access to homeownership – savings (including savings in HPF account), parental support, informal borrowing from relatives and friends, and finally, mortgage loans from HPF and commercial banks. Of these channels, the importance of saving and parental support outweighs the importance of other channels. Informal borrowing, which has no interest to pay, is immensely popular in China. Although loans from banks account for a small share, they have been gaining popularity among homebuyers in recent years. Figure 2-11 presents the distribution of homeowners in terms of financial sources between 2002 and 2009. Among all the homeowners, 58.48% are outright homeowners and the rest of the homeowners (about 41.52%) have either mortgage loans (14%) or informal borrowings (27.52%).

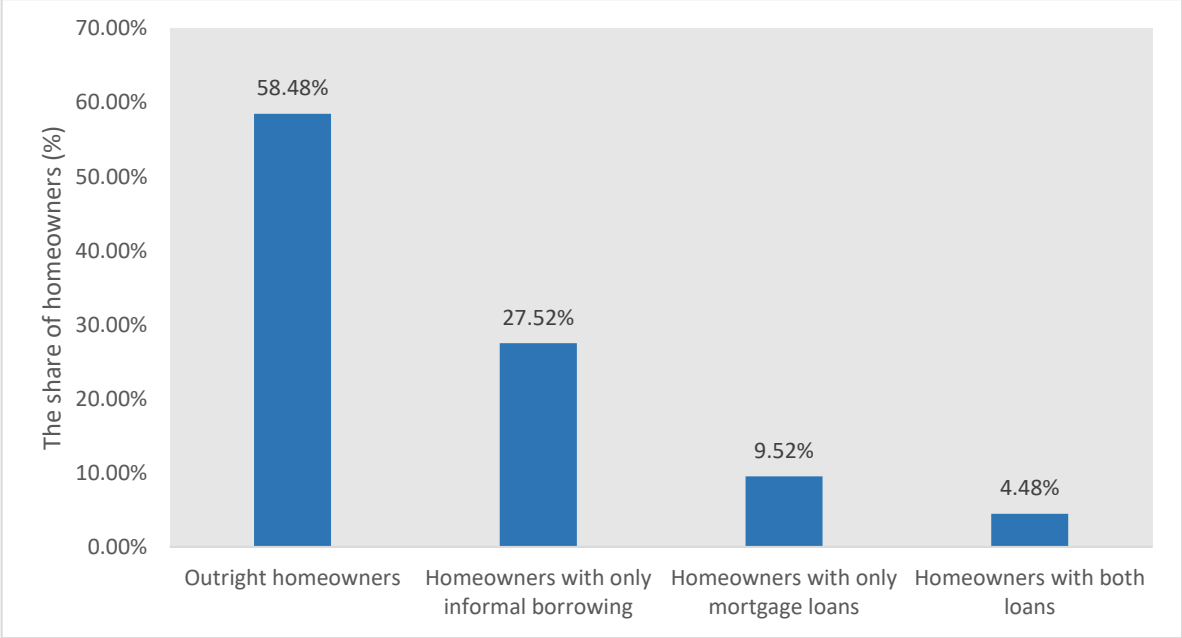

Figure 2-11. Pathways to homeownership between 2002 and 2009
Source: Calculated based on Fan et al. (2017).

Savings accumulated from incomes are one of the major sources to finance access to home purchases. China has a long history of high saving rates. In 2017, the total savings rate was 78.4 per cent (F. Wu et al., 2020). Due to the slow pace of mortgage finance, home purchases to a large extent are financed out of savings (Nabar, 2011). The recent increases in saving rates, particularly among young households are caused in part by homeownership objectives (Chamon & Prasad, 2010). Correspondingly, the sudden decrease in savings can also be attributable to housing purchases (S. Wei & Zhang, 2011).

Another source of savings is the amount saved in the HPF account. As mentioned before in this chapter, employees and employers contribute the same amount to individuals' HPF accounts as a specific percentage of the participant's salary, ranging from 5% to 12% across cities. HPF participants cannot manage the investment in their account, but they are eligible to make withdrawals from their accounts to pay for home construction, home improvement, home purchase, home mortgage down-payments, and monthly mortgage payments, as well as rent payment, retirement and migration. In 2021, about 2.03 trillion yuan (322.22 billion dollars) in HPF was withdrawn, and among this, 25.56 per cent was withdrawn to finance home purchases, self-build, or renovation and 49.98 per cent were used for mortgage repayments (Ministry of Housing and Urban-Rural Development [MOHURD], 2022). The sales of residential housing in 2020 were about 15.46 trillion yuan (2.45 trillion dollars) (National Bureau of Statistics of China [NBSC], 2021). Assuming 25 per cent of the withdrawal money from HPF rests on home purchases, on average about 3.28% (=2.03*25%

/15.46) of the expenditure on home purchases was financed by withdrawals from HPF savings. Combined with the contribution for mortgage repayments, about 10% of housing assets could be contributed to HPF savings.

However, not every enterprise is required to establish an HPF account for its employees, albeit with its increasingly mandated coverage in more employment sectors over the years (W. Wang et al., 2014; Xu, 2017). The data from the National Housing Provident Fund 2019 Annual Report issued by the MOHURD indicate that 148.81 million employees paid HPF in 2019 (MOHURD, 2020). According to the data published by NBSC (NBSC, 2022), there were 754.47 million employees nationwide in 2019, of which 452.49 million were urban employees. Based on urban employees, the calculated participation rate of the HPF is 32.89%, and if based on total employees, the calculated participation rate of the HPF system is 19.72%. HPF savings are disproportionately contributed by employees in the public sector. HPF is well established in the public sector, with a coverage rate reaching almost 100% in most public-sector organisations (J. Chen & Deng, 2014). Many employees working in private sectors, rural migrants, and temporary workers, notwithstanding, are excluded from the HPF savings program. The up-to-date data show about half of the employees who pay the HPF come from government institutions and state-owned enterprises (MOHURD, 2020), while employees employed in public organisations only account for about 12.62 per cent (NBSC, 2022). Additionally, compared to private sectors that pay HPF, employers in state-owned enterprises and government institutions contribute a much higher proportion (20% to 25% in some cases) to HPF savings.

China has a long-standing tradition of parents financing their children's home purchases (Or, 2018). The family plays an important part in pooling resources for the project of home ownership (Lui, 1995). 36% of young homeowners received their parents' financial assistance and 11% even had their parents pay for their flats in full (Zhu, 2012). In comparison, Figure 2-12 plots the financial assistance from parents for homeowners according to 2017 CHCS. For the first house, about one in three homeowners have their parents' financial support towards their down payment, 5.26% have their parents pay the debts (partly or fully), and about one in ten homeowners have their parents pay for their houses in full. Among the homeowners who have multiple properties, although fewer homeowners get financial assistance from their parents in making a down payment, however, a higher share of such buyers have their parents pay their debts (13.05% or one in eight homeowners) or pay for their flats in full (13.05%).

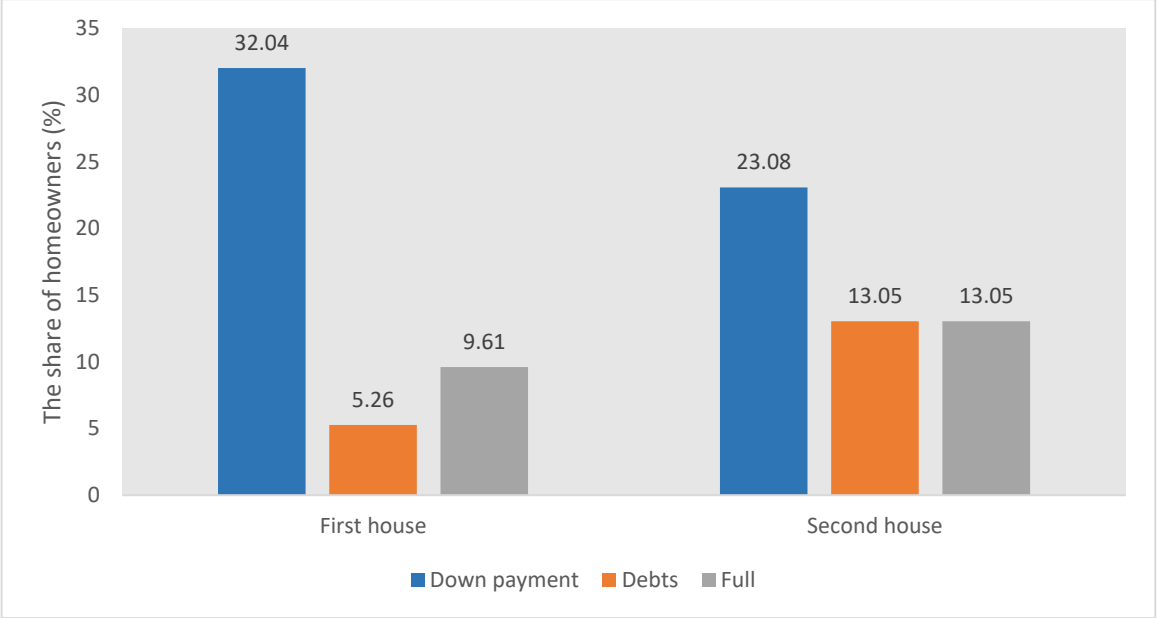

Figure 2-12. Financial assistance from parents
Source: Calculated by the author through using CHCS.

Recent research shows that parental lending for housing triples adult children's odds of homeownership (Z. Yu, 2020). A recent finding on parental high saving rates exhibits that as the sex ratio rises, Chinese parents with a son raise their savings to increase their son's competitiveness in the marriage market. Parents with daughters may not decrease their savings due to the existence of two offsetting motives, namely reducing their savings to take advantage of the higher savings rates of their future sons-in-law and, alternatively, increasing their savings rates to avoid eroding their bargaining power in the marriage 'market' (S. Wei & Zhang, 2011).

The third source of finance for homeownership is informal borrowing. Because of the low financial cost (or no financial cost) of informal borrowing, households tend to borrow as much as possible from relatives or friends (Fan et al., 2017). According to the statistics from the Urban Household Survey conducted by NBSC, informal borrowings accounted for 45.4% of the total housing value, while the average loan-to-value ratio for mortgage loans was about 35% (Fan et al., 2017). Between 2002 and 2009, over 32% of home buyers borrowed informally from their relatives or friends (Fan et al., 2017). About 4.48% of home buyers had both mortgage loans and informal borrowings (Fan et al., 2017). In the 2013-2015 CHFS, 13.2% of the urban households had outstanding bank mortgages, while 13.9% had informal borrowing (Peng et al., 2019). It turns out informal borrowing plays an essential role in helping access homeownership.

China has a low level of mortgage utilisation relative to the total value of housing purchased (F. Wu et al., 2020). As noted earlier in this chapter, China's formal housing finance support is composed of commercial mortgage loans and HPF loans, with the former dominating the housing finance system in China. Figure 2-13 shows the balance of loans from HPF and loans from commercial mortgages.

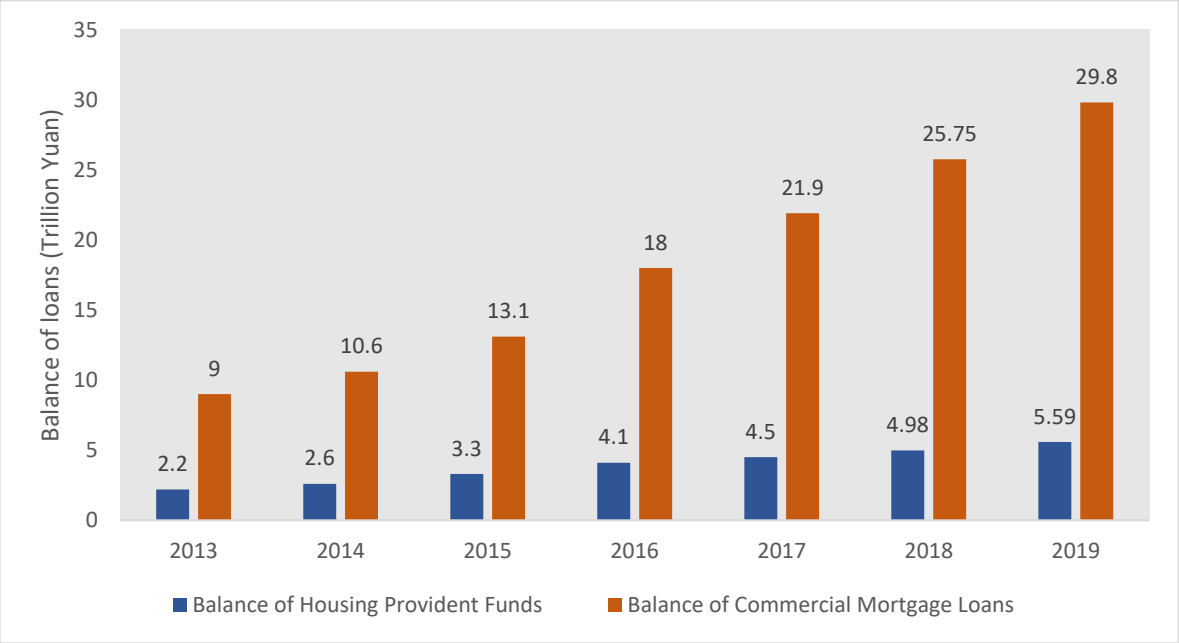

Figure 2-13. Balance of HPF loans and commercial mortgage loans
Sources: MOHURD; People's Bank of China.

Besides HPF's saving function, as mentioned at the start of this chapter, participants are eligible to apply for HPF loans after their first 12 consecutive monthly contributions to the HPF savings account (Burell, 2006). Compared with households without the HPF enrolment, households whose both the head and the spouse were enrolled in the HPF had a homeownership rate 38 percentage points higher during the period 1998 to 2009, whereas those where only one of the couples was enrolled had a homeownership rate 14 percentage points higher (Xu, 2017). This could be almost entirely accounted for by the role of HPF savings and loans play in down-payment and the monthly HPF contributions toward monthly mortgage payments.

Intuitively, HPF loans would be the first choice for all households due to their lower interest rates (about 2 percentage points lower than those for mortgage loans made by commercial banks (5%)), and lower down-payment requirements (20%, whereas commercial mortgage loans made by banks typically require at least 30%). However, the HPF mortgage loans used in home purchases account for a small share of the total sale of commodity housing, ranging

from 8% to 16%, as Figure 2-14 shows. The program has received criticism on both efficiency and equity grounds (J. Chen & Deng, 2014; Chiquier, 2009). Besides the constrained scope of HPF savings and thus the loans in private enterprises, the quota of loans from HPF available to employees is relatively low. This evidence can be seen in the case of Shenzhen. Calculated at the average price, the purchase of a 90-square-meter house with a 30% down payment requires a loan of 3.4 million yuan (about 540 thousand US dollars), while the maximum loan amount for the family's first housing from HPF is only 900,000 yuan (143 thousand dollars), which can only cover 26% of the loan demand. In other popular cities such as Nanjing, Hangzhou, Beijing and Shanghai, the provident fund loans can only cover less than 50% of loan demand. Therefore, most households in bigger cities choose to utilise both commercial mortgage loans and HPF mortgage loans to finance their home purchase. At the end of 2019, the balance of commercial personal housing loans was 29.8 trillion yuan (4.73 trillion dollars), accounting for 53.9% of the total personal housing loan balance.

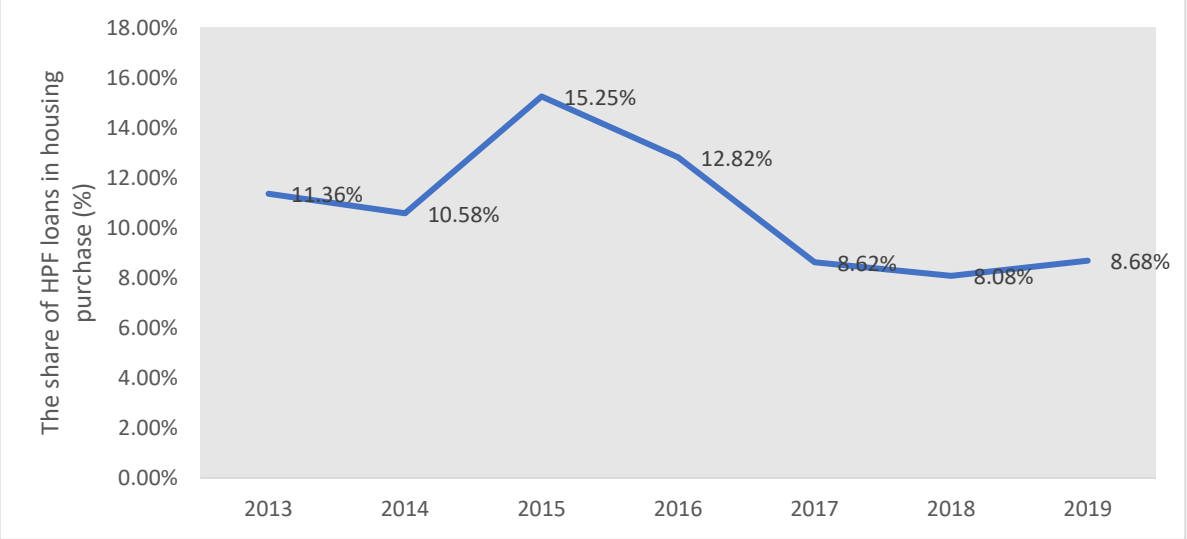

Figure 2-14. The share of the HPF mortgage loans
Sources: MOHURD; NBSC.

Due to the rising housing prices in recent years, a growing number of first-home buyers are utilising mortgages to finance their purchases. Figure 2-15 traces the change in interest rates of long-term loans since 1998, which presents a decreasing tendency in interest rates. The relatively low-interest rates partly contribute to the increased reliance on mortgage loans. The results from Fan et al. (2017) displayed that only 14% of homebuyers in urban China received mortgage loans between 2002 and 2009, whereas, in the 2017 survey, CHCS showed that about 35.57% of the first house was purchased with mortgage loans from banks,

a significant increase in the dependence on mortgage loans. Of all those households who had loans, the average loan-to-value ratio was 49.81%, more than half of which were from commercial mortgage banks.

The discussion in this section suggests that with housing prices rising ahead of income and the advantages of homeownership, households in China tend to depend on multiple ways to get access to homeownership. Nonetheless, inequalities exist in these ways: not everyone receives parental assistance or sufficient intergenerational transfer, and they are both more likely to be received and higher in value among households at the top of income and wealth distribution; the savings in HPF are higher for households who are employed by public sectors. These factors generate wealth inequality, which will be discussed further in Chapter 9.

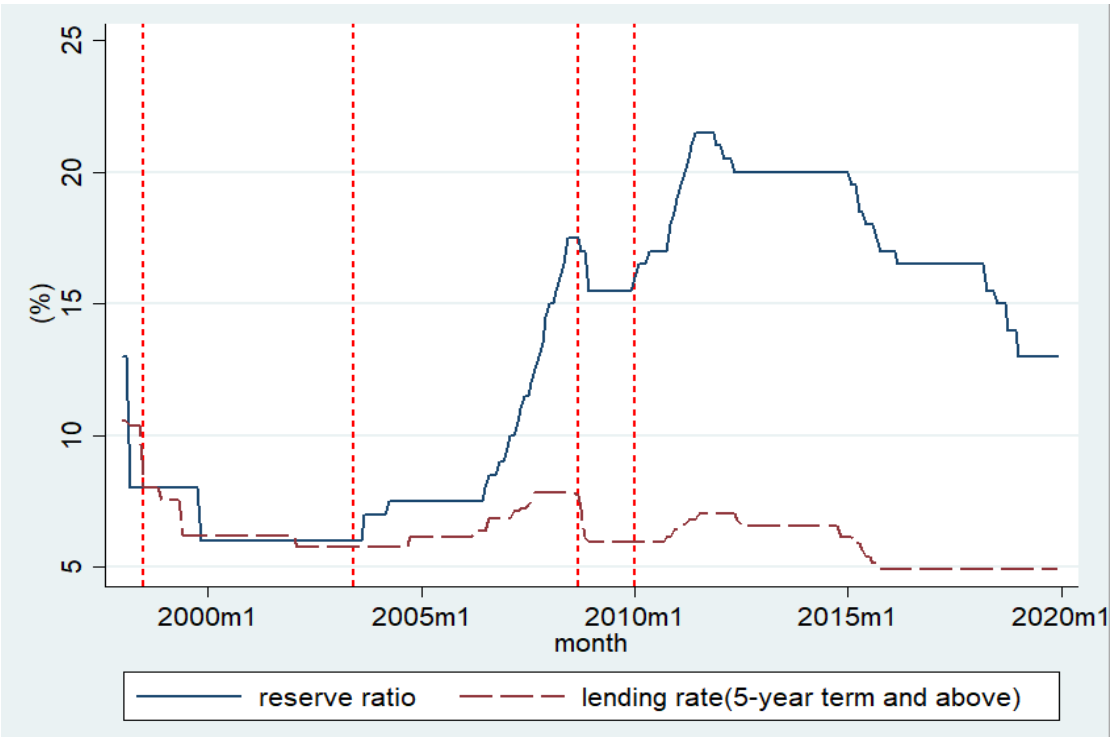

Figure 2-15. Lending rate for a 5-year term and above
Source: Plotted by the author based on data from CEIC.

2.6 Conclusion

This chapter described the transition that has taken place in Chinese housing, detailing the process by which the non-market allocation system was transformed in stages into a market-oriented housing system. It then delivered an overview of the current housing provision system after housing reforms and the reasons for the favourable status of homeownership

over renting. After that, the housing tenure distributions over the period by region, age, gender, migration, hukou status, and income were examined. It also examined housing price trends since housing reform, followed by the introduction of four pathways to access homeownership.

Through housing privatisation and housing commercialisation, China became a country of homeowners within a short period. A diversified multi-level provision system has been established in urban areas to balance the role of the state and the reliance on market power in the production, consumption and exchange of housing. Commercial housing, special-access housing, and self-built housing constitute the current housing provision system. Since housing reforms, homeownership has been favoured through 'idealisation' and the tax system.

Although China has a high rate of homeownership, homeownership is unequally distributed across demographic, socio-economic, spatial, and institutional characteristics. The rate of homeownership is lower in first-tier cities than in other-tier cities. The rate of homeownership is also lower for households whose heads were born after 1980 compared to households whose heads were born before 1980. Households whose heads are female, migrants, who have agricultural hukou, and households that come from a low-income background are less likely to have become homeowners than their counterparts.

Housing prices since 1998 experienced persistent increases, albeit large fluctuations in the annual growth rate. Since 2015, increases in housing prices have risen ahead of income, exacerbating housing affordability difficulties in China. Furthermore, housing price increases were assuaged by the COVID-19 pandemic and recent 'deleveraging' shifts in monetary policies. Nonetheless, great variation in the levels and growth rates of housing prices exists in different regions and cities, with housing prices in first-tier cities higher and rising faster than in other tiers.

With housing prices outstripping income, multifaceted modes have been developed by households to secure entry to homeownership. Savings from income and HPF accounts, intergenerational transfers, informal borrowing from relatives and/or friends, and mortgage loans from HPF loans and commercial bank mortgage loans comprise the means for entering homeownership. In China savings, parental support and informal borrowing account for a large share of the financing of homeownership. This implies that the inequalities that exist

in the pathways to homeownership, and the subsequent wealth inequalities, are distinctive in China, especially the extent and depth of parental support and HPF savings.

The following chapter will discuss the theoretical background of the empirical analysis in this thesis through a literature review.

Chapter 3 Literature review

3.1 Introduction

As outlined in Chapter 1, this thesis examines the impact of homeownership on household wealth accumulation and the outcomes for wealth inequality and housing strategies in China. Homeownership not only influences wealth through the accumulation of housing wealth but may also affect the accumulation of non-housing wealth. Patterns of wealth accumulation also generate wider socio-economic outcomes arising from wealth inequalities and directly affect the housing tenure, borrowing and investment strategies deployed by households. The current chapter gives a brief synopsis of the relevant literature relating to homeownership and wealth accumulation based on the separate impacts of homeownership on household wealth and discusses how wealth inequality is linked to housing through unequal access to homeownership and consequent housing wealth inequality. This reflection forms a basis upon which to establish a theoretical framework that shapes econometric modelling and econometric specifications for empirical estimates.

Each strand of the literature reviewed here is linked to a specific, subsequent chapter of the thesis. A considerable literature exists on the effects of homeownership on household net worth, and it will be the focal discussion in Section 3.2, and it underpins the follow-up empirical analysis presented in Chapter 6. Section 3.2 also presents a detailed discussion concerning how housing portfolios are developed and wealth is accumulated. More specifically, the channels through which housing wealth is accumulated and the factors that exert an influence on housing wealth augmentation will be investigated in this section. Correspondingly, the empirical analysis of how housing wealth is accumulated in China is outlined in Chapter 7.

Following the discussion on housing wealth accumulation, Section 3.3 will review the literature on the relationship between homeownership and non-housing wealth. As important parts of non-housing wealth, the relationships between housing assets and, separately, financial and business wealth will be explored in Section 3.4 and Section 3.5, respectively, mainly borrowing literature on housing and the wider economy. The empirical analysis regarding the effect of homeownership on non-housing wealth in China, grounded in the discussion in these sections, is presented in Chapter 8.

Section 3.6 and Section 3.7 focus on how inequality in access to homeownership and housing wealth inequality are produced or reinforced. These reflections and empirical explorations of the accumulation and distribution of housing wealth are then critically linked to the pivotal discussion of wealth inequality and housing strategies in Chapter 9. A summary of key literature findings for each topic and the corresponding research gaps identified for each strand of work will be presented at the end of each section. Section 3.8 integrates the conclusions of this chapter.

3.2 Homeownership and wealth accumulation

There is a large volume of published research describing the link between homeownership and wealth. This section discusses theoretical and empirical understanding relating to how homeownership is linked to household wealth. Here patterns are established but there is also an investigation of how housing wealth is accumulated and the factors that impact housing wealth accumulation.

3.2.1 Two strands of studies assessing the financial returns to homeownership

Before proceeding to examine the research regarding the effects of housing tenure choice on wealth accumulation, it will be helpful to consider the research approaches being used in those studies. There are two broad classifications of studies that have attempted to assess the relationship between homeownership and wealth accumulation (Herbert et al., 2014): panels/cross-sectional studies and simulation models. Mixed evidence has been found via these two methods.

One group is dependent on panel studies to track actual wealth accumulation over time among owners and renters (Herbert et al., 2014) or cross-sectional data to directly compare the wealth holdings between owners and renters. The findings from this type of analysis provide strong evidence for whether owners are likely to accrue more wealth than renters in practice. Most studies reporting a positive relationship between homeownership and wealth accumulation come from this type of approach. Widely-cited examples of studies utilising this approach include Di et al. (2007), Kaas et al. (2019), Lersch and Dewilde (2018), and Wind and Dewilde (2019).

Though a wide selection of 'explanatory' variables has been investigated in this approach, such studies have been plagued by endogeneity problems and complex statistical issues. One of the most important issues is the substantial selection bias as to who becomes a homeowner, as there is reason to believe homeowners are intrinsically distinguished from renters (both concerning aspects of preferences and constraints). For instance, those who are better off in economic terms (constraints) or more inclined, at any given income level, to save (preferences) are more likely to become owners. Much more information has become available on methods and techniques in econometrics to solve endogeneity issues, such as instrumental variables, differences-in-differences, regression discontinuity, and propensity score match. These methods have been widely used in literature.

The second broad approach relies on simulations that compare all possible costs of owning (including mortgage interest, property taxes, insurance, maintenance, and transaction costs minus gains in property value) to the costs of renting a comparable housing unit. These simulations have to '*make a variety of assumptions and hypotheses about market conditions and household choices*' (Herbert et al., 2014, p.65). For instance, one of the key assumptions would be that '*renters make full use of opportunities to save and invest both the initial investment that owners make in buying their homes as well as any annual savings in housing costs in financial markets*'(Herbert et al., 2014, p.65). Under some of these assumptions and conditions, the positive effects of owning a home on wealth accumulation could be outweighed by the positive effects of renters investing in financial investments. Therefore, the effects of home tenure choice on net wealth become ambiguous in these studies, considering the choices made, future uncertainty and information required for households. Arguably, the involvement of financial investments makes this situation more complex and flexible. Such an approach has been employed by analysts such as Goodman and Mayer (2018) and Somerville et al. (2007).

The studies in the simulative models overcome the risks caused by endogeneity issues by assuming that identical households operate under different assumptions. This also makes it possible to flexibly examine under what circumstances owning or renting is likely to be more financially beneficial. The problem existing in these studies, nonetheless, is that under these strong assumptions the reality of these simulations, that is the extent to which those assumptions would be realistic and could be materialised by households.

3.2.2 The effect of homeownership on wealth accumulation

Traditionally, what we know about the effect of homeownership is largely based upon empirical studies that investigate how homeownership influences wealth accumulation, especially for low- and middle-income households. It has been claimed that homeowners have higher household wealth than renters (Belsky et al., 2005; Boehm & Schlottmann, 2008; Causa et al., 2019; Di et al., 2007; Wind & Dewilde, 2019). One well-known study that is often cited in research regarding the relationship between homeownership and household wealth is that of Di et al. (2007), who found that those who own homes for longer periods have significantly higher household net wealth. One recent American study estimated that on average, homeownership has yielded a net gain in wealth holdings of about $10,000 per year since 1990, with lower but still significant gains for low-income and minority households (Herbert et al., 2014). In addition, the advantages of resulting in more wealth for homeowners persisted even through the recent housing recession (Belsky et al., 2014; L. S. Goodman & Mayer, 2018; Grinstein-Weiss et al., 2013).

The innovative work of Killewald and Bryan (2016) pioneered a new approach to examining this relationship. Different from the research that estimates the effects of years of homeownership on wealth gains or compares the wealth outcomes of renting households transforming from renting to owning with renting households who are stuck in the rental market, they investigated the estimated effect on midlife wealth if an individual were randomly blocked from homeownership for a year. Their results confirm that homeownership has substantial wealth benefits. Each additional year spent as a homeowner is connected with about $6,800 more in mid-life wealth in 2008.

The wealth advantage of ownership found in prior studies, albeit most of this evidence coming from the experience of the United States, turns out to be quite important for low-income households, which underpins the theoretical basis for the policies that support the spread of homeownership among low-and middle-income households around the world. In the extant literature, the merit of homeownership over renting in accumulating more wealth could be due to four possible reasons: (1) housing appreciation over the long term; (2) leverage and fixed commitments; (3) changed saving behaviour; (4) a favourable tax system.

Housing appreciation over the long term

How house price appreciation drives wealth accumulation has a predominant role in prior studies of housing equity accumulation. Homeowners tend to accumulate housing wealth through house price appreciation over time (Killewald & Bryan, 2016). Across all durations of ownership from 1989 to 2001 in the USA, Di et al. (2007) point out that owners had more wealth in 2001 than renters due to the amount of house price appreciation. Relying on housing appreciation to accumulate housing wealth has been prevalent in many advanced economies since the 1970s, such as in the UK, USA, Australia, Canada, the UK, New Zealand, Ireland and Norway (Maclennan et al., 2019).

Unlike Di et al. (2007), who took regional characteristics into account, Boehm and Schlottmann (2008) incorporated neighbourhood characteristics. They also found the positive effects of homeownership on wealth through housing appreciation. Boehm and Schlottmann (2008), present compelling evidence that housing appreciation is the most important channel of wealth accumulation. Especially, they took into consideration the transitions in the housing hierarchy and the implicit change in value between the first home and the second, or the third home. However, they did not attempt to estimate the causal effect of homeownership on wealth using empirical analysis. Capital gains from housing price appreciation account for the largest share of wealth changes during the past decades since the 1980s.

Leverage and fixed commitments

Causa et al. (2019) argue that one of the reasons why housing is an effective vehicle of wealth accumulation can be due to its possibility of being acquired with leverage, which indicates that even small percentage gains in home values can be large relative to the down payment invested in a home and thus permits households with low income and poor assets to accumulate wealth (Belsky & Prakken, 2004). This argument has also received support from (Smith & Searle, 2010, p.1). The housing appreciation effect is further magnified through leverage (Di et al., 2007), which means housing provides households with the unique opportunity to invest in a highly leveraged asset.

A cash down payment, normally between 10 per cent and 30 per cent of the purchase costs, is required when financing the remainder with a mortgage. Bernstein and Koudijs (2020) firstly combined the effect of mortgage repayments on housing-wealth accumulation and

non-housing wealth accumulation (bank deposits, stocks, or bonds). Holding other variables constant, mortgage repayments into housing wealth do not reduce the savings in non-housing wealth. They provide compelling empirical evidence on the causal effects of mortgage amortisation on wealth accumulation. Increases in mortgage repayments do not crowd-out non-mortgage savings, associated with a substantial reduction in consumption. They found through mortgage amortisation homeownership is a key driver of household wealth building. The effect of leverage and the following fixed commitments can be seen from two aspects.

One is the periodic debt repayments going toward house equity increases over time. A few studies have mentioned that the fixed commitments accompanied by paying down outstanding mortgage principal help homeowners accumulate wealth (Aarland & Reid, 2019; Boehm & Schlottmann, 2008; Fuller et al., 2020; Herbert et al., 2014; Ruel & Hauser, 2013).

Previous research examines the importance of fixed commitments in wealth accumulation through a comparison, in which owners accumulate wealth via mandatory saving schemes whereas renters are not able to make the same savings through self-discipline. Rossi and Sierminska (2018) note that the main mechanism through which housing is an easier asset to accumulate wealth compared to others is via mortgage repayments, which force households to adhere to a contractually agreed saving scheme that may involve significant costs of breaking/moving. They propose that this channel effectively forces households to save more than they would without the mortgage scheme. Rossi and Sierminska's results are complemented by the study of Somerville et al. (2007) in Canada. Using simulated analysis, Somerville et al. claim that for renters to accumulate the same amount of wealth as owners, they must be extremely diligent savers, invest in a high yield instrument, do so with minimal fees, and have the good fortune to live in cities where the right combination of low rents and/or low house price growth allows them to invest more in a relatively higher return asset. These challenges make it unrealistic for renters to accrue the same financial wealth as owners. The requirements of fiscally disciplined saving habits and high returns on financial investments for renters to accumulate similar wealth have also been accented by Lin and Vandell (2007) and Beracha and Johnson (2012).

The other aspect, which has rarely been discussed in the literature, can be detected when mortgage repayments, interest rates, and inflation are closely linked together. One of the differences between leverage and outright payment for housing purchases is the opportunity cost involved in the outright purchase, which would generate profit when returns exceed

interest rates. However, in reality, the profit could be quite small. Another difference arises because the value of mortgage repayments is highly influenced by inflation. It has been widely recognised that buyers who have taken out a loan with a fixed interest rate benefit from the effects of inflation, as the real value of the debt falls (Doepke & Schneider, 2006).

Changed saving behaviour

By far, the most detailed account of saving behaviour between homeowners and renters is to be found in the work of Lersch and Dewilde (2018). In their paper, saving is defined as the residual between disposable income and current consumption. In the review of Lersch and Dewilde, saving has three functions:

> … *(1) to accumulate a buffer stock of resources given the contingency of life course events; (2) to accumulate resources for (relatively) expectable income losses due to socially structured transitions; and (3) to accumulate resources for concrete future life goals, e.g., saving for a down payment to buy a home* (p.1178) …

Some studies argue that once households enter homeownership, they would increase their saving because of the need to reinvestment in their homes to maintain the value of their initial investment (Tegeder & Helbrecht, 2007, as cited in Lersch and Dewilde, 2018), securing their mortgage repayments against income loss (Pryce & Keoghan, 2002, as cited in Lersch and Dewilde, 2018)), past saving experience (Toussaint et al., 2007, as cited in Lersch and Dewilde, 2018)), and normative expectations of being a homeowner (Gurney, 1999, as cited in Lersch and Dewilde, 2018)).

Empirically, Di et al. (2007) found that homeownership itself during the period 1989 to 2001 resulted in greater household non-housing wealth in 2001. The possible reason is that owning a home lowered the rate of increase in housing costs and left more for savings and investment. Due to a considerable amount of wealth being tied into, often, relatively illiquid housing wealth, homeowners cannot dispose of this type of wealth in the same way they could do were they renting and owning an equivalent financial asset. As a result, being a homeowner increases the saving propensity (Mathä et al., 2017).

A few studies suggest that homeowners reduce their saving due to committed mortgage repayments (Skinner, 1993). Lersch and Dewilde (2018), demonstrated that homeownership is negatively related to saving. The null hypothesis in Lersch and Dewilde is that the saving

behaviour is changed when becoming a homeowner and thus homeownership generates positive effects on non-housing wealth. Nonetheless, instead of finding positive increases in savings, they find homeowners reduce their average saving rate in Germany and UK. This finding tends to support that the higher financial wealth of owners over renters is a result of selection characteristics while not entering homeownership, at least not via the saving channel. More specifically, they find that in the UK, the negative effect is reinforced in the presence of young children (also in Germany), while home improvement and house price growth play no role.

Some scholars, however, are sceptical of the claimed significance of this channel. They argue that this mode will be uninfluential as rational individuals will choose to save their optimal amount no matter whether they are homeowners or not (Rossi & Sierminska, 2018). That is, they maintain that saving is independent of tenure status.

Favourable tax system

Meanwhile, some studies implicitly examine the role of a favourable tax system in facilitating the accumulation of wealth (Causa et al., 2019). It has been argued that the preferential status of homeownership taxation cannot be accessed through renting or investing in the financial market. There are three principal homeownership tax benefits found in advanced economies: the home mortgage interest deduction (not used in all countries, for instance, the UK, Ireland, the Netherlands, and Canada), the exclusion of capital gains on the sale of a principal residence, and the exemption from property taxes, rental income taxes and imputed rental income taxes. Among these, the ability to deduct mortgage interest and property taxes is the most apparent of these benefits in some countries, for instance, the Netherlands, Luxembourg, and Belgium, while in other countries such as the United Kingdom, other types of tax relief, such as capital gains tax, private residence relief, and stamp duty land tax, for homeowners account for a larger share of GDP (Herbert et al., 2014). For example, both Ozanne (2012) and Fatica and Prammer (2018) point out that the loss of revenue to the U.S. from the exemption for imputed rent taxes is substantial, outweighing the costs of the mortgage interest deduction. This idea has also received support from a recent OECD report (OECD, 2022a).

Recently, L. S. Goodman and Mayer (2018) computed the financial returns of purchasing a home relative to the returns from comparable indexes of alternative investments in America. Their analysis assumed a purchase at the end of 2002, a time when home prices were close

to a long-run normalized level and prior to the large run-up in home prices from 2003–to 2006 and the subsequent decline from 2007–to 2012. They attributed the favourable status of homeownership wealth accumulation to the mortgage interest deduction, and a lack of taxation of imputed rent and capital gains. In a similar vein, in Canada, Somerville et al. (2007) also confirm the important role of the tax system for homeownership in augmenting wealth for owners, while renters are not exempt from taxes on capital gains from investing in financial markets. Fatica and Prammer (2018) explored the impact of the preferential treatment of owner-occupied housing in Europe. They find that tax benefits to homeowners decline the user cost of housing capital by almost 40 per cent compared to the efficient level under neutral taxation. The general conclusion is that the tax treatment of homeowners decreases the user cost of housing capital (Lunde & Whitehead, 2021).

3.2.3 Factors influencing the effect of homeownership on wealth

However, owning a house is not without some risks (L. S. Goodman & Mayer, 2018). The large foreclosures that occurred during Global Financial Crisis proved the existence of risks of owning houses (Smith & Searle, 2010). Indeed, it has been suggested that whether and to what extent a homebuyer will materialise the potential benefits of owning while refraining from the risks depends on market conditions, the timing of purchase, the holding period, location, mortgage terms (Belsky et al., 2005; L. S. Goodman & Mayer, 2018; Newman & Holupka, 2016). Especially, homeowners who come from low-income households are more likely to experience the risks caused by these factors and lose the benefits and gains arising from their previous homeownership experience.

Timing of purchase

The most apparent factor is the timing of purchase (Boehm & Schlottmann, 2008). Empirical analysis shows that house price dynamics are fundamentally driven by income and demographics but fluctuations in these fundamentals and the changes in credit conditions can create deviations from the equilibrium path (Igan & Loungani, 2012). House prices can be volatile in most places, even in highly developed diversified economies. Consequently, the volatility of housing prices and the implied volatility of household net wealth is enormous (Quigley, 2006). It shows that the fall in house prices may furthermore quickly diminish any capital gains.

The extent to which homeownership as a means of wealth accumulation, especially for low-income households, depends much on the state of the housing market and there are times when owning a home may mean having housing wealth lower than if they had rented and saved. The study by Duda et al. (2002) offers a comprehensive empirical analysis of this risk. They explored data on repeat sales in four market areas between 1982 and 1999 in America and found that roughly half of the owners who bought and sold their homes within this period failed to realize gains that exceeded the overall inflation rate, assuming a 6 per cent sales cost, although most did earn a return in nominal terms.

More recently, a longitudinal study by Wainer and Zabel (2020) discussed this risk further. Though Wainer and Zabel confirm the importance of timing of home purchase, they suggest the gains depend much more on the broad period of purchase rather than on the exact date within periods. They argue that low-income households that were renters in 1984 and first purchased a home in 1989–1999, a period of relatively stable real house prices, experienced significant gains in wealth as of 2011 compared to households that remained renters. On the other hand, low-income households that were renters in 1999 and first purchased a home in 2001–2007, a period of growth followed by the Great Recession, experienced little or no gains in wealth as of 2013 compared to renter households. Instead, their results give prominence to the duration of homeownership, which will be discussed in the next sub-section.

Sustaining homeownership

It is well demonstrated that the most fundamental factor to accumulate wealth through homeownership is whether ownership is sustained over the long term (Belsky et al., 2014; Grinstein-Weiss et al., 2013). Homeowners sustaining their homeownership have a high possibility to accumulate more wealth. Li and Yang (2010) emphasise that the longer the homeownership, the higher the wealth gap between owners and renters. Using NLSY79 data and marginal structural models, Killewald and Bryan (2016) highlight that each additional year of homeownership increased midlife wealth in 2008 by about 6800 dollars. In his base case scenario, Mills (1990) found when compared with renting, a holding period of slightly longer than seven years was needed for owning to be preferred. The more recent studies suggest that a single fixed holding period of eight to ten years is required to make ownership outweigh renting (Beracha & Johnson, 2012; Rappaport, 2010).

Belsky et al. (2014) reviewed the evidence in the U.S. The most important critique of the benefits of homeownership is that specific types of owners will be less likely to realise any financial gains from owning and worse, face a heightened risk of foreclosure, i.e., low-income and minority households. It has been established that it is more difficult for low-income and minority households to sustain ownership, which directly influences their financial benefits from homeownership (L. S. Goodman & Mayer, 2018; Wainer & Zabel, 2020). Boehm and Schlottmann (2008) argue that there is a high likelihood that lower-income and minority households will go back to renting after attaining homeownership. The impermanence of ownership with people entering and exiting the sector several times in their housing careers, especially in times of housing booms has been identified in Australia, the UK and the USA (Ong ViforJ et al., 2021).

Location and neighbourhood

Location and neighbourhood are also important influences on housing wealth accumulation. Patterns of house-price appreciation and stagnation differ significantly across space (Hamnett, 1999; Meen, 2001). Spatial variations in housing-market dynamics could crucially structure wealth-accumulation prospects (Arundel & Hochstenbach, 2020; Maclennan & Tu, 1998). So, the potential of appreciation largely depends on the demand and supply in local markets and in which specific neighbourhood the home is located.

Jud and Winkler (2002) presented the dynamics of real housing price appreciation in 130 metropolitan areas across the United States. This study confirms that housing appreciation rates vary across areas because of location-specific fixed effects. A recent Swedish study recapitulates that higher-income individuals were able to achieve greater capital gains, with where they live over their life course serving as an important explanation (Wind & Hedman, 2018).

Perhaps, the most powerful argument has been made by Newman and Holupka (2016). They note that during the 2000s, black first-time homebuyers in the U.S. did not benefit from the boom and were particularly hard hit by the bust, while white first-time homebuyers gained firstly but experienced a reduction within four to six years. Low-and moderate-income blacks experienced losses in net worth even when their purchase timing was impeccable. They attributed this significant difference between whites and blacks to neighbourhood locations. Compared with whites, blacks were more likely to purchase their first homes in

predominantly black neighbourhoods with lower housing prices and price appreciation, and lower and declining rates of homeownership.

Terms of financing

In some studies, the terms of financing used to buy the home and materialise housing wealth also matter (Grinstein-Weiss et al., 2013). Households from low-income deciles have a higher possibility to acquire high-cost and risky loans from financial institutions (Wainer & Zabel, 2020). Discriminatory terms in the financial market and unequal access to credit-granting institutions undermine low-income and minority households' abilities to sustain homeownership in downturn periods (Levitin & Ratcliffe, 2013). It is worth noting that the spread of prudential regulation policies since the middle of the last decade led to a reduction in this effect.

Campbell and Cocco (2003) suggest that homeowners are often better off taking out adjustable-rate instead of fixed-rate mortgages. However, numerous studies have examined the financial risks of delinquency and foreclosure for those who hold adjustable-rate mortgages or other subprime products (Quercia et al., 2007; Schloemer et al., 2006). Bostic and Lee (2007), for example, explored the effects of household expenditures, neighbourhood types, and mortgage instruments and found that mortgage affordability is a key factor in determining whether homeownership offers benefits for low-and middle-income households. They demonstrated that the value of homeownership increases through the early acquisition of home equity, most often achieved through a larger down payment. For instance, they found that after five years, a one-person household making a 10% down payment gained wealth at 2–6 times the rate of a person who made no down payment.

3.2.4 Research on homeownership and wealth accumulation in China

Research, to date, in China has not been able to establish empirical associations between homeownership and wealth accumulation. The literature in China exclusively focuses on the mechanism of housing price appreciation. Wu (2015) concluded that rapidly increased housing prices create an expanding middle class. Official statistics show that housing prices more than doubled from 2007 to 2014 (Chivakul et al., 2015). Housing prices have increased rapidly with an annual growth rate of more than 10% on average in most cities since 2006 (J. Wu et al., 2012). Macdonald et al. (2012) reported that property prices in China increased

about 16% annually from 2005 to 2011 and the average annual growth rate of housing prices was 17.45% from 2002 to 2016 calculated by NBSC.

From a novel standpoint, Li and Wan (2015) point out that the value of net housing assets in 2010 would drop more than 56.1%, as well as the proportion of housing assets to overall wealth if 2010 values were deflated by the price of housing in 2002. This result indicates that the increasing value of the stock of housing assets in China has not come from real stock additions but primarily from the rapid inflation of housing prices. Through a comparison between urban areas and rural areas, Y. Wang et al. (2020) found that housing capital gains greatly help to accelerate the accumulation of household wealth.

Knight et al. (2020) did not consider the separate roles of housing appreciation and 'forced savings' but rather focused on the role of homeownership as a whole in wealth accumulation. They divided the increase in housing wealth into that part which is due to relative house price inflation and that part due to a real increase in housing quality (represented by an increase in the average number of square metres reported). They found that 74 per cent of the increase in housing wealth could be attributed to relative house price inflation, while 26 per cent is due to the increase in the volume of housing. Much of China's rapid growth in housing wealth can be attributable to a relative increase in house prices—by no less than 14.9 per cent per annum. They also analysed the effect of housing wealth on the growth of household wealth as a whole. The result shows that no less than 57 per cent of the increase in household wealth reflects high house price inflation rates relative to consumer price inflation (and 43 per cent reflects other influences). These results stress the central importance of relative house price inflation for the growth of household wealth in China.

An important backdrop to housing wealth changes in China is the major role that privatisation of state housing played in wealth accumulation. The housing reform accelerated the accumulation of wealth among urban residents (S. Li & Zhao, 2008). Many working-class families have benefited from both welfare housing and housing privatisation, serving as a key factor in generating household wealth for most urban Chinese families, despite the uneven distribution of accessibility and affordability across occupations (Walder & He, 2014; Q. Zhang et al., 2020). It has been argued that the majority of today's wealth is the result of windfall gains from housing privatisation, which underpinned their wealth accumulation in the times of housing appreciation since 2003 (Park & Shen, 2015; Walder & He, 2014; W. Zhao & Ge, 2014). For instance, although the purpose of their paper is to investigate the

wealth inequality of China's older population aged 45 and older, Park and Shen (2015), using data from the 2011 national baseline of the China Health and Retirement Longitudinal Study, found that the majority of today's wealth is the result of windfall gains from housing privatisation, especially rapid increases in housing prices. Under housing reforms in the late 1990s, employed-provided housing was sold to urban workers at highly subsidised prices. Then, as the housing market developed and become highly commercialised, the market price for housing increased, creating enormous wealth for owners of desirable housing units.

3.2.5 Summary and research gap

These studies in this section illustrate the positive effect of homeownership on household wealth, mainly through the accumulation of housing wealth. Four mechanisms have been identified: housing appreciation, leverage and fixed commitments, changed saving behaviour and a favourable tax system. The magnitude of wealth gains depends on market conditions, the timing of the purchase, the holding period, location, and mortgage terms. These factors are relatively important in shaping if and how low- and middle-income households benefit from homeownership, who are more likely to be exposed to the risks associated with homeownership. In China's context, although the research concentrates on how housing wealth is linked to wealth inequality, it still implies that housing wealth accumulation is more dependent on housing price appreciation. Another stylised factor is the great influence of housing privatisation on wealth building for the old generation in China.

3.3 Homeownership and non-housing wealth

Although most studies support the positive relationship between homeownership and wealth accumulation through the accumulation of housing wealth, as reviewed in Section 3.2, some papers have attempted to establish the relationship between homeownership and non-housing wealth. The academic literature on the link between homeownership and non-housing wealth has revealed the emergence of several contrasting themes. There are diverse, inconclusive research findings regarding this relationship, with positive, insignificant, and negative associations being demonstrated in existing studies.

3.3.1 The positive effect of homeownership on non-housing wealth

In addition to augmenting housing wealth, Di et al. (2007) reported that homeowners also tend to accumulate more non-housing wealth. However, how homeownership is beneficial

to non-housing wealth was not investigated in this paper. Grinstein-Weiss et al. (2013) compared the changes in net worth, assets, debts, liquid assets, and non-housing net worth from 2005 to 2008 of owners and renters in the USA. They concluded that the choice to buy a home led owners to amass more financial assets (net worth, assets, and non-housing net worth) than those accrued by a comparable set of renters. Additionally, they claim that at the mean, the increase in non-housing assets contributes more than half of the overall increase in net wealth for homeowners than does the accrual of home equity and this finding persists in estimates from models that address differences in other characteristics between renters and owners. Nonetheless, only modest gains in non-housing wealth are found in Boehm and Schlottmann (2008).

This disparity in non-housing wealth gains from Boehm and Schlottmann (2008) and Grinstein-Weiss et al. (2013) may stem from the studied period. Boehm and Schlottmann studied the period from 1984 to 1992 in the U.S., when the housing market experienced long-term appreciation, while Grinstein-Weiss et al. (2013) traced the wealth change from 2005 to 2008, the period of the GFC. Similarly, Wainer and Zabel (2020) also found that wealth gains for homeowners include gains in both home equity and other forms of wealth for both low-and higher-income households.

Nevertheless, the mechanisms through which homeownership positively affects the accumulation of non-housing wealth were not investigated in the above-mentioned studies.

3.3.2 The insignificant effect of homeownership on non-housing wealth

A good summary of the insignificant effect of homeownership on non-housing wealth has been provided in the work of Lersch and Dewilde (2018). In conjunction with other extensive studies, Lersch and Dewilde support that the positive association between homeownership and non-housing wealth in prior literature could be explained by self-selection bias. Different explanations have been advanced for the findings that homeowners own more non-housing wealth than tenants. The first is some observed socio-economic characteristics. Becoming a homeowner requires a stable income and employment position. A stable income and employment position are also connected with higher non-housing wealth. Thus, higher housing and non-housing wealth of homeowners may simply reflect general stratification (Lersch & Dewilde, 2018). Secondly, some time-invariant unobserved characteristics of people which determine the home tenure decisions may also influence their higher propensity to accumulate non-housing wealth (Dietz & Haurin, 2003; Zavisca & Gerber,

2016). The deviation rests on what unobservable characteristic it is. For instance, Keister et al. (2016) highlight the role of expenditure lifestyles. More recently, Causa et al. (2019) and Vestman (2019) note that homeownership, because it involves individuals in acts of saving for deposits and committing to regular quasi-forced savings, 'selects' particular kinds of households with appetites for asset accumulation and so tenure outcomes may reflect these selection effects. Therefore, both home tenure choice and non-housing wealth are determined by these observable and unobservable variables. This means the positive relationship between homeownership and non-housing wealth (financial wealth) cannot be causally due to the effects of owning a house.

Empirically, the within-estimates in Lersch and Dewilde (2018) indicate that when other covariates are held constant, the transition to mortgaged homeownership is not accompanied by changes in financial wealth ownership and the amount of financial wealth in the UK. In Germany, financial wealth ownership remains unchanged concerning tenure transition, but households significantly reduce the amount of financial wealth. However, the between-estimates reflect the selection bias, which means financially wealthier households are more likely to enter homeownership.

3.3.3 The negative effect of homeownership on non-housing wealth

In some cases, renting could result in more non-housing wealth accumulation (Beracha & Johnson, 2012; Kaas et al., 2019; Rappaport, 2010). Following the classification of simulation analysis and panel studies, the negative relationship can be found in simulation analyses in which the assumption of full investment in financial assets is made and in panel studies in which the adverse impact of homeownership on non-housing wealth is demonstrated.

Goetzmann and Spiegel (2002) suggest that from 1980 to 1999 housing returns lagged behind financial market assets while modestly beating inflation. Using the equivalent of the down payment and savings in annual housing costs in an alternative investment, renting may earn a better return. Likewise, (J. Goodman, 1998, pp. 1985–1995) found that from 1985 to 1995 renting was a superior financial choice in U.S. Rappaport (2010) made a comparison of net worth held by homeowners and renters throughout 10-year occupancies. Rappaport observed that in some periods, homeowners experience greater net worth gains than renters do; in other periods, renters who invest in stocks and bonds have greater net worth gains than homeowners. In an analysis of all possible eight-year holding periods given actual

market conditions at both the national and regional level between 1978 and 2009, Beracha and Johnson (2012) found that in 65 to 75 per cent of cases, renting offered greater opportunities for accruing wealth than owning, depending on whether renters employ a more conservative or aggressive investment approach.

The above studies use simulation methods to compare the owning costs/benefits and renting costs/benefits, as mentioned before. A similar conclusion has also been reached via some panel studies (econometric analysis). Empirically, by using the instrumental variable approach to make a comparison between some people who inherit a home and keep it while others of the same characteristics inherit other forms of wealth of the same amount in eight Euro area countries, Kaas et al. (2019) documented a large and significant negative causal link between owning a home and household wealth due to the negative effect on financial wealth and real wealth. Their results support that the presence of illiquid housing amplifies the degree of risk aversion of households that reduces the demand for financial assets and other real wealth, with no significant effects on other parts of wealth. Their results, therefore, are closely linked to the effect of housing on the participation in financial assets investments and business investments (Chetty et al., 2017; Chetty & Szeidl, 2007; Cocco, 2005; Flavin & Yamashita, 2002; Grossman & Laroque, 1990; Heaton & Lucas, 2000; Yamashita, 2003).

3.3.4 Summary and research gap

In this section, the literature on the association between homeownership and non-housing wealth is reviewed. The results turn out to be ambiguous. Positive relationships, insignificant relationships, and negative relationships have been found in existing studies. Notwithstanding, the mechanisms through which the relationship between homeownership and non-housing wealth can be established have not been entirely examined. Some of the inspiration could be explored in the next two sections – Section 3.4 and Section 3.5.

From the perspective of non-housing wealth, the most analogous papers to this thesis are Lersch and Dewilde (2018) and Kaas et al. (2019). Lersch and Dewilde found that the transition into homeownership is negatively related to financial wealth holdings in Germany while no significant effect can be found in the UK. Kaas et al. reported that homeownership can harm household wealth via its insignificant effect on the accumulation of business wealth and negative influence on financial and real wealth.

This paper is distinguished from these two papers in the following ways. First, Lersch and Dewilde (2018) only investigated one channel – the changes in saving – through which homeownership would affect non-housing wealth, while risk aversion is mentioned in Kaas et al. (2019). In this thesis, most mechanisms mentioned in the extant literature are explored. Second, the empirical strategies used are different. Lersch and Dewilde mainly employed hybrid panel regression models and Kaas et al. applied instrumental variable estimator, while I mainly rely on difference-in-difference models. Third, the institutional contexts are also distinctive. Lersch and Dewilde explored the relationship between homeownership and financial wealth in Germany and UK, and Kaas et al. used a dataset that contains cross-sectional household-level data from eight Euro area countries. This thesis, therefore, will complement the literature by using the case of China. Aside from these differences, this paper additionally controls for some institutional-specific variables, such as hukou status, migration status, physical status, and the child's gender.

3.4 Housing and financial wealth: mechanism exploration

This section reviews the relevant literature on the possible mechanisms by which homeownership would impact financial wealth (a significant component of non-housing wealth). Although only a few studies directly examined the relationship between homeownership and financial wealth (Kaas et al., 2019; Lersch & Dewilde, 2018), a great deal of previous research in finance has focused on how relevant housing variables and housing outcomes (mostly housing prices) influence participation in financial investment or arrangements on the portfolio choices. Housing is widely recognised as a key element in determining household financial asset allocation. The extant literature regarding the role of housing in participation and portfolio choice shows inconsistent and contradictory findings.

3.4.1 Channels from housing to financial wealth: evidence outside China

Three channels have been identified from prior financial literature: crowding-out effect, collateral effect, and wealth effect.

Crowding-out effect

The first channel from housing to financial investment being related would be the crowding-out effect. Innovatively, Yao and Zhang (2005) study how households optimally choose their portfolio of financial assets using a life-cycle model. They point out that when investors are

indifferent between renting and owning a house, they choose substantially different portfolio allocations when owning a house versus when renting housing services in each period. When owning a house, investors substitute home equity for risky stocks, while renting leads investors to overweight stocks. To put it another way, homeowners tend to invest in low-risk assets and renters prefer risky financial assets.

Different housing characteristics and housing outcomes resulting in the negative relationship between housing and financial investments have been pointed out in prior research. The first one, also the most influential one, is the committed expenditure risk, namely monthly mortgage repayments. The amplified degree of risk aversion stemming from illiquidity and indivisibility of housing makes households exposed to house price fluctuation risk and also leads to higher liquidity risk. Fratantoni (2001) alleges that in the absence of committed expenditure risk, agents will place the majority of their wealth in risk assets. His model shows that the addition of committed expenditure risk associated with homeownership results in much lower predicted risky asset portfolio shares. Yamashita (2003) matched the actual household portfolios to provide evidence for this. Their results indicate that households with a high house-to-net-worth ratio adjust their holdings of financial assets to mitigate the portfolio risks by holding less risky assets. Chetty et al. (2017) argue that the value of mortgage debt exerts a quite critical influence on the effects of home tenure choice on stock investment. They find an increase in mortgage debt reduces stockholdings, while a decrease in mortgage debt raises stockholdings.

The second housing outcome is the overinvestment in housing. Over-investment in housing assets could crowd out some types of financial investment due to the limited resources that could be used to invest in financial investments. Fratantoni (1998) shows that mortgages reduce risky asset holding by approximately 15% when the median homeowner's mortgage payment/income ratio is doubled. Flavin and Yamashita (2002) put forward that overinvestment in housing affects the financial portfolio of homeowners. Cocco (2005) argues that for those who own more than one house, homeowners have limited financial wealth to invest in other financial assets. In addition, the crowding-out effect is larger for households with low financial wealth, such as younger and poorer investors (Cocco, 2005).

It has also been reported that the indivisibility and illiquidity of housing assets reduce the willingness of households to pay for the fixed costs occurring with equity market participation (Chetty & Szeidl, 2007; Flavin & Yamashita, 2002; Kullmann & Siegel, 2005).

Meanwhile, Corradin et al. (2014) emphasise the importance of house price predictability on the optimal behaviour of households. The housing price predictability has substantial effects on financial portfolios and households tended to withdraw funds from stocks over the same period.

Collateral effect

Albeit the dominant role of the crowding-out effect, the positive association between housing and the holding of financial investment, in some cases, could also be possible. A few research suggests a link between the collateral values of housing property and households' portfolio choices. These studies show that higher housing prices increase collateral values and the net wealth of borrowers, a situation that leads to credit expansion (Goodhart & Hofmann, 2008). Such credit expansion caused by rising housing prices through collateral may provide homeowners with more liquidity and easy access to the stock market. Although mortgage equity withdrawal is mainly used in promoting consumption, a small share of the refinancing money could still be partitioned into financial markets. For instance, Canner et al. (2002) find that cash-out financers use roughly 35 per cent of the cash for home improvements, 26 per cent to pay off other debt, 16 per cent for consumer expenditures, and 11 per cent to invest in stocks.

Wealth effect

Another widely mentioned channel is the wealth effect. It is worth noting that in most prior studies, the 'wealth effect' is used to explain the relationship between housing price rises and consumption (e.g., Duca et al., 2021). The wealth effect, in this context, highlights how housing capital gains through housing price appreciation and homeownership's hedging behaviour impact households' risk preferences.

The wealth improvement from housing capital gain allows households to be less risk-averse and engage in riskier investments in equity products (Cardak & Wilkins, 2009; Chetty & Szeidl, 2007). Even though house price appreciation has not been materialised and how much gains could be achieved still relies on the future housing markets, the 'perceived' wealth may stimulate households' investment in riskier portfolios, creating a 'wealth effect' on their portfolio choices (Campbell & Cocco, 2007; Shum & Faig, 2006; Wachter & Yogo, 2010). In addition, as housing returns are not correlated with returns on other financial assets,

investing in equities may work as a useful diversification tool in a household's portfolio choice (Goetzmann & Kumar, 2008).

Meanwhile, homeowners are hedged against fluctuations in rents and inflation, as opposed to tenants, who need to pay the rents influenced by inflation. The hedging functions of housing induce the household to endure greater risk and make riskier financial investments. Sinai and Souleles (2005) claim that homeownership hedges households against fluctuations in rents. C. Wu and Pandey (2012) note that residential real estate also provides a modest hedge against inflation.

Some other researchers prove the existence of the wealth effect from an opposing perspective. Large negative wealth shocks caused by decreasing housing prices lead to low participation in stock markets (Paravisini et al., 2017). Beaubrun-Diant and Maury (2016) provide evidence that homeowners are more likely to become stockholders and the crowding-out effect of homeownership is no longer present in their analysis. Specifically, they point out that a homeowner in 1999 with similar socioeconomic profiles to a renter has a 53% chance to become a stockholder in 2007, a 10% higher chance.

3.4.2 Channels from housing to financial wealth: evidence from China

Likewise, the majority of previous literature in China focuses on the effects of housing characteristics and housing outcomes on the financial market (the dependent variable is either the participation in financial investment or the ratio of diversified financial assets to total financial wealth), rather than on the effect of homeownership on the amount of financial wealth.

Some research verifies the existence of the crowding-out effect in China. For instance, Q. Zhou et al. (2017) examined the relationship between homeownership, home equity ratio, number of houses, housing price, housing price expectation and stock participation. They find that compared to tenants, homeowners are less likely to participate in the stock market and more likely to allocate fewer stock assets to financial assets, verifying the crowding-out effect. They also demonstrated that the share of housing equity to net wealth has a negative effect on stock market participation, showing the trade-off effect between housing assets and stock assets. However, the number of houses has a positive effect on stock investment. X. Chen et al. (2021) investigated how multi-home ownership affects households' allocation of risky and riskless financial assets and reported that homeownership with multiple properties

significantly crowds out the proportion of risky financial assets held by urban Chinese households compared to households with only one residence. They also find that investment in housing by younger and less wealthy investors reduces the investment in risky financial assets, which is consistent with previously reported finding (Cocco, 2005; Flavin & Yamashita, 2002).

Conversely, some studies corroborate the collateral effect. S. Li et al. (2017) investigated the collateral effect of housing equity on financial wealth accumulation in China. They find the positive and statistically significant impacts of housing values on non-housing wealth which may be the evidence that a rise in housing value may increase housing's collateral value, provide more credits and opportunities for households to invest in other financial assets, such as stocks, funds, and even another housing units.

In terms of the changed saving behaviours, Chamon and Prasad (2010) point out that the effects of home ownership status on savings are negligible, although owners of poor-quality homes have higher savings rates than those with better homes. Instead, they find that owning a home is associated with sharply lower savings rates among young households, but not among older ones. B. Wu and Xie (2013) indicate that renters and owners of homes with below-average values show a significant increase in saving rate, while owners of homes with above-average values do not show changes in the saving rate.

Instead of finding evidence of a single channel, some researchers support the coexistence of mixed effects. J. Zhao and Li (2017) find a collateral effect, wealth effect, risk hedging, as well as crowding-out effect in China. Using CHFS data in 2011, they suggest that house value appreciation (wealth effect) has positive effects on households' investment in equity portfolios, whereas the house-to-wealth ratio imposes negative effects on households' stock investments (crowding-out effect). The wealth effect enables households to be more capable of taking more risks. The risk hedging function of homeownership, which helps urban families to hedge the risk of both rent expenditure and inflation, also plays a role here. Households could balance risk and return by participating in stock investment. For another thing, the heavy investment concentrated in housing assets makes households no additional money to invest in financial assets. The higher rate of return of housing investments attracts multiple purchases of housing rather than involvement in the ailing stock market. Finally, they indicate that housing itself creates trade-off forces in household portfolio choices.

Through examining the heterogeneous effect among different groups, X. Chen and Ji (2017) verified the coexistence of the wealth effect (for homeowners who do not participate in the stock market) and the crowding-out effect (for homeowners who have been in the stock market). X. Chen and Ji note that with the appreciation of house prices, households with more real estate will benefit more or be more confident about their assets and therefore are more active in financial investment. For households without real estate, appreciation of house price may even exacerbate the burden of these potential owners and thus makes it even less possible for them to participate in the stock market. However, their results for those potential owners are insignificant, which means households with no houses are either immune to the change in house price or less likely to participate in the stock market with the increase in house price. X. Chen and Ji also investigated the participation depths in terms of the ratio of the stock asset to total asset and absolute stock asset, finding that appreciation of house price adversely impacts the stock asset holdings of households already involved. They hold the view the possible reason could be because, with higher house prices, households are more likely to invest in the real estate market and therefore reduce their investment in the equity market.

Similarly, Z. He et al. (2019) find in response to 10% of home equity appreciation, the stock market participation rate and shareholdings increase by approximately 0.6 and 0.3 percentage points respectively. The effect is more pronounced for owners who own more than one house and for those in the first and second tiers of cities, and weaker among households with mortgages, credit constraints, low income, and a lack of employment security. They underscore the importance of wealth and collateral effects of home equity on the stock market while finding no evidence for the crowding-out effect of home equity on households' portfolio choice decisions. Nevertheless, X. Shi et al. (2020) also imply that a 10-percentage points increase in housing share crowds out the share of total risky assets by 2.5 per cent, which is greater than the magnitude of the home equity effect. Their results turn out that the home equity effect on stocks and wealth management products is greater than on other risky assets. He and other colleagues' results in 2019 and 2020 seem paradoxical in these two papers.

In marked contrast to the existence of all the different channels, there are examples of research that find that holdings of housing assets do not affect and are not affected by the non-housing components of household wealth (Sato et al., 2013).

3.4.3 Summary and research gap

The extant literature regarding the effects of housing characteristics and housing outcomes on financial market participation and portfolio choice seems inconsistent, as both positive and negative effects have been reported. It is worth mentioning that although a large number of studies supported the significant influence of housing on financial participation and portfolios, especially in stock markets, strong theoretical and empirical evidence has been provided by some scholars, such as Lersch and Dewilde (2018) and Vestman (2019), both of whom are concerned about the endogeneity and found no evidence of the effects of homeownership on financial wealth and emphasised the importance of time-invariant variables (risk preference and savings motive). This effect may be even more insignificant in China in light of the stock market in China being extremely volatile and the poor performance of the financial market especially after 2008 (Carpenter et al., 2021), which leaves little space and opportunity for similar renters to accumulate wealth.

The crowding-out effect, collateral effect, wealth effect and the changed saving behaviour have been used to explain the relationship between housing characteristics, housing outcomes and financial investment. It seems like that which mechanism dominates depends on financial investments depend on the housing market. The collateral channel and wealth channel play a dominant role when real house price appreciation accelerates, whilst the crowding-out effect stands out when the housing market experiences downturn development. The credibility of the collateral channel relies on the extent to which households are eligible to refinance housing to invest in the financial market. If households are not prone to refinance housing, then the claim collateral effect may be implausible. Additionally, only outright homeowners in China could borrow against rising collateral values (Z. He et al., 2019). In the formal lending market, the Chinese mortgage policy restricts homeowners with outstanding mortgages from borrowing against collateral. On the other hand, most households refinance their housing to invest in a business or start a business rather than promote investment in financial markets. Thus, this collateral channel may not be applied to China in terms of augmenting financial assets. The crowding-out effect, wealth effect and risk hedging appear notable in China's context.

Homeownership may influence a household's aggregate participation in financial investment. Nevertheless, the direct effects of homeownership on financial wealth accumulation are seldom documented. The prior research is primarily focusing on stock

investment and the impact of housing price appreciation on stock participation. The majority of previous studies limit the analysis to stock investment for renters and homeowners, leaving a broad set of asset classes, such as bonds, money market funds, and savings accounts under-researched.

3.5 Housing and business wealth: mechanism exploration

Similarly, how home ownership impacts business wealth is rarely discussed. Therefore, the relationship between homeownership and business wealth is still an open question worth investigating, especially in China. Much of the current literature on the relationship between housing and business pays particular attention to the impact of housing characteristics and housing outcomes at household levels on entrepreneurship or business start-ups and in some cases, business investment. Existing studies on this issue present mixed results. Still, different channels have been found in explaining this relationship: crowding-out channel, collateral channel, and wealth channel.

3.5.1 Channels from housing to entrepreneurship: evidence outside China

Crowding-out channel

One strand of studies has found a negative relationship between related housing variables and self-employment through the crowding-out channel. Bracke et al. (2014) established the link between home ownership and entrepreneurship using a model of occupational choice and housing tenure, in which homeowners committed a fixed budget to mortgage repayments. They find that mortgage commitments diminished the likelihood that homeowners entered entrepreneurship and that this negative relationship was more pronounced in risky sectors. In their recent paper, Bracke et al. (2018) put forward the lock-in effect and argue that homeownership is generally financed by leveraged mortgages and homeowners under loan repayments pressure will be more likely to be locked in their current jobs and thus less likely to embark upon entrepreneurship, which is also a higher-risky activity.

Taken together, the crowding-out channel in the link between housing characteristics and housing outcomes and entrepreneurship at the household level arises from the reason that homeownership and self-employment are both risky, therefore homeowners may shy away from self-employment to limit their exposure to risks. This finding is consistent with Sinai and Souleles (2005) and Davidoff (2006).

Collateral channel

Compared with the weak or perhaps insignificant role that the collateral channel plays in the association between housing and the participating financial investment, the collateral effect in entrepreneurship is much more widely-accepted. Much of the literature on the association between housing and entrepreneurship has emphasised the importance of the collateral channel. It has been argued that home equity can be used to facilitate access to other wealth-enhancing investments, including entrepreneurial activity (Adelino et al., 2015; Black et al., 1996; Reuschke, 2016). In the process of a homeowner becoming an entrepreneur, the collateral channel plays a pivotal role. Housing can be used as collateral that enables households to relax borrowing constraints and have better access to credit

Historically, Black et al. (1996) described the possibility of the existence of the collateral channel. Employing American Housing Survey panel data, J. P. Harding and Rosenthal (2013) suggest that home ownership provides a potentially easy source of low-cost financing that could be used to start and operate a business. Using a large U.S. individual-level survey dataset for the 1996-2006 period, Corradin and Popov (2015) report that a 10% increase in home equity raises the share of individuals who transition into self-employment each year from 1% to 1.07% due to the alleviation in credit constraints by extracting housing wealth from their residential property. And to alleviate the concerns about the house price boom driving entrepreneurship in the real estate sector, they excluded business start-ups in construction, finance, and real estate from the analysis, which enhances the credibility of housing prices in promoting capital investment.

Schmalz et al. (2017) reinforce Corradin and Popov's (2015) conclusion after using data from France. Specifically, they split the group of homeowners into outright homeowners and homeowners with a mortgage to alleviate the endogeneity problem caused by inherent differences among homeowners and renters. They find that in France, only full owners can pledge their houses as collateral to obtain business loans since home equity withdrawals and second lien loans are very rare in France.

J. P. Harding and Rosenthal (2017) verify the effect of homeownership and housing capital gains on self-employment and consider the importance of market conditions. They suggest that links between homeownership and self-employment are strong enough to be important when home prices are rising rapidly, but modest when housing capital gains are limited or negative. Specifically, a 20% real increase in home value over two years raised the likelihood

of entry into self-employment by roughly 1.5 percentage points, whilst self-employers would not choose to exit when faced with housing capital losses, demonstrating that housing capital gains encourage entry into self-employment while housing capital losses have little effect on exits. The connection between homeowners and entrepreneurship is a home equity line of credit, which could be used to cover business expenses.

Albeit not using household-level data, in their analysis of the relationship between housing prices and business investment, Bahaj et al. (2020) investigated the home values of the owners of firms. Using firm-level data for the United Kingdom, they found that a £1 increase in the value of the homes of a firm's directors increased the firm's investment (defined as the change in fixed assets plus depreciation) by £0.03. Further, the collateral effect was more concentrated among firms whose directors' homes were valuable relative to the firm's assets, that were financially constrained, and that had directors who were personally highly leveraged.

Contrary to all these positive effects of housing on entrepreneurship or business investment, Hurst and Lusardi (2004) used microlevel data from the Panel Study on Income Dynamics and argue that liquidity constraints do not matter for entrepreneurship for most of the wealth distribution. Furthermore, they found that households that lived in regions in which house prices appreciated strongly were no more likely to start a business than were households in other regions. However, Corradin and Popov (2015) claim that their analysis is mainly conducted on data from the 1998–1994 period when house prices in the United States were relatively flat. This argument may suggest that in general, previous results suggest that the relationship between housing and entrepreneurship depends on the local housing market and the housing prices. In the rising house price period, homeowners may tend to utilise the house as collateral to start a business and build business wealth, while in housing bust time the collateral role of housing in starting a business may be insignificant.

Wealth channel

A few studies verify the wealth channel from housing to entrepreneurship. Positive wealth shocks from housing capital gains could increase preferences for self-employment (Hurst & Pugsley, 2011; Kerr et al., 2015). Fairlie and Krashinsky (2012) explored matched Current Population Survey data from the US to show that, once changes in local economic conditions are controlled for, housing appreciation measured at the level of Metropolitan Statistical Areas is a significantly positive determinant of entry into self-employment. This finding is

also supported by the research of J. P. Harding and Rosenthal (2013), which demonstrated that housing capital gains encouraged self-employment.

Some analysts have attempted to draw fine distinctions between the wealth channel and collateral channel, since they are always being found to be confounded, and questioned the role of collateral effect. Kerr et al. (2015) conducted a series of empirical exercises, including comparing owner-occupiers to renters and examined the collateral channel using 2000-2004 US individual-level panel data. They found robust evidence that housing capital gains encourage entrepreneurship and they attributed much of the estimated effect to factors including possibly wealth-induced shifts in preferences other than collateral constraints. Connolly et al. (2015) point out that the wealth channel is different from the collateral channel and Corradin and Popov's (2015) and Schmalz et al.'s (2017) support for collateral effect may have confounded the wealth channel with the collateral channel.

3.5.2 Channels from housing to entrepreneurship: evidence from China

In China's context, previous studies tend to discuss the relationship between housing and entrepreneurship across different types of property, that is, privatised public housing, commercial housing and private housing. However, inconclusive results are also found in these studies.

J. Chen and Hu (2019) established a conceptual framework to preliminarily explain why different types of ownership may have different correlations with entrepreneurship, although in general, they suggest that owners are more likely to become an entrepreneur. They indicate that owners of market housing do not differ much from renters in terms of the odds of entrepreneurship entry, owners of privatised public housing are connected with significantly less propensity for entrepreneurial engagement, and owners of inherited housing are correlated with a much higher prevalence of entrepreneurship. Their paper may be the first to explore the possible heterogeneity of types of ownership in entrepreneurship in China.

Some studies do attempt to explain the mechanisms of housing to entrepreneurship in the context of China. Using the housing reform as a natural experiment, Wang (2012) suggests that the individuals who purchased privatized public housing at subsidized prices in the 1990s are associated with higher odds of self-employment, attributable to the capitalisation on the housing value to alleviate credit constraints and increases in aggregate job mobility.

The alleviation of credit constraints plays a larger role in the expansion of investment in business enterprises.

By contrast, while Iyer et al. (2009) found that although the housing reform could account for the movement of workers from state sectors to the private sector from 1986 to 2005, they did not find any evidence for entrepreneurship. Additionally, L. Li and Wu (2014) argue that the soaring housing price in post-reform urban China has negative effects on the entrepreneurial engagement of urban adults, not only for homeowners but for non-homeowners. They imply that preference for property purchase crowded out business investment.

Most of the previous research focuses on the effect of house price inflation on self-employment. For instance, Oh et al. (2021) found that a higher growth rate of house prices in China is associated with a higher propensity to be self-employed. They also examined the heterogeneous effects of housing price growth in different areas with different price volatility and housing trading volume as a proxy for liquidity to confirm the collateral channel. Houses in regions with a higher housing transaction volume have a higher value in the collateral. Banks need to bear higher risks while holding a house in the high price volatility market, resulting in lower valuation for the collateral. As a result, they further found that lower house price volatility and higher liquidity in the real estate market boost entrepreneurial choices by households, confirming that collateral is indeed an important channel for household entrepreneurial choices.

Recently, a combination of wealth effect and collateral effect has been explored by S. Liu and Zhang (2021). They argue that housing capital gains alleviate household credit constraints, reduce risk aversion and increase awareness of financial information, which encourage households to become an entrepreneur.

3.5.3 Summary and research gap

Based on the literature review in Section 3.5, it could be reasonable to assume there is a lack of research on the direct effect of homeownership on business wealth holding. In terms of business start-ups, home characteristics and housing outcomes play a role in business start-ups, especially for households under credit constraints. Three mechanisms are found: crowding-out channel, collateral channel and wealth channel. In promoting business, the collateral channel is assumed to play an essential role. China has multiple forms of

homeownership with different levels of completeness of property rights. The results thus tend to be more mixed and heterogeneous.

Still, the empirical analysis in this strand of literature tries to solve the endogeneity problem by establishing reliable econometric models and great effort has been made in this exploration. Due to the differences between homeowners and renters (mobility, risk preferences, and wealth position), most of the previous studies in this section restrict the sample to just owner-occupiers. There is a lack of direct comparison between owner-occupiers and tenants.

3.6 Access to homeownership and wealth inequality

This part of the review is inspired by the notion that access to homeownership matters for structuring wealth accumulation patterns and helps to provide instructions and possible explanations for the chapters of empirical analysis (the choice of variables and the explanation for Chapters 7 and 9). Under the assumption that homeownership benefits wealth accumulation, unequal access to homeownership would cause the loss of some people in accumulating more wealth and thus induce wealth inequality. This section examines the literature on the factors that influence access to homeownership. Although some international studies are mentioned in this section, this section is principally concerned with studies regarding China.

3.6.1 Housing redistributive system

One stream of housing inequality stems from the housing redistributive system. Housing privatization marks housing market evolution in some advanced economies such as the UK and post-socialist societies of the former Soviet Union. It has been said that this redistributive system mitigated total wealth inequality because mass homeownership has been achieved across households at an unprecedentedly fast pace. Cross-national studies within Europe find that redistributive policies such as social housing, and subsidies could mitigate or exacerbate inequality, depending on the recipients of the benefits and the preponderance of homeownership (Fahey et al., 2004; Heylen & Haffner, 2012).

By studying a sample of households headed by persons older than 35 years old in 10 European countries, Wind and Dewilde (2019) put forth that in countries where homeowners have been able to accumulate housing wealth due to state subsidies or family help, the tenure

wealth gap between homeowners and tenants is larger. This is because marginalised tenants are barely able to save to the same extent as homeowners could accumulate housing wealth. However, state subsidies or family-based provision of housing are associated with less housing wealth inequality among homeowners (Wind et al., 2017).

Some of the wealth inequality can date back to the unequal distribution of housing allocation and then privatised housing. Before housing privatisation, when the housing system in China was featured by welfare-based allocation, inequality existed in the access to housing (Howe, 1968). The Maoist housing policy between 1949 and 1978 was mainly shaped by ideological and political considerations (X. Chen & Gao, 1993; X. Zhang, 1997). People with strong relationships with authorities, as well as those in positions of authority in the state bureaucracy and work units, benefited more from housing allocation by enjoying the largest and best-equipped apartments (White, 1989).

During the socialist planned economy era, people in privileged positions, such as those with political status and seniority were more likely to become the beneficiaries of housing privatisation (Logan et al., 2010; Y. Wang & Murie, 1996). Evidence from China shows that a large amount of public rental housing was sold to the sitting tenants at highly subsidised prices while sitting tenants were people in a privileged position such as those with seniority, high political status, party membership, and resourceful work units and were more likely to access larger and better housing under the socialist housing system, and they gained more subsidies and benefit more during the privatisation process (Feng, 2003; Y. Huang, 2004; Y. Huang & Clark, 2002; Y. Huang & Jiang, 2009; S. Li & Yi, 2007; Pan, 2004; Sato, 2006; M. Zhou & Logan, 1996). Therefore, a degree of housing differentiation emerged between people with different social and political statuses (Bian & Logan, 1996; Y. Huang & Jiang, 2009). For instance, when public housing was sold to tenants, the price was determined solely by housing space, with other variables such as locations and housing quality being ignored (S. Li & Zhao, 2008). When households rely on savings, including active savings and forced savings to accumulate housing wealth, this unequal distribution of housing privatisation makes no significant impact. While housing price appreciation becomes the main mode for households to accrue housing wealth, this inequality in the distribution of privatisation generates unequal influence, overwhelming the intended distributive impact of housing policy.

These, to some extent, underpinned housing differences among different groups in transitional urban China. In modern times, housing inequality in China is a combination of institutional characteristics, spatial characteristics, and socioeconomic characteristics (Y. Huang et al., 2021). Within any national housing sector increasing equality in overall wealth distribution consequent to rising home-ownership rates and house prices is also consistent with increasing inequalities among particular groups, most obviously between localities, tenants and owners, and between life-cycle groups. With housing prices outpacing income, wealth would concentrate more on developed areas which attract more capital, owners especially multiple property owners, and old generations.

3.6.2 Institutional factors

A special type of factor relates to the institutional arrangements, which have been comprehensively examined in existing studies. Institutional factors such as hukou status, higher job rank, working in state/government and public organisation, and party membership and access to HPF still play roles in access to homeownership (Clark et al., 2021; W. J. Deng et al., 2016; Y. Huang, 2004; Y. Huang & Clark, 2002; Y. Huang & Jiang, 2009; S.-M. Li & Li, 2006). Recently, Sato et al. (2013) point out that although institutional factors have little impact on the choice to own commodity housing versus rent, they significantly influence the probability of owning housing-reform housing. Hukou status and work units stand out in this type of factor.

Hukou status

It is now well established from a variety of studies that one of the institutional factors, namely hukou status plays a vital role in access to homeownership. China's hukou system places institutional barriers based on two classifications: hukou type (urban vs. rural) and hukou location (local vs. non-local) (W. Wu, 2006). A person's rights and entitlements were attached to one's hukou status. Under this system, residents with urban hukou were entitled to receive benefits including pensions, public education, subsidised housing, and health care, while rural citizens were left to fend for themselves (Chan, 1994). Compared to local hukou residents, millions of migrants do not have equal access to welfare and services including housing (Logan et al., 2009). This restriction was used to be acute since the late 1970s when rural residents began to migrate to cities for livelihood opportunities (Y. Fang et al., 2020).

Nonetheless, since 2014, the Chinese government has embarked upon hukou reform, through which hukou restrictions are almost being abolished in small cities and towns, relaxed in medium-sized cities, but still tightly maintained in a handful of megacities, namely, Beijing, Shanghai, Guangzhou, and Shenzhen (Xinhua News, 2014; L. Zhang & Tao, 2012). The hukou system, which discriminatorily excluded rural hukou holders from welfare housing provision and a list of social services has slowly faded away (Andreas & Zhan, 2016). Nevertheless, hukou classification by location continues to disadvantage migrants (L. Wu et al., 2019). It may not be significant in predicting homeownership in less-developed municipalities, however, having local hukou still significantly affects homeownership attainment in more-developed municipalities which are the most attractive places to migrants (X. Huang et al., 2014). Migrants have few opportunities to own housing in urban destinations (S. Li et al., 2018; Logan et al., 2009; Ouyang et al., 2017; Stephens, 2010; Tang et al., 2017), although they may own a house in their hometowns.

Empirically, Y. Huang and Jiang (2009) and Logan et al. (2009) indicate that the hukou system before reform may be the most crucial institutional factor underlying housing inequality in today's Chinese cities. Liao and Zhang (2021) suggest that rural-to-urban migrants are 20 percentage points less likely to own housing units in cities due to rural hukou status (high uncertainty, limited access to subsidised mortgage loans and limited access to subsidised homeownership opportunities), compared with household heads with local urban hukou and thus accumulate less housing wealth and total wealth. In the meantime, they also benefit less from housing capital gains. These differences are much larger in the first- and second-tier cities, cities with more stringent hukou regulations, and among younger cohorts.

Private rental housing is one of the only few options for migrant workers' housing tenure choice, with insufficient tenure protection, poor housing condition as well as discrimination in accessing public services (Y. Huang, 2003; Y. Huang & Yi, 2015; Jiang, 2006; B. Li & Duda, 2010; Logan et al., 2009; Tao et al., 2014; Y. Wang & Otsuki, 2015). The vast majority of temporary migrants live in employer-provided dormitories or rent private housing in informal settlements (Z. Liu et al., 2013; W. Wu, 2004). Although an increasing number of migrant homeowners (C. Cui et al., 2015; S. Li, 2017) and improvement in housing conditions for migrants (W. Wu & Wang, 2014) have been witnessed in host cities, their disadvantages persist over time compared to urban locals (Niu & Zhao, 2018; L. Wu & Zhang, 2018). The lower rates of homeownership among migrants can also be partly due to

insecure jobs, and limited access to privileged financial markets (G. Chen, 2016; C. Cui et al., 2016; Y. Wang & Otsuki, 2015; W. Wu, 2004; W. Wu & Wang, 2014).

Work units

Institutional forces especially the nature of work units have been proposed to explain people's housing access (Yi & Huang, 2014). Many work units especially those with power and resources continue to provide subsidised housing to their employees despite that the government forbade them to do so (MOHURD, 2006; The State Council, 2007). Compared with non-state sectors, state sectors (government agencies, institutes, state-owned enterprises and collectively-owned enterprises) occupying crucial domains of the economy remain capable of providing their employees with housing benefits (Fu, 2016). For instance, a housing purchase subsides (*zhufang butie*), a cash lump sum issued by workplaces, is restricted only to employees in state sectors for housing purchases (Chiu, 2001; Y. Huang, 2004).

In the meantime, as an important part of mortgage loans, HPF helps households get access to lower mortgage interest rates and thus homeownership markets. At the beginning of national reform, only government agencies, public institutions and large state-owned enterprises provided HPF, while private and small companies had financial difficulty and had no obligation to provide HPF for their employees (Clark et al., 2021). The proportion of HPF that employers need to pay for employees is much higher for employees in state sectors, about 20% of the wages. Workplace segmentation remains an important source of housing inequality (Fu, 2016).

3.6.3 The interplay of different factors

Unsurprisingly, most prior research focuses on the interaction of different types of factors.

Demographic and socioeconomic characteristics

Age, gender, marital status, education attainment, income, family size, and initial wealth have been found to impact the probability of owning versus renting in China. With the deepening of housing marketisation reforms, individuals' demographic and socioeconomic characteristics are becoming increasingly important determinants of accessing commercial housing (Bian & Lu, 2014).

More specifically, age and family structure are central to tenure choice (Y. Huang & Clark, 2002). S.-M. Li and Li (2006) identified the effect of age, education attainment, and change in marital status on tenure choice switch. Based on the data from a survey conducted in 2009 in eight municipalities in one province, X. Huang et al. (2014) point out that homeownership proves to be affected by age, gender, educational level, household size, personal income, and participation in an urban insurance scheme. L. Gan et al. (2014) show that income is one of the central aspects of ownership. Access to finance and housing mortgage subsidies also play roles in ownership. Bian and Liu (2005) suggest that households with higher socioeconomic statuses tended to own larger and better commercial dwellings compared to those with lower statuses. Educational attainment is also a critical factor in defining housing behaviour (Y. Huang & Jiang, 2009; Ren & Hu, 2016; Yi & Huang, 2014). Both household size and marital status have been acknowledged to significantly influence housing choices (Y. Huang & Clark, 2002; Y. Huang & Jiang, 2009). Housing tenure and homeownership vary significantly across occupation and education groups (Yi & Huang, 2014).

Intertwined factors

In most existing studies, institutional factors (including the housing privatisation system) and demographic and socio-economic features are intertwined with each other. Y. Huang and Jiang (2009) found both socialist institutions and market mechanisms could have an impact on housing inequality in urban Chinese cities. C. Fang and Iceland (2018) also admit the role of institutional characteristics in the form of a household's work unit (such as being employed by the government/party organisation or by the private sector) and socio-economic status (income and education) in homeownership status.

Apart from socio-economic factors playing a role in housing differentiation, Z. Wei et al. (2020) identified individual- and city-level factors that drive housing differentiation too. Institutional factors inherited from the socialist planned economy era and burgeoning market mechanism intertwined to intensify housing differentiation in transitional urban China. These factors they mentioned include educational attainment, marital status, age, household size, hukou conditions, city-level commercial housing prices and real estate investments.

Other researchers imply that determinants may play different roles for different cohorts. Sato (2006) shows that years of education and political status (measured by CCP membership) had different effects on housing inequality. Meritocracy only mattered for households in the private sector, whereas political status had a positive and statistically significant effect on

rent for households in the public sector, which demonstrated that housing privatisation reinforced the inequality in the old welfare system.

Chen (2016) investigated the heterogeneity of factors in influencing the housing-tenure choice in the City of Guangzhou. The results show that among affluent local urban residents, urban migrants and privileged citizens such as state employees and Communist Party members, housing tenure choice is positively correlated with marital status, age and education. For less affluent residents, housing tenure is a result of household size and income. Instead, rural migrants are mostly renters, although household size was found to be a significant predictor of homeownership. Institutional factors such as hukou status, party membership and state employment affect tenure outcomes for urban elites and the lower masses, but not for the native middle class.

Using nine successive waves of the China Health and Nutrition Survey data set, Fu (2016) analysed temporal patterns of urban homeownership from 1989 to 2011 and found the positive effects of education on homeownership, whereas working in state sectors has persistently attached to preferred housing-tenure choice before and after the housing reforms.

3.6.4 Summary and research gap

A set of factors influence access to homeownership, creating a wealth gap among different groups. This section reviewed redistributive factors, institutional factors and other combination factors mentioned in prior studies. The examination in this section will help establish theoretical variables for econometric modelling, to generate econometric specifications for empirical estimation, since most of these factors influence both tenure status and wealth holdings. Meanwhile, this section also underpins the discussion in Chapters 7 and 9, where housing wealth accumulation patterns and the relationship between housing wealth and wealth inequality will be examined.

3.7 Housing wealth and wealth inequality

The literature in this section directly links to Chapter 9, exploring the relationship between housing wealth and wealth inequality. Housing is believed to be central to the production of inequality (Piketty, 2018; Savage, 2015). One example of significance could be identified through unequal access to homeownership, as noted above, and the other one could be evaluated through housing wealth inequality. Housing wealth is not evenly distributed

among the population. Scrutinization of the role of housing in producing wealth inequality indicates the starkly uneven nature of housing wealth. Other factors, however, could also impact the distribution of housing wealth and thus influence total wealth inequality. Previously, China's degree of wealth inequality is moderated by its remarkably high rate of homeownership in both urban and rural areas (Davies et al., 2008). However, housing wealth is unevenly distributed.

3.7.1 Demographic and socioeconomic factors

Some influential research focuses on the effects of homeownership on wealth accumulation for low-income households, aiming to identify whether homeownership is an effective way to accumulate wealth for them. Financial returns to homeownership for minority or lower-income households may not be as great as for white or higher-income households (Herbert & Belsky, 2008; Norris et al., 2007; Shlay, 2006; Turner & Luea, 2009). Duda et al. (2002) and Goetzmann and Spiegel (2002) emphasise that too commonly low-income homebuyers sold their homes for real losses while alternative investments offered higher returns. Turner and Luea (2009) found homeownership had a different effect on the ability of low-and moderate-income households and high-income households to accumulate wealth from 1987 to 2001. In their paper, the impact of homeownership varies by income status, with each additional year of homeownership being associated with $15 K more in wealth holdings for high-income households and roughly $6 to 10 K more in wealth holdings for low-and moderate-income households. The most comprehensive critique of the policy emphasis on fostering low-income homeownership is provided by Shlay (2006), who reviewed academic evidence to cast doubt on the likelihood that either the financial or social benefits of owning would be realised. Shlay (2006) reflects these alleged effects of homeownership may be a result of self-selection and the policy support of low-income homeownership has deflected political attention away from alternative policies for affordable housing.

Although the heterogeneous effect of housing wealth gains is most apparent for high-income households and low-income households, there are still some studies that underscore the importance of other demographic and socio-economic factors. Homeownership has shown to be most beneficial for wealth accumulation when houses are purchased at a young age (U. Kuhn & Grabka, 2018). Using Household Finance and Consumption Survey, Rossi and Sierminska (2018) found that women seem to be more inclined to wealth accumulation.

Burbidge (2000) suggests that capital gains were substantial and were not evenly distributed in terms of several indicators of socioeconomic status.

3.7.2 Spatial disparities

The unequal housing wealth gains can be mostly magnified by spatial polarisation. Spatial polarisation means booming and struggling property markets coexist within a city, metropolitan area and country. A large body of theory has linked spatially uneven developments of the housing market to the ongoing housing marketisation and restructuring (Brenner, 2009), and more recently the financialization of real estate (van Loon & Aalbers, 2017). Alongside housing commodification and financialization, housing's role as a storing and accumulating wealth have attracted capital from domestic and global markets flow into housing (Aalbers & Haila, 2018; Doling & Ronald, 2010). However, capital is disproportionately invested in favourable locations, particularly in major cities (Fernandez et al., 2016; Hamnett & Reades, 2019). These major cities experienced rapidly housing price appreciation, whilst leaving other smaller cities with stagnant housing markets.

Arising from uneven developments, spatial polarisation also exacerbates housing wealth divides among high-income households and low-and moderate-income households (Arundel & Hochstenbach, 2018). This idea is commensurate with the location theory of housing. Differential levels and rates of house price change in different areas create spatial inequalities (Soaita et al., 2019). Higher-income households are capable to buy into the most profitable niches, while peripheral regions are more likely to be occupied by low-and middle-income households (Arundel & Hochstenbach, 2018). Henley (1998) debated that if wealth gains were more likely to be experienced by more affluent households in regions with above-average house price inflation then a widening of the distribution may have occurred.

Perhaps, the most comprehensive account of the spatial inequality of housing wealth gains is to be found in the work of Arundel and Hochstenbach (2020), as a useful example of research on housing spatial polarisation, as well as the interactions of socio-economic characteristics and spatial disparities. Drawing upon national registers including longitudinal and geocoded data over the 2006 -2018 period in the Netherlands, they gauged house-value developments in the Netherlands over time and at detailed spatial scales and found that rising spatial inequality between neighbourhoods is notable at the national level, within almost all provinces as well as most of largest municipalities. This kind of spatial inequality is structural and pervasive, even increasing throughout declining house prices. Further,

Arundel and Hochstenbach investigated the impact of income, employment position and parental wealth in divided access to housing submarkets. They found that differentiated access interacting with spatial polarisation between high-gain versus low-gain submarkets appears fundamental to driving inequalities in housing wealth accumulation in the Netherlands. Young adults with higher income, education level, employment position, and higher parental wealth (especially in the form of non-housing wealth) are more likely to become a homeowner in higher-gain neighbourhoods.

In the context of China, the research on spatial disparities concentrates on the urban-rural gap. S. Li and Zhao (2008) found that wealth distribution in China as a whole became much more unequal in 2002 than it was in 1995, which could be largely due to a striking increase in the wealth gap between urban and rural households. Although housing reform has accelerated the accumulation of wealth among urban households, it has widened the wealth gap between urban and rural areas on the other hand. Another contributor to the widening wealth gap between urban and rural households is declining land values in rural areas, which leads to a slowdown in wealth growth for rural households when land values are added to the net wealth of rural households. They also point out that housing assets are the greatest contributor to the inequality of wealth distribution in urban China, explaining 68 per cent of the total inequality in 2002 in urban China. When public housing was sold to urban households, the price was set with consideration only of housing space, ignoring other factors such as locations and housing quality. Those living in apartments of high quality and good locations obtained much higher capital gains after purchasing public housing.

Recently, Y. Wang et al. (2020) thoroughly explored the rural-urban housing inequality in China. They argue that since price appreciation is dramatically uneven between urban and rural areas, wealth accumulation for urban homeowners is faster than for their rural counterparts. Urban households accelerate their wealth accumulation through higher capital gains due to the higher marketisation of housing in urban areas, thus widening the household wealth gap between urban and rural areas. This result is consistent with Sato et al. (2013), who argue that these urban-rural gaps in housing wealth exceed China's high urban-rural gap in per capita incomes. They reported that in 2007 the urban-rural gap in per capita housing wealth contributed roughly 40 to 50 per cent of national inequality in per capita housing wealth.

3.7.3 Institutional factors

The privatisation of housing during the 1990s created a difference in wealth between the group who become a homeowner through privatisation and the group who accessed homeownership through the market. This, to some extent, also underpinned housing differences among different groups in transitional urban China (J. Lee & Zhu, 2006).

In the early reform era, political status and redistributive power had significant predictive power for housing space and quality (Logan et al., 1999). 'Key' work units, such as advanced enterprises in favoured industries or high-ranked government institutes usually received more public funds and additional resources (F. Wu, 1996). Work units with a higher rank and more resources were able to build more and better housing for employees, leading to substantial inequality in housing conditions across work units (F. Wu, 1996). Consequently, the elites among party leaders, government officials, and managers of state-owned enterprises, as well as people with strong ties to authorities were disproportionately allocated high-quality houses before housing privatisation (M. Zhou & Logan, 1996). Therefore, a degree of housing differentiation emerged between people with different social and political statuses (Bian & Logan, 1996; Y. Huang & Jiang, 2009).

When the housing reform started, these households were eligible to purchase these high-quality and good-location houses at discounted prices and then received great capital appreciation. Meng (2007) points out that the reason party members have more wealth than their non-party-member counterparts from 1995 to 2002 is that the larger and better housing they possessed before housing reform and the higher purchasing price subsidy they received from work-units during the housing reform. Wang (2011) found that state employees had a 15% discount on housing purchases on average, compared to consumers in the private market. Located in the inner districts of urban areas, most public houses were generally highly valued with time going on (Logan et al., 2010). As a result, those who had access to better housing under the old system reap great windfalls through the new market mechanisms. Those households tended to own newer and better housing (Walder & He, 2014), live in better locations (H. Fang et al., 2015), and even were more likely to own multiple properties (Y. Huang & Yi, 2011). Housing privatisation under housing reform laid the foundation for growing housing inequality as its most important cause in China (Yang & Chen, 2014). Those who received better housing in the old redistribution system benefited from more

discounts and could realise remarkable capital gains. After the end of housing privatisation, institutional factors still play an important role in creating housing wealth inequality.

3.7.4 Summary and research gap

Housing wealth plays an important role in wealth inequality through interactions with spatial characteristics, demographic and socio-economic characteristics, and institutional characteristics. In the existing literature, how housing wealth contributes to wealth inequality *de facto* has been extensively examined, which means a variety of factors have been identified. Combining the literature reviewed in Section 3.6 and Section 3.7, some factors (such as work units and housing privatisation) exert an effect on both the inequality in access to homeownership and housing wealth inequality.

In China's context, the studies on housing wealth inequality more focus on the inequality caused by the division between the urban area and rural area, while inequality caused by other factors has been neglected in the existing literature. Additionally, under the backdrop of rising housing prices, how increases in housing prices interact with other factors to cause housing wealth inequality has rarely been discussed, which will be examined in Chapter 9.

3.8 Conclusion

The literature review undertaken in this chapter discussed the essential points of how homeownership contributes to households' wealth accumulation and wealth inequality, including how housing wealth is accumulated, how homeownership impacts non-housing wealth, and how inequalities in access to homeownership and housing wealth are generated and reinforced by a combination of factors. This chapter further revealed some research gaps as highlighted in each section. Some key references that are similar to this thesis are concluded in Appendix Table A3.1.

Homeownership has been argued to help accumulate wealth. Three mechanisms have been identified and listed: housing appreciation, leverage and fixed commitments, changed saving behaviour and a favourable tax system. It has also been pointed out that the magnitude of wealth gains depends on market conditions, the timing of the purchase, the holding period, location, and mortgage terms. In China, however, previous research failed to establish a comprehensive relationship between homeownership and wealth accumulation. Meanwhile,

previous studies have been unable to demonstrate how wealth accumulation through homeownership is influenced by factors identified in this section.

Apart from accumulating housing wealth, this chapter also discussed literature on the association between homeownership and non-housing wealth. The results turn out to be ambiguous. Positive, insignificant, and negative relationships have been found in prior studies. Nevertheless, the mechanisms through which the relationship between homeownership and non-housing wealth have not been entirely examined in these studies. Relevant mechanisms can be borrowed from research concerning the relationship between housing and the wider economy (such as consumption and investment). The extant literature regarding the effects of housing characteristics and housing outcomes on financial market participation and portfolio choice seems inconsistent. The crowding-out effect, collateral effect, and wealth effect have been used to explain the relationship between housing characteristics and housing outcomes and financial investment. Considering China's financial regulations, the collateral channel may not be applied to China. The crowding-out effect and wealth effect may be notable in China's context. Similarly, there is a lack of research on the direct effect of homeownership on business wealth. In terms of business start-ups, home characteristics and housing outcomes play a role in business start-ups. Three mechanisms are found: crowding-out channel, collateral channel, and wealth channel. In promoting business, the collateral channel is assumed to play an essential role.

Two inequalities in housing are linked to wealth inequality: inequality in access to homeownership and the distribution of housing wealth. A set of factors influence access to homeownership, creating a wealth gap among different groups. Redistributive factors, institutional factors and other combined factors have been listed. Housing wealth plays an important role in wealth inequality through interactions with spatial characteristics, demographic and socio-economic characteristics, and institutional characteristics. In China's context, the studies on housing wealth inequality more focus on the inequality caused by the division of urban areas and rural areas, while inequality caused by other factors has been neglected in the existing literature. Additionally, under the backdrop of rising housing prices, how increases in housing prices interact with other factors to cause housing wealth inequality has rarely been discussed.

Inspired by the literature reviewed in this chapter and combining the research questions, the following chapter discusses the theoretical framework and research methods employed in this thesis.

Chapter 4 Theoretical framework and research methodology

4.1 Introduction

In Chapter 3, the literature on how homeownership is linked to household wealth and wealth inequality was discussed. Homeownership impacts household wealth both through the accumulation of housing wealth and its subsequent effects on non-housing wealth. Related channels through which effects could work were also outlined. Unequal access to homeownership and inequality in housing wealth were both examined. Informed by the findings and research gaps in the literature review, this chapter constructs a theoretical framework and outlines the methods and approaches which underpin the empirical analyses carried out in Chapters 6-9.

This chapter starts by constructing a theoretical framework to explore the effect of homeownership on wealth accumulation in China in Section 4.2. This framework aims to address research questions systematically and facilitate a better understanding of this relationship. The new framework resonates with the literature, and it also determines the research design and methodology of this research. Based on the theoretical discussion and research questions, some key hypotheses are developed in this section to provide a basis for appropriate model specification and the understanding of the empirical investigation in Chapters 6 to 8. Section 4.3 provides a synopsis of the technical problems that have been confronted and solved by existing studies and how this thesis would possibly address these problems in practice. Following this section, the research methodology used to implement the framework and verify these hypotheses is presented in Section 4.4. Given the differences in data between Chapters 6 to 9, more specific detail in terms of methods is provided in the individual chapters themselves. Finally, Section 4.5 completes the chapter.

4.2 Theoretical framework and hypotheses

This research aims to answer how homeownership has impacted the accumulation of wealth in China, as introduced in Chapter 1. Drawing upon the discussions in the literature chapter, a theoretical framework is developed, which guides the methodology and empirical analysis. The theoretical framework that instructs this thesis is presented in Figure 11-1.

Homeownership could exert an important effect on net worth. The aggregate effect of homeownership on net worth relies on the trade-off between housing wealth and non-housing wealth (Di et al., 2007; Kaas et al., 2019). If the negative forces on non-housing wealth outpace the positive effects on housing wealth accumulation, then a significant threat would be posed to the conventional belief that homeownership helps to build and accumulate wealth. However, if homeowners could not only benefit from building housing wealth but also accrue more non-housing wealth by fully utilising homeownership, then homeownership would be a comparably advantageous investment choice to store and accumulate wealth. In this case, tenants renting would be disadvantaged as it accrues no housing wealth and does not seem to accumulate more non-housing wealth.

Although tenants may compensate for their lack of housing wealth by accumulating more non-housing wealth over time, I expect an 'overall' positive effect of homeownership on net worth. After entering homeownership, households accumulate more net worth compared to those remaining in the rental sector (**Hypothesis: 1a**). However, enormous variation in wealth holdings exists across households, which must be attributed to heterogeneous household characteristics: socio-economic, institutional, parental, and spatial factors (**Hypothesis: 1b**) (Chapter 6).

First, homeowners could accumulate more wealth through housing equity increases. Homeowners tend to accumulate housing wealth through house price appreciation over time (Di et al., 2007; Killewald & Bryan, 2016). Homeownership is also likely to affect housing wealth through leverage and fixed commitments. Leverage and fixed commitments associated with paying down outstanding mortgage principal help homeowners accumulate wealth (Aarland & Reid, 2019; Fuller et al., 2020; Herbert et al., 2014; Ruel & Hauser, 2013). This, usually, slow payment going toward house equity typically increases over time. The relative importance of reliance on price appreciation and leverage and fixed commitments to accumulate housing wealth varies. The longer the household stays in homeownership, the higher the proportion of the price appreciation in housing values. When housing prices are stable, the accumulation of housing wealth relies on saving through mortgage repayments. When housing prices experience rapid increases, the accumulation of housing equity tends to be more dependent on price appreciation. Although a favourable tax system also facilitates the accumulation of wealth, it is more directly linked to the user cost of housing capital, with a weak association with the accumulation of housing wealth. Whether and to what extent a homebuyer will secure the potential benefits/returns of owning whilst avoiding the potential

risks of homeownership depends on market conditions, the timing of purchase, the holding period, location, and mortgage terms (Belsky et al., 2005; L. S. Goodman & Mayer, 2018; Newman & Holupka, 2016). Additionally, the housing wealth gains could be different for different socio-economic, institutional, and parental characteristics.

In China, the average annual real growth of housing prices in the last decade was 13.1% in first-tier cities, 10.5% in second-tier cities, and 7.9% in third-tier cities (H. Fang et al., 2015). Recently, with the deep involvement in the financial market, an increasing number of Chinese households have relied on mortgages to enter homeownership. Therefore, I expect that, in China, homeowners augment housing wealth mainly via price appreciation and mortgage payments, with housing price appreciation dominating (**Hypothesis: 2a**). However, the favourable status in wealth holdings of Chinese homeowners over renters, at least until mid-2022, could arise from housing price appreciation rather than from fixed commitments and changed saving behaviour (**Hypothesis: 2b**). Further, the extent to which housing wealth can be built and accumulated depends on a complex of factors: duration; location; timing of purchase; housing type; mortgage status (**Hypothesis: 2c**). Finally, considerable variation of housing wealth holdings exist across households, even with the same duration of homeownership, as a consequence of heterogeneous household characteristics (**Hypothesis: 2d**). The factors by which homeownership affects households' different wealth holdings include socio-economic, institutional, and parental characteristics (Chapter 7).

Homeownership is related to the accumulation of non-housing wealth (including financial wealth and business wealth) through four main channels: collateral effects, wealth effects, crowding-out effects, and changed saving behaviour. In aggregate, I expect homeownership could also positively influence non-housing wealth holdings (also financial wealth and business wealth) because of behavioural changes caused by homeownership attainment (**Hypothesis: 3a**) (Chapter 8).

Housing can be used as collateral that enables households to relax borrowing constraints and have better access to credit to participate in the financial market or start a business (Berger et al., 2018; Lustig & Van Nieuwerburgh, 2010; Ortalo-Magné & Rady, 2006). On the other hand, although in China, only homeowners with full property rights are allowed to borrow against their homes from the formal sector (Z. He et al., 2019), homeowners with partial property rights could increase their odds of receiving loans from the informal sector when

they hold a housing. Additionally, the amount of loans could be higher compared with them not being a homeowner. On the other hand, most households would choose to use their housing to invest in a business or start a business rather than promoting investment in financial markets, considering the stock market in China is both extremely volatile and financial markets in China had a relatively poor performance, especially after 2008 (Carpenter et al., 2021). This indicates that in China, the collateral effect may only work in promoting business wealth while not impacting financial wealth holdings (**Hypothesis: 3b**) (Chapter 8).

Homeowners could also experience house price appreciation gains. The wealth improvement from housing capital gain potentially enables households to be less risk-averse and engage in riskier investment in equity products and/or starting/expanding a business. Even though house price appreciation has not been materialised and households show only a "book gain" through house price appreciation, the perceived wealth may stimulate households' investment in riskier activities, creating a wealth effect (Campbell & Cocco, 2007; Fougère & Poulhes, 2012; Hurst & Pugsley, 2011; Kerr et al., 2015). Meanwhile, homeowners are perfectly hedged against fluctuations in rents and inflation (Sinai & Souleles, 2005; C. Wu & Pandey, 2012). The hedging functions of housing induce the household to endure greater risk and make riskier investments. In addition, housing capital gains could increase owner awareness of financial information, which encourage households to participate more in the financial market and become an entrepreneur (S. Liu & Zhang, 2021). Besides, the transition into homeownership can increase financial wealth holdings and business wealth holdings by promoting knowledge in finance and economics. In sum, I expect the wealth effect enables homeowners to hold more financial wealth and business wealth (**Hypothesis: 3c**) (Chapter 8).

By contrast, housing as the major component of wealth is indivisible and relatively illiquid. Indivisibility and illiquidity of housing assets engender homeowners with less available liquid wealth (Flavin & Yamashita, 2002). The heavy investment concentrated in housing assets leaves households with no additional savings to invest in financial assets and business investments. To ensure meeting their mortgage payments, they are likely to reduce their holdings of assets with riskier or fluctuating returns. Additionally, owning a house introduces asset price risk and for risk-averse individuals, the exposure to house price fluctuation prevents them from investing in risky financial investments and business investments. Moreover, experience in homeownership often leads homeowners to believe

the rate of return of homeownership is much higher than from holding financial assets or being an active entrepreneur, which decreases the attractiveness of these two activities to them. In sum, I expect homeownership would reduce households' holding of financial wealth and business wealth due to the crowding-out effect (**Hypothesis: 3d**) (Chapter 8).

China's housing prices have experienced and are experiencing rapid increases. In conjunction with the effect of homeownership on wealth accumulation, wealth inequality in China will be exacerbated and housing strategies deployed by households would be different. The increase in wealth inequality could be manifested in three particular aspects: location, tenure, and intergenerational differences and transfers. First, wealth inequality among homeowners in different places will be amplified. Homeowners in places which undergo rapid housing price increases and homeowners in places where struggling property markets exist experience growing disparities in housing wealth gains. Secondly, wealth inequality between multiple-property homeowners, homeowners, and tenants is expected to grow. Multiple-property homeowners and homeowners experience great wealth gains, while tenants excluded from the homeownership market lose the opportunity for wealth gains. Thirdly, total wealth is likely to concentrate within older generations who are more likely to own houses and multiple properties, whereas young generations are less likely to become homeowners and the total wealth they hold may be reduced. This intergenerational difference further exerts an impact on intergenerational mobility and the intergenerational transmission of advantages, inducing intra-generational inequality between different socio-economic backgrounds. Young generations are more dependent on intergenerational transfer to attain homeownership, while intergenerational transfer is not equally distributed among households.

Housing strategies employed by households to benefit from homeownership are impacted by housing wealth accumulation patterns. Smith and Searle (2010) and Soaita et al. (2019) identify three common strategies deployed by households: passive strategies, active strategies, and pro-active strategies. The approach of the 'passive' strategy simply enjoys the benefits of having paid off a mortgage, which is linked to a desire to age in place, the precautionary saving motive, and the bequest motive. The 'active' strategy would accumulate and use housing wealth in housing movement processes, covering up-/down-sizing of housing over the life course. The 'pro-active' strategy would use new financial techniques, consequent to housing market deregulation, to extract or add to housing equity without moving, and expand the traditional methods to use housing equity, for example, re-

mortgaging and equity release. In China, passive strategies will still be dominant. However, with house prices rising ahead of incomes and experiencing long-term increases, the more speculative strategies, i.e., active and pro-active strategies will be increasingly deployed by some households, especially by households at the top of income and wealth distributions.

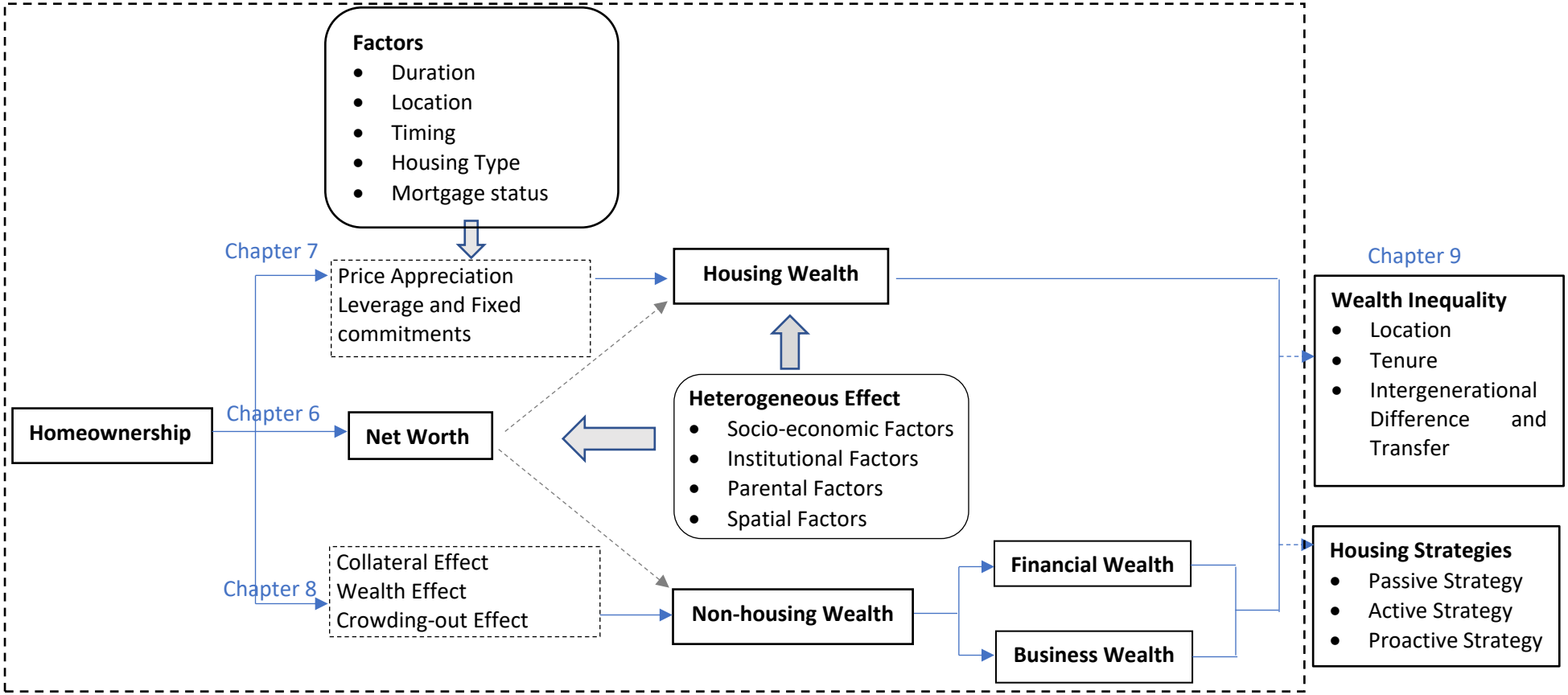

Figure 4-1. Theoretical framework

Source: Produced by author.

4.3 Technical problems

It is not a trivial task to estimate the causal relationship between homeownership and wealth accumulation. The ideal randomised experiment is based on the absolute exogeneity of homeownership, that is, whether becoming a homeowner is uncorrelated with any other variables. Households are assumed to be randomly assigned to be renters or owners. Then any differences in wealth could be attributed to homeownership. However, as discussed above, homeownership is endogenous to the economic conditions and other socioeconomic characteristics of households. The assumption of randomisation of homeownership is unfeasible, and researchers and policymakers are left with the need to use non-experimental studies to estimate the effects of homeownership. The fundamental challenge in such non-experimental studies is endogeneity problems. More specifically, four causes of endogeneity in relevant literature will be discussed in the next part: reverse causality (simultaneity), selection of treatment, omitted variable, and measurement error.

4.3.1 Reverse causality

Estimating the contribution of homeownership to wealth poses substantial methodological and conceptual challenges because wealth per se is an important factor affecting the likelihood of home purchase (Di et al., 2007; Kaas et al., 2019). The requirement of a down payment means that households must acquire some wealth before purchasing a home, thus wealth is necessary for homeownership and earlier access to be a homeowner. This problem is ignored in some prior research, while some studies solve this problem by adding the initial position of wealth into control variables (e.g., Di et al., 2007).

In this thesis, I am unable to add the initial position of wealth into the vector of covariates. Adding the initial position of wealth requires wealth data prior to the sample years. There are only four rounds in CHFS, the main data source I employed, 2011-2017. However, since a quite small number of households were surveyed in 2011, the data in 2011 were deleted from the sample. If we use the data of the initial position of wealth in 2013 and exclude the data in 2013 from the sample, only two rounds (2015 and 2017) can be used to construct the main models, which would make it difficult to test parallel trend assumption. If we also include the data in 2013 into the sample, multicollinearity would be generated.

Instead, I used ‘saving’, the residual between total household income and total household consumption to proxy for the initial position of wealth. For a typical household, total household income is stable during a period and so is the consumption, while the initial position of wealth is closely related to the ‘saving’. Additionally, a parallel trend assumption was conducted in this thesis to secure the independence of homeownership.

4.3.2 Selection of treatment

It has been long argued that, compared to the population of households/adults, homeowners are more likely to be married, have children, be better educated, and have higher income and wealth, as well as higher future earning potential. These observable characteristics are closely linked to tenure status (Kaas et al., 2019), most of which are simultaneously found to be correlated with wealth level. For instance, observed higher levels of wealth among homeowners than renters may reflect the propensity of higher-income households to own.

The way to cope with observed characteristics is to statistically control for these observable differences, as done in prior research. In this thesis, following common practice in these studies, a large number of observable variables will be controlled for, which will be discussed in detail in Chapter 5. But adding these time-varying covariates to the model is an issue since they may be correlated with unobservable. Tenure transition may cause changes in these covariates, which are called bad controls in economics (Angrist & Pischke, 2009). To measure the full impact of owning on wealth, Wainer and Zabel (2020) netted out these covariates (although adding in these time-varying covariates has no discernible impact on the results) and just added time fixed effects and household fixed effects. Following the way that Wainer and Zabel did to deal with the possibility of bad controls, in some cases, empirical specifications without controlling for any covariate will be reported to make a comparison in this thesis.

4.3.3 Omitted variable

Perhaps the most difficult issue in estimating the relationship between homeownership and wealth arises from unobservable influences. The selection of certain types of households into ownership is well established in the literature (Lersch & Dewilde, 2018; Vestman, 2019). This raises problems with identification because the counterfactual outcome, the wealth of homeowners had they not become owners, would likely be different from that of non-owners. Homeowners may be distinguished from renters in terms of some unobservable attributes,

which are also closely related to wealth level. These could be related to their degree of risk aversion, their ability to make forward-looking decisions, plan future expenditures or make transfers to their children (Kaas et al., 2019). Vestman (2019) identified the role that risk preference plays in saving motives and being a homeowner.

Causa et al. (2019) and Vestman (2019) note that homeownership, because it involves individuals in acts of saving for deposits and committing to regular quasi-forced savings, 'selects' particular kinds of households with appetites for asset accumulation and so tenure outcomes may reflect these selection effects. Owners are likely to be better savers and hence are likely to accumulate more wealth than renters, regardless of tenure (Wainer & Zabel, 2020). Lersch and Dewilde (2018) explain that the higher wealth among homeowners over renters may be a consequence of self-selection. In this case, wealth and homeownership are jointly determined by other unobservable variables. The omission of key explanatory variables in the wealth equation would result in the pseudo-causal relationship that homeownership creates wealth. Just as Di et al. (2007) mentioned, without controlling for propensity to save and invest, any correlation between homeownership itself, or its duration, with wealth accumulation, could be fake.

Considerable efforts have been made to solve this endogeneity issue in homeownership or years of homeownership in pertinent studies. The first trial is to add the control variables that proxy for the unobserved characteristics. An example of this is the study carried out by Di et al. (2007) in which they attempt to control for unobserved differences across households in the propensity to save and invest by including a control variable for net wealth growth as a share of cumulative household income, five years before the studied period in their regression analysis.

The other solution is to utilise econometric methods, including random effects or fixed effects of panel data, the differences-in-differences method (DID), the combination of matching approaches and DID, and instrumental variables. Turner and Luea (2009) used an individual random effect model. Wainer and Zabel (2020), instead, established a household-level fixed effects framework to capture the time-invariant unobservable household characteristics correlated with wealth and homeownership such as the likelihood that owners are better savers than renters since they have to save for a down payment. Grinstein-Weiss et al. (2013) used matching approaches that address sample selection and endogeneity issues.

Newman and Holupka (2016) combined propensity score matching techniques with the more general DID estimator.

Kaas et al. (2019) employed an instrumental variable approach to deal with the endogeneity of homeownership status and unobserved heterogeneity. The idea is that if some people inherit a home and keep it, while others of the same characteristics inherit other forms of wealth of the same amount, then the overall differences in their net wealth positions will be a direct consequence of the inherited homeownership. The proposed identification scheme relies on the argument that inheriting the household's main residence conditional on the total amount of inheritance affects wealth accumulation only through homeownership. However, this premise could be easily broken by selectively transferring home inheritances such as only transferring home to the poorest child or the eldest son. Thus, inheriting a home might have a direct channel of influence on household wealth.

Sodini et al. (2016) overcame the endogeneity problems by using a quasi-experiment which randomly assigns homeownership. They tried to distinguish a pure homeownership effect from the windfall effect. Indeed, there exists this kind of housing in China, such as houses obtained from inheritance or endowments, houses obtained from welfare housing distribution from household members' work units, cooperative-constructed houses obtained from the work units, and houses obtained from relocation and compensation from collective land expropriation of local governments (J. Zhao & Li, 2017). Houses in this class are not households' homeownership decisions. Rather, the acquisition of these houses depends on the work units that experienced the welfare housing distribution (and cooperative-constructed houses) or past generations' inheritance (endowments) that are beyond the family's control. The homeownership for such households is independent of the household's wealth decision, and thus can be reasonably considered exogenous. Other houses, such as houses purchased directly from commercial housing markets with either full property rights or limited property rights, affordable houses purchased from governments at subsidised prices, and self-built houses may be closely related to households' wealth condition. The classification could effectively identify the effects of homeownership on wealth accumulation.

In the same way, although Q. Zhou et al. (2017) did not examine the relationship between homeownership and wealth directly, they used the variable of whether the households have experienced housing demolition in the past and whether the households inherited houses are

used as instruments for homeownership. Housing demolition and housing inheritance experiences happened in the past, which can be viewed as exogenous shocks to the households' wealth accumulation.

In this research, considering data restrictions and feasibility, a few efforts have also been made to solve the possible problems caused by omitted variables. First, to keep the treatment groups and control groups more comparable, only households who reported they were renters in 2013 are included. Second, DID models are used to control for unobservable time-constant household characteristics and time trends. In addition, time-invariant regional characteristics are also controlled for to build a three-way fixed-effect model. Third, a series of robustness checks including a parallel trend test and following the practice of J. Zhao and Li (2017) are conducted.

4.3.4 Measurement error

The distribution of wealth is right-skewed. To put it another way, a large number of households own a lower level of wealth, while some people have a quite high level of wealth. To solve this problem, Di et al. (2007), Turner and Luea (2009), and Grinstein-Weiss et al. (2013) used a natural logarithm of total net wealth combined with estimating a trimmed distribution that excludes the upper and lower 2.5% of the wealth distribution. Wainer and Zabel (2020) dropped the top 10 highest and lowest values of wealth from the sample to limit the outliers' impact on the regression results because these extreme values may be the result of reporting errors. Newman and Holupka (2016), however, emphasised that computing the log of net worth for each household is less appealing since logs cannot be computed for zero or lower values, and many households hold negative net worth. They think the options of discarding these cases or assigning an arbitrary value could introduce bias. Instead, they employed quantile regressions to account for the skew in net worth outcomes.

In this thesis, the logarithm of total net worth is additionally employed to lower the influence of measurement error. Following the practice of Di et al. (2007) and Turner and Luea (2009), a value of 1 is assigned to cases with zero or negative values to avoid the loss of the cases when using the log form.

It is worth noting that some types of measurement errors cannot be resolved in this thesis. It has been reported that there is always a possibility of over-estimation of wealth value,

especially for housing values. It has been long reported that households tend to overestimate the market value of their houses (Robins & West, 1977). However, it has also been argued that there is an issue about unwillingness to report all wealth, income and savings (D. Goodman, 2008), which is also true in New Zealand (Rashbrooke et al., 2021). Therefore, it would be hopeful that the overestimate and underestimate of self-reported housing values would offset each other.

4.4 Research methodology

This study is based on quantitative research methods. The data used are observational data obtained from secondary household surveys. Chapters 6 to 9 are chapters of empirical analysis in this thesis. It is worth mentioning that nuance exists in these empirical analysis chapters. Compared to Chapter 9, the methods in Chapters 6 to 8 are relatively mature and complete. Chapter 9, nonetheless, is actually at the initial stage of analysis, which relies more on literature analysis and survey data to support the ideas argued in this chapter.

Based on the research questions and the data characteristics, mixed models are employed in the empirical analysis. Given the differences between Chapters 6 to 9, more specific detail in terms of models is provided in the individual chapters. This section only provides a theoretical understanding of the models used in this thesis, especially the causal basis for the DID model.

4.4.1 Differences-in-Differences model

The key point for observation research is how it could simulate random experiments through appropriate research design. This process is called the identification strategy. The main identification strategy I used in this thesis is DID and the fixed-effect model.

Assuming N individuals, we use i to denote individual, thus $i = 1, \dots, N$. D_i equals one when individual i received treatment, zero otherwise. Therefore, $D_i \in \{0, 1\}$. For any individual i, the treatment effect is:

$$\tau_i = Y_{1i} - Y_{0i}, i = 1, \dots, N$$

where Y_{1i} is the potential outcome under treatment and Y_{0i} is the potential outcome under control. The individual treatment effect is difficult to estimate. Thus, we are concerned with

the average treatment effect (ATE), defined as the average effect for all individuals (Angrist & Pischke, 2009, p.54):

$$\tau_{ATE} = E(Y_{1i} - Y_{0i})$$

Sometimes, we care about the average treatment effect for the control (ATC), denoted as:

$$\tau_{ATC} = E(Y_{1i} - Y_{0i} | D_i = 0) = E(Y_{1i} | D_i = 0) - E(Y_{0i} | D_i = 0)$$

In most cases, however, we care more about the average treatment effect for the treated (ATT), which is the effect for those in the treatment group, denoted as:

$$\tau_{ATT} = E(Y_{1i} - Y_{0i} | D_i = 1) = E(Y_{1i} | D_i = 1) - E(Y_{0i} | D_i = 1)$$

The relationship between τ_{ATE}, τ_{ATC} and τ_{ATT} is as follows:

$$\tau_{ATE} = E(Y_{1i} - Y_{0i})$$

$$= E[E(Y_{1i} - Y_{0i} | D_i)]^{3}$$

$$= E(Y_{1i} - Y_{0i} | D_i = 1) * \Pr(D_i = 1) + E(Y_{1i} - Y_{0i} | D_i = 0) * \Pr(D_i = 0)$$

$$= \tau_{ATT} * \Pr(D_i = 1) + \tau_{ATC} * \Pr(D_i = 0)$$

The '*fundamental problem of causal inference*' is that, for individuals, we can observe only one of these potential outcomes (Holland, 1986). For τ_{ATT}, only $E(Y_{1i} | D_i = 1)$ is observable, while $E(Y_{0i} | D_i = 1)$ is unobservable, namely, the counterfactual result. For τ_{ATC}, $E(Y_{0i} | D_i = 0)$ is observable, while $E(Y_{1i} | D_i = 0)$ is unobservable. In a random experiment, individuals are randomly allocated to a treated group and a control group, namely $(Y_{1i}, Y_{0i}) \perp\!\!\!\perp D_i$. That is to say, an individual would not choose to enter the treated group and control group based on the size of potential results (Y_{1i}, Y_{0i}). Differences caused by other factors are occasional and would be statistically insignificant (Zhao, 2017). Therefore, the system difference in results between the treated group and the control group

[3] This transformation is according to the law of iterated expectations. This law says that an unconditional expectation can be written as the unconditional expectation of that variable conditional on a second variable (Angrist & Pischke, 2009, p.31).

could be attributed to the intervention. In this case, $E(Y_{0i}|\, D_i = 1) = E(Y_{0i}|\, D_i = 0)$ and $E(Y_{1i}|\, D_i = 1) = E(Y_{1i}|\, D_i = 0)$. Thus, τ_{ATT} and τ_{ATC} and then τ_{ATE} could be calculated through $\tau_{ATT} = \tau_{ATC} = \tau_{ATE} = E(Y_{1i}\,|D_i = 1) - E(Y_{0i}\,|D_i = 0)$, in the case of a random experiment.

In a non-random experiment (typically an observational study), however, $E(Y_{0i}|\, D_i = 1)$ may not be equal to $E(Y_{0i}|\, D_i = 0)$. $E(Y_{1i}|\, D_i = 1)$ may not be equal to $E(Y_{1i}|\, D_i = 0)$. Therefore, the direct calculation of the differences between $E(Y_{0i}|\, D_i = 1)$ and $E(Y_{0i}|\, D_i = 0)$ might cause bias to τ_{ATT}. The differences between $E(Y_{1i}|\, D_i = 1)$ and $E(Y_{1i}|\, D_i = 0)$ might cause bias to τ_{ATC}. The way to solve these biases is to introduce control variables into the estimation.

By adding control variables, it could be possible that $E(Y_{0i}\mid X_i, D_i = 1) = E(Y_{0i}\mid X_i, D_i = 0)$ and $E(Y_{1i}\mid X_i, D_i = 1) = E(Y_{1i}\mid X_i, D_i = 0)$, which is also called Conditional Mean Independence (CMI) (Zhao, 2017). Another stronger assumption is the Conditional Independence Assumption (CIA), which means $(Y_{1i}, Y_{0i}) \perp\!\!\!\perp D_i|\, X_i$, which indicates that conditional on a set of observable characteristics, the treatment participation and treatment outcome is independent. The CIA implies that treatment status is random, and does not rely on the two potential outcomes, conditional on a set of observed attributes X_i (Zhao).

The reason why $E(Y_{0i}\mid X_i, D_i = 1) = E(Y_{0i}\mid X_i, D_i = 0)$ and $E(Y_{1i}\mid X_i, D_i = 1) = E(Y_{1i}\mid X_i, D_i = 0)$ is possible when X_i are included is that covariates X_i or some of them could determine individuals' treatment status. When holding X_i constant, any individual who does not take part in the intervention would have the same Y_{0i}. Correspondently, any individual who participates in the intervention would produce the same Y_{1i}. In this case, $\tau_X = \tau_{ATT}(X_i) = \tau_{ATC}(X_i) = \tau_{ATE}(X_i)$. Factors that cause the differences between the treated group and the control group could only be ascribed to the intervention. In that sense, the choice of X_i is crucial for these conditions to hold.

A general regression model is based on observed variables and established on CIA. In a typical function which estimates the treatment effect:

$$Y_i = \alpha + \beta D_i + X_i'\gamma + \varepsilon_i$$

where X_i' is a vector of control variables, and ε_i is the error term. β is the coefficient of interest. Through Ordinary Least Square estimation (OLS) we could get $\hat{\beta}$. According to the Law of Large Numbers, $\hat{\beta} \xrightarrow{p} \beta$. However, β does not necessarily mean treatment effect.

More specifically, β could be calculated through the weighted average τ_X.

$$\tau_X = E(Y_i \mid X_i, D_i = 1) - E(Y_i \mid X_i, D_i = 0)$$

$$= E(Y_{1i} \mid X_i, D_i = 1) - E(Y_{0i} \mid X_i, D_i = 0)$$

(1)

$$= E(Y_{1i} \mid X_i, D_i = 1) - E(Y_{0i} \mid X_i, D_i = 1) + E(Y_{0i} \mid X_i, D_i = 1) - E(Y_{0i} \mid X_i, D_i = 0)$$

$$= E(Y_{1i} - Y_{0i} \mid X_i, D_i = 1) + E(Y_{0i} \mid X_i, D_i = 1) - E(Y_{0i} \mid X_i, D_i = 0)$$

$$= \tau_{ATT}(X_i) + E(Y_{0i} \mid X_i, D_i = 1) - E(Y_{0i} \mid X_i, D_i = 0)$$

Or (2)

$$= E(Y_{1i} \mid X_i, D_i = 1) - E(Y_{1i} \mid X_i, D_i = 0) + E(Y_{1i} \mid X_i, D_i = 0) - E(Y_{0i} \mid X_i, D_i = 0)$$

$$= E(Y_{1i} - Y_{0i} \mid X_i, D_i = 0) + E(Y_{1i} \mid X_i, D_i = 1) - E(Y_{1i} \mid X_i, D_i = 0)$$

$$= \tau_{ATC}(X_i) + E(Y_{1i} \mid X_i, D_i = 1) - E(Y_{1i} \mid X_i, D_i = 0)$$

This means that if τ_X wants to denote treatment effects τ_{ATC} or τ_{ATT}, $E(Y_{0i} \mid X_i, D_i = 1) - E(Y_{0i} \mid X_i, D_i = 0)$ must be equal to zero, or $E(Y_{1i} \mid X_i, D_i = 1) - E(Y_{1i} \mid X_i, D_i = 0)$ must be equal to zero, too. Nonetheless, the general regression model cannot control for unobserved variables, thereby failing to fulfil the requirements. If there are unobserved factors that affect both treatment assignment and potential outcomes, conditional on a set of observed variables, the treatment participation and treatment outcome cannot be independent. CIA cannot be satisfied and thus treatment

effect (causal effect) could not be gained. In this sense, general regression could not solve any endogeneity issue.

One approach to these potential sources of omitted variable bias would be to collect data on all these variables and add them to the annual cross-sectional regression. Unfortunately, some of these variables might be very hard or even impossible to measure. One method to solve this unobserved problem is to use DID (Zhao, 2017). The baseline case for DID is the one with two periods and two groups:

$$Y_{it} = \alpha + \beta D_i + \delta T + \tau(D_i * T) + X'_{it}\gamma + \varepsilon_{it}$$

where T is an indicator variable for period, equal to 1 if in the period of treatment and zero if not. Consistent with prior expression, Y_{it}^0 is the outcome that unit i who does not participate in the treatment would experience in period t and Y_{it}^1 is the outcome that unit i who participate in the treatment would experience in period t.

In this equation, τ, the coefficient of the interaction term $D_i * T$, is equal to the difference between the mean change in outcomes over time experienced by units in the treated group adjusted by the mean change in outcomes over time experienced by units in the untreated group. The calculation proceeds as follows:

$$E(Y_{it}^1 | X_{it}, D_i = 1) = E(Y_{it} | X_{it}, T = 1, D_i = 1) = \alpha + \beta + \delta + \tau + X'_{it}\gamma$$

$$E(Y_{it-1}^1 | X_{it-1}, D_i = 1) = E(Y_{it} | X_{it}, T = 0, D_i = 1) = \alpha + \beta + X'_{it-1}\gamma$$

$$E(Y_{it}^0 | X_{it}, D_i = 0) = E(Y_{it} | X_{it}, T = 1, D_i = 0) = \alpha + \delta + X'_{it}\gamma$$

$$E(Y_{it-1}^0 | X_{it-1}, D_i = 0) = E(Y_{it} | X_{it}, T = 0, D_i = 0) = \alpha + X'_{it-1}\gamma$$

Thus,

$$E(Y_{it}^1 | X_{it}, D_i = 1) - E(Y_{it-1}^1 | X_{it-1}, D_i = 1) - [E(Y_{it}^0 | X_{it}, D_i = 0) - E(Y_{it-1}^0 | X_{it-1}, D_i = 0)]$$

$$= \alpha + \beta + \delta + \tau + X'_{it}\gamma - (\alpha + \beta + X'_{it-1}\gamma) - [(\alpha + \delta + X'_{it}\gamma) - (\alpha + X'_{it-1}\gamma)]$$

$= \tau$

Bear in mind that τ indicates no causal relationship. The factor that makes the coefficient τ equal the treatment effect ATT lies in an important assumption called parallel trend:

$$E(Y_{it}^0 - Y_{it-1}^0 | X_{it}, D_i = 1) = E(Y_{it}^0 - Y_{it-1}^0 | X_{it}, D_i = 0)$$

This assumption says that the change in outcomes over time that units in the treated group would have experienced if they had not participated in the treatment is the same as the change in outcomes that units in the untreated group experienced, holding constant X_{it}. The parallel trend assumption indicates unobserved factors exert the same influence on the treated group and control group. The difference between $E(Y_{0i} \mid X_i, D_i = 1) = E(Y_{0i} \mid X_i, D_i = 0)$ and $E(\Delta Y_{it}^0 \mid X_{it}, D_i = 1) = E(\Delta Y_{it}^0 \mid X_{it}, D_i = 0)$ is that ΔY_{it}^0 is incremental value while Y_{0i} is level value. The influence of unobserved characteristics could be eliminated in incremental value and thus CMI could be satisfied. The parallel trend assumption allows for the level of untreated potential outcomes to differ across groups. DID only requires individuals in the treated group and individuals in the control group to show similar increase (decrease) tendency when intervention was not implemented after controlling for observed characteristics. Parallel trend assumption can equivalently be represented as follows:

$$E(Y_{it}^0 | X_{it}, D_i = 1) - E(Y_{it}^0 | X_{it}, D_i = 0) = E(Y_{it-1}^0 | X_{it}, D_i = 1) - E(Y_{it-1}^0 | X_{it}, D_i = 0)$$

Under the parallel trend assumption, the ATT is identified and given by:

$$\begin{aligned}
&\tau_{ATT}(X_{it}) = E(Y_{it}^1 - Y_{it}^0 | X_{it}, D_i = 1) \\
&= E(Y_{it}^1 | X_{it}, D_i = 1) - E(Y_{it}^0 | X_{it}, D_i = 1) \\
&= E(Y_{it} | X_{it}, D_i = 1) - \left[E(Y_{it-1}^0 | X_{it}, D_i = 1) + E(Y_{it}^0 | X_{it}, D_i = 0) - E(Y_{it-1}^0 | X_{it}, D_i = 0)\right] \\
&= E(Y_{it} | X_{it}, D_i = 1) - E(Y_{it-1}^0 | X_{it}, D_i = 1) - \left[E(Y_{it}^0 | X_{it}, D_i = 0) - E(Y_{it-1}^0 | X_{it}, D_i = 0)\right] \\
&= E(Y_{it} | X_{it}, D_i = 1) - E(Y_{it-1} | X_{it}, D_i = 1) - [E(Y_{it} | X_{it}, D_i = 0) - E(Y_{it-1} | X_{it}, D_i = 0)] \\
&= \tau(X_{it})
\end{aligned}$$

That is to say, the ATT is equal to τ, the coefficient of the interaction term. The latter term, under the parallel trend assumption, is what the path of outcomes for units in the treated group would have been if they had not participated in the treatment.

Most notably, in settings where there are more than two units and two time periods, the regression DID model usually takes the following two-way fixed effect form (A. C. Baker et al., 2022):

$$Y_{it} = \alpha + \tau D_{it} + X'_{it}\gamma + \lambda_i + \nu_t + \varepsilon_{it}$$

where λ_i controls for variables that are constant over time but differ across entities and ν_t controls for variables that are constant across entities but evolve, $D_{it} = D_i * T_t$ is an indicator for a treated unit in treated periods, the main effects for D_i and T_t are subsumed by the unit and time-fixed effects. Besides, the regional fixed effect could also be added to control for time-invariant regional characteristics:

$$Y_{it} = \alpha + \tau D_{it} + X'_{it}\gamma + \lambda_i + \nu_t + \theta_c + \varepsilon_{it} \quad (4.1)$$

Equation (4.1) is the basic DID model I will use for the empirical analysis, mainly in Chapter 6, where the effect of owner-occupation on net worth holdings; and in Chapter 8, where the effect of owner-occupation on non-housing wealth holdings.

Similar to the DID model, the fixed-effect model will also be employed in some empirical analysis, such as robustness checks in Chapters 6 to 8 and as the main model in Chapter 7:

$$Y_{it} = \alpha + X'_{it}\gamma + \lambda_i + \nu_t + \theta_c + \varepsilon_{it} \quad (4.2)$$

4.4.2 Logit model

For a limited dependent variable (y=1 or y=0), the linear probability model goes like this:

$$Y_{it} = \beta_0 + X'_{it}\beta + \varepsilon_{it}$$

However, the predicted values are not going to be 0 or 1, or even restricted to between 0 and 1. Assume when $\beta_0 + X'_{it}\beta + \varepsilon_{it} > 0$, Y_{it}=1 and when $\beta_0 + X'_{it}\beta + \varepsilon_{it} \leq 0$, Y_{it}=0. Thus,

$$\Pr(Y_{it} = 1) = Pr(\beta_0 + X'_{it}\beta + \varepsilon_{it} > 0) = \Pr(\varepsilon_{it} > -(\beta_0 + X'_{it}\beta)) = 1 - \Pr(\varepsilon_{it} \leq -(\beta_0 + X'_{it}\beta))$$

If the distribution of ε_{it} is symmetric, thus

$$\Pr(Y_{it}=1) = 1 - \Pr\left(\varepsilon_{it} \le -(\beta_0 + X'_{it}\beta)\right) = \Pr\left(\varepsilon_{it} \le (\beta_0 + X'_{it}\beta)\right) = F(\beta_0 + X'_{it}\beta)$$

If we assume it is the cumulative distribution function of logistic distribution, then we can get:

$$\Pr(Y_{it}=1) = F(\beta_0 + X'_{it}\beta) = \frac{\exp\left(\beta_0 + X'_{it}\beta\right)}{1 + \exp\left(\beta_0 + X'_{it}\beta\right)}$$

Thus,

$$\Pr(Y_{it}=0) = 1 - \Pr(Y_{it}=1)$$

$$= 1 - \frac{\exp(\beta_0 + X'_{it}\beta)}{1 + \exp(\beta_0 + X'_{it}\beta)}$$

$$= \frac{1}{1 + \exp(\beta_0 + X'_{it}\beta)}$$

Thus,

$$\frac{\Pr(Y_{it}=1)}{\Pr(Y_{it}=0)} = \frac{\exp\left(\beta_0 + X'_{it}\beta\right)}{1 + \exp\left(\beta_0 + X'_{it}\beta\right)} \Big/ \frac{1}{1 + \exp(\beta_0 + X'_{it}\beta)}$$

$$= \exp(\beta_0 + X'_{it}\beta)$$

Thus,

$$Log\frac{\Pr(Y_{it}=1)}{\Pr(Y_{it}=0)} = \beta_0 + X'_{it}\beta \qquad (4.3)$$

The logit model is useful when dealing with the binary dependent variable. Equation (4.3) is the one I use for the estimation of the Logit model. From this equation, it is easy to recognise that the coefficient β, which indicates the logarithm of the odds ratio, $\frac{\Pr(Y_{it}=1)}{\Pr(Y_{it}=0)}$, is not what we are interested in. Therefore, the marginal effect will be estimated in most cases when the Logit model is used, mainly in Chapter 7, where the relationship between housing debt ownership and first-time purchaser, multiple-property owner, and trading up is estimated in the robustness check; in Chapter 8, where the effect of owner-occupation on the

participation of financial investment and business investment and wealth effect through which homeownership would influence non-housing wealth will be examined; in Chapter 9, where how past housing experience would influence future housing trajectory will be investigated.

4.4.3 Tobit model

Given that a large number of households do not own any risky investments (including high-risk investments and low-risk investments), these variables take on the value of zero with positive probability, but other values are continuous. In Chapter 17, Wooldridge (2010, p.667) elaborates on the models for limited dependent variables that are featured by both continuous and discrete random variables. When a variable takes on the value zero with positive probability, but other values are continuous, this variable is called corner solution response or corner solution outcome. The model is also called the censored regression model in most economics' cases, although Wooldridge argues this is where the label "censored regression" is least appropriate. Thus, the linear regression could produce inaccurate results (Baldwin et al., 2016). In that case, the Tobit model is recommended in most cases.

$$Y_{it}^{*} = \beta_0 + X_{it}'\beta + \varepsilon_{it} \tag{4.4}$$

$$Y_{it} = \begin{cases} Y_{it}^{*}, & if\ Y_{it}^{*} > 0 \\ 0, & if\ Y_{it}^{*} \leq 0 \end{cases}$$

Equation (4.4) will be employed in Chapter 8, where the effects of owner-occupation on financial wealth and business wealth will be examined. The Tobit model requires that the residuals are normally distributed and homoscedastic. Researchers must be cautious when applying the Tobit model (Boulton & Williford, 2018). On the other hand, there are two types of zeros: censored zeros and true zeros. The true value could be negative, however, due to a measurement instrument they are displayed as zeros. The other one is true zeros, representing individuals' true standing. The Tobit model is more appropriate for the first type of zeros. However, it is not always clear whether zeros are censored or true. Another consideration is that the Tobit model may not adequately account for excessive numbers of zero values as compared to the two-part model or Poisson model.

When the response is nonnegative and takes a lot of zeros, the fixed effects Poisson estimator is often the most convincing. The outcome need not be a count variable. Because of the

multiplicative heterogeneity, it accommodates units with lots of zeros as well as those with large outcomes (Wooldridge, 1999). Nichols (2010) argues that although there are many models for nonnegative outcomes, few have the robustness of the Poisson model. Considering the benefits of the fixed effects Poisson model, I employ the Poisson model as well to estimate the impacts of owner-occupation on the risky investment in Chapter 8.

To make the discussion in the remainder of this chapter as clear as possible, Table 4-1 provides a summary of the separate empirical investigations that are carried out in Chapters 6 to 9. It details the sources of data that are involved, the main dependent variables that are analysed, and the main quantitative methods that are applied. To recapitulate, in Chapter 6, which illustrates the relationship between owner-occupation and net worth, DID models are employed to get the causal link. In addition, this chapter also uses fixed-effect models to conduct robustness checks. Chapter 7 examines housing wealth accumulation patterns, through which homeowners receive their favourable status in wealth holdings over tenants. In this chapter, the fixed-effect model is mainly utilised and in the part of robustness checks, general regression models and extra Logit models are used. Similar to Chapter 6, DID model and fixed effect model are employed in Chapter 8. In addition, considering the special characteristics of financial data and business data, the Logit model, Tobit model and Poisson model are also employed in this chapter. A Logit model is mainly used in Chapter 9, to explore the relationship between past housing experiences and future housing plans.

Table 4-1. Summary of analysis by chapter

	Data source	Outcome variable	Main methods
Chapter 6	CHFS	Net worth	DID/ Fixed effect model
Chapter 7	CHFS/CHCS	Housing wealth	Fixed effect model/Logit model
Chapter 8	CHFS	Non-housing wealth, including financial wealth and business wealth	DID/Fixed effect model/ Logit model/Tobit model/Poisson model
Chapter 9	CHCS	Housing trajectory	Logit model

4.5 Conclusion

This chapter discussed the theoretical framework and research methods employed in this thesis. A quantitative research approach will be employed, aiming to investigate the effects of homeownership on wealth accumulation (net worth, housing wealth and non-housing wealth) and housing strategies used by households in China. Based on the need to answer the research questions and the data characteristics, a mix of econometric models is deployed in different chapters. More detailed econometric models are introduced in each chapter. Following this chapter, Chapter 5, describes the key data sources, data cleaning process, key variables, and descriptive statistics.

Chapter 5 Data and variables

5.1 Introduction

As stated in previous chapters, this thesis aims to examine the effects of homeownership on wealth accumulation in China. The methodology chapter outlined the theoretical framework and the econometric modelling applied to the data collected for this thesis. This chapter highlights that data by describing various data sources and data characteristics in detail. The main data source in this thesis is the China Household Finance Survey (CHFS). This dataset will be used in Chapters 6 through 8. The Chinese Housing Consumption Survey (CHCS) constitutes another data source, and it will be used in Chapters 7 and 9. The chapter is structured as follows: Section 5.2 discusses data from CHFS. The subsequent section 5.3, illustrates another data source, CHCS. Section 5.4 finalises this chapter.

5.2 Data source 1: China Household Finance Survey

The CHFS has been widely used in prior research on the explorations of assets and liabilities. The CHFS is conducted by the Research Institute of Economics and Management of the Southwestern University of Finance and Economics. As the first nationally representative survey in China on household finance (L. Gan et al., 2014), the CHFS is well known for its scientific survey design and data collection, low rejection rates (11.6%), and high-quality control (Z. He et al., 2019). The thesis takes advantage of the data.

The CHFS is composed of four sections of information for each household. The first contains socioeconomic and demographic information, including hukou status, hukou registration places, age, gender, marital status, educational level, profession, and income. The second part reports detailed information on households' assets and liabilities. The financial assets include cash, bank current accounts, bank savings accounts, money lend-out, bonds (treasury bonds and corporate bonds), bank financial products, stock type mutual funds, and stocks, including listed shares and non-listed firms, while the nonfinancial assets include farming assets, business assets, housing assets, and land. Liabilities include home mortgage loans, car loans, education loans, and credit card loans. As regards housing assets, the data records household housing characteristics, and the self-reported market value for up to three housing units. The third part of the survey includes information related to the household social security and insurance status and the fourth gives details on households' expenditures.

CHFS conducts a random sampling of the household finance survey every other year since 2011 with the latest survey completed in 2019. This survey contained 8,438 sample households in 2011, involving 320 communities in 80 counties, both rural and urban, across all 25 provinces. The second round of the survey was conducted in 2013, with the larger sample of households, 28,141, located in 1,048 communities, in 267 counties, across 29 provinces. In 2015 the sample size was further expanded to 37,289 households, covering 1396 communities, 351 counties, and 29 provinces. In 2017, the sample size was 40,011 households. Some households appear in all the surveyed years, allowing me to build a panel dataset. Panel data can help to estimate the effect of homeownership on wealth accumulation for a representative sample of renters who become homeowners at different points.

5.2.1 Data cleaning process

Next, how data is dealt with is discussed. Household-level data and individual-level data are separate in both surveys. Therefore, individual-level data need to be matched with household-level data through household ID. In CHFS, the household head refers to the main bearer of the family's source of finances. In that case, the respondent could be different from the household head. Every household has been assigned a household head every survey year and the household head could be different for a household in different years. As some important questions are only answered by respondents and their spouses, the samples are restricted to households in which the head is either respondent or their spouse. Then these individual-level data are matched to household-level data in every survey year. Because of the relatively small sample size in 2011, only three rounds of the survey data are available for my study (2013, 2015, 2017). A panel dataset could be constructed through these households. At last, there are 13,512 households and 40,536 observations which appeared in all three rounds of the survey.

Several criteria are utilised to develop the analysis samples. First, to keep the treatment group and control group comparable, only households who reported they were renters in 2013 were retained, which restricts the samples to consist of 1,698 households and 5,094 observations. Second, based on wealth consumption empirical results, people tend to show no significant wealth accumulation before their 20 years old and begin to consume the wealth they collect during their working times after retirement. Therefore, the sample is restricted to household heads between 20 and 65 years old to avoid different wealth accumulation behaviours during school or after retirement. There are three households in the sample whose household head

is younger than 20 years old and 436 households in which the head is elder than 65 years old. 1259 households are left after deleting these observations. It is noteworthy here that the household head in one household in this survey could be different in different periods since the household head in this survey refers to the main bearer of the family source of finances. However, no differences are made in the second step when taking the difference of household heads into account. Third, the high homeownership rate (around 97%) features rural areas in China which makes it difficult to find the appropriate control groups; residents here experience significantly fewer wealth increases than residents in urban areas since most of them live in self-built houses; the housing market in rural China is under-developed and incomparable to the housing market in urban China; rural residents are much less likely to participate in financial investment and/or business investment. Therefore, I restricted my samples to urban households. Due to fast urbanisation in China or resettlement of some households, some households in different years could live in a rural area or urban area. Thus, those households who lived in rural areas for all the survey duration are deleted, which decreased the samples to 1,111 households and corresponding 3,333 observations. At last, I delete households whose key variables were absent. The final panel data consist of 998 households and 2,994 observations. This is the basic sample constructed from CHFS and we would execute empirical analysis and construct models.

5.2.2 Variable definitions

Independent variables

As emphasised above, the purpose of this thesis is to examine the effect of homeownership on wealth accumulation. Therefore, the main independent variable should be 'homeownership', which refers to whether the household owns houses (no matter whether they live or not). However, in light of that, the regional disparities of households will be investigated in this thesis, without considering the geographic features of houses may cause estimation bias, therefore in this thesis, instead, the main independent variable will be 'owner-occupation', which is equal to 1 if the household owns the house they live in and equals 0 if the household's current residence is rented. In this case, 'owner-occupation' could be distinguished from 'homeownership', as we mentioned in Chapter 2. As 'homeownership' is also critical, and constantly being used interchangeably with 'owner-occupation', the analysis of 'owner-occupation' will be accompanied by the examination of 'homeownership' in most cases, as a type of robustness check in the empirical analysis.

Although these two terms are distinguished in this thesis, the use of 'owner-occupation' as the main explanatory variable rather than 'homeownership' follows the common practice in theory and empirical analysis in prior studies, where 'homeownership' and 'owner-occupation' are employed interchangeably. On the other hand, to my best knowledge, few prior studies recognise the distinction between 'homeownership' and 'owner-occupation'. This differentiation will first make people realise the existence of an emerging phenomenon, namely, 'owning-renting' (Y. Huang et al., 2020b), as a result of mismatches caused by socio-economic reasons. It would also empirically, examine the different effects of homeownership and owner-occupation, although the difference could be expected to be small.

Another important independent variable is 'years since purchase'/ 'years own'. 'Years since purchase' is the number of years since first purchase of a house. In reality, some owners will revert to renting so that the total years of owner-occupation/ homeownership for these households will be less than the years since first purchase. Therefore, I also estimate the regression of wealth in the years of owner-occupation/homeownership, 'years own'. In some influential studies, this variable has been widely used (e.g., Di et al., 2007; Wainer & Zabel, 2020). In this paper, 'years since purchase'/ 'years own' will be utilised in some chapters, as a robustness check (Chapter 6) or as a main independent variable (Chapter 7).

Dependent variables

It is important to mention that the empirical measurement of wealth is challenging (Causa et al., 2019). Net wealth is the sum of assets minus liabilities. In this thesis, the logarithm of net worth is additionally employed to lower the influence of measurement error and, as noted in Chapter 4, 1 unit is assigned to cases with zero or negative values to avoid the loss of the cases when using the log form.

Of all the household assets, housing assets, financial assets and business assets are the main components. More specifically, in this thesis, housing assets are the sum of the following assets: primary residence and other real estates. Financial assets include cash, saving deposits, stocks, bonds, funds, derivatives, wealth management, foreign currency assets, gold, other financial assets, and lending. Based on risk, I decompose financial assets into risky investments and risk-free financial wealth (including cash, saving deposits, other financial assets, and lending). Risky investments can be further divided into two types: high-risk investments including stocks, funds, derivatives, and foreign currency assets; and low-

risk investments consisting of bonds, wealth management, and gold. Business assets include the business projects that the household members participate in. Liabilities include mortgage loans and non-mortgage loans. Correspondingly, housing wealth is defined as property value minus outstanding mortgage debts. Financial wealth is defined as the total amount of financial assets net of debts related to financial assets. Business wealth refers to the equity in self-owned enterprises.

Covariates

Some important control variables will be introduced in this section.

Gender - Rossi and Sierminska (2018) showed that women tend to accumulate more than men. Women are more inclined to wealth accumulation, a pattern possibly driven by relatively higher risk aversion, which, in turn, boosts savings. Both Bian and Lu (2014) and X. Huang et al. (2014) confirm that homeownership is affected by gender. So, the gender of the household head will be included.

Age and Age-squared – Age seems to correlate with wealth accumulation and homeownership at the same time. Homeownership has shown to be most beneficial for wealth accumulation when houses are purchased at a young age (U. Kuhn & Grabka, 2018). Age would be an important symbol of wealth. It generates an age profile for savings (Modigliani, 1988; Turner & Luea, 2009). On the other hand, being a homeowner is also concomitant with age due to the effect on the relationship with family formation (G. Chen, 2016; Y. Huang & Clark, 2002). It is also possible that age is nonlinear with wealth thus age-squared is added as a control variable. Thus, I specify both age and age-squared to capture linear and nonlinear life cycle and cohort effects.

Children and Children's Gender - The competitive saving motive is a saving-related hypothesis recently proposed by S. Wei and Zhang (2011) and reinforced by Du and Wei (2013), who use the competitive saving motive to explain the high savings in China. This motive is argued to arise because bridegrooms' parents increase their savings to ensure grooms' success in an increasingly competitive marriage market as the sex ratio increases due to the one-child policy in Maoist time, whereas the parents of brides keep their savings rate constant due to offsetting forces stemming from increased savings from the future husbands and maintaining girls' bargaining power in the new family. This hypothesis implies

that a family would change its saving behaviours once they have a child and the gender of a child.

Family Size – The bigger the family is, the more likely they accumulate more wealth for precautionary savings and children's education (Cagetti, 2003). Simultaneously, household size was found to be a significant predictor of homeownership (Bian & Lu, 2014; G. Chen, 2016; X. Huang et al., 2014; Y. Huang & Clark, 2002; Y. Huang & Jiang, 2009; Z. Wei et al., 2020). Family size is defined as the number of family members.

Marital Status - Marital status has been acknowledged to significantly influence housing choices (Bian & Lu, 2014; Y. Huang & Clark, 2002; Y. Huang & Jiang, 2009; S.-M. Li & Li, 2006; Z. Wei et al., 2020; Yi & Huang, 2014) as well as wealth accumulation for precautionary reasons. Household head marriage status is equal to one if the household head is married and zero otherwise.

Income – Intuitively, income is an important determinant of wealth and homeownership. The importance of income has been long proved in prior research (Bian & Lu, 2014; G. Chen, 2016; L. Gan et al., 2014; X. Huang et al., 2014).

Education - Milton Friedman introduced the permanent income hypothesis (PIH). According to PIH, individuals' current consumption levels are not only determined by their current income, but also by the expected level of income over their lifetimes. To achieve maximum utility, households attempt to smooth their consumption over their lifetime (Friedman, 1957). An individual's permanent income almost entirely depends upon their human capital endowment or ability to earn and may be proxied by the individual's highest education level attained. Education levels and qualifications may affect a household's ability to save and thus influence wealth accumulation (Bastagli & Hills, 2012). In China, education attainment is a critical factor in defining housing behaviour (Bian & Lu, 2014; G. Chen, 2016; X. Huang et al., 2014; Y. Huang & Jiang, 2009; S.-M. Li & Li, 2006; Ren & Hu, 2016; Z. Wei et al., 2020; Yi & Huang, 2014). Thus, the education of the household head will be controlled for.

Gift - Intergenerational transfers represent an injection of resources increasing household wealth if not consumed immediately and are important for wealth accumulation. Family resources are increasingly important in determining who gets into homeownership and who remains on the outside (Forrest & Hirayama, 2015). Unexpected changes in wealth in the forms of gifts and inheritance could impact homeownership, which would mislead to a

positive bias as the purchase of a home 'appears' to increase wealth (Wainer & Zabel, 2020). In China, some scholars have emphasised the importance of parental financial support in accessing homeownership (Or, 2018; Z. Yu, 2020). I will control for the number of gifts and financial support received from parents or grandparents.

Financial attention, Financial background, and Financial literacy - Financial knowledge represents one important factor in shaping portfolio and wealth accumulation (Rossi & Sierminska, 2018; van Rooij et al., 2012). For instance, the question on financial attention asks the extent to which the respondent is concerned about economic and financial information.

Risk attitude – Vestman (2019) highlights households' joint exposure to the housing and stock markets is a result of self-selection and predetermined by risk preference. Therefore, it appears necessary to keep constant risk preference. Conventionally, risk preference could be divided into risk appetite, risk-averse and risk-neutral. In CHFS, the risk attitude question asks what the respondent would choose between a lottery with 100% shot at 4000 RMB and another with 50% shot at 10,000 RMB and 50% shot at 0.

Saving –Lersch and Dewilde (2018) emphasise that homeowners are better savers compared to renters. The relationship between homeownership and wealth is a result of self-selection. Thus, it is necessary to control for saving propensities. In this thesis, I will use the difference between total household income and total household expenditure to substitute saving propensity and initial wealth level.

Parental characteristics - In previous research, the effects of parental characteristics on the relationship between homeownership and wealth have never been discussed. It has been reported that parents' homeownership and socioeconomic status (such as hukou status, party membership, educational attainment, and occupational type) influence young adults' housing attainment (C. Cui et al., 2020). All these factors may also affect a household's ability to accumulate wealth. Therefore, I would set a few variables for the father's characteristics of household heads: Hukou, Party, and Employment Type.

Region Characteristics - Homeowners in different regions experience different wealth accumulation. There is an increasing disparity in the growth rate of housing prices between coastal and inland regions (Shih et al., 2014). For households in the eastern part of the country, house prices exhibited stronger dynamics in these parts, while in central and western

China, house price appreciation was not so pronounced. In this paper, the region in China will be divided into eastern China, middle China, and western China.

Institutional characteristics such as hukou status, working in state/government and public organisation, and party membership and access to HPF still play a vital role in access to homeownership (Clark et al., 2021; W. J. Deng et al., 2016; Y. Huang, 2004; Y. Huang & Clark, 2002; Y. Huang & Jiang, 2009; S.-M. Li & Li, 2006), particularly for migrants to access to subsidised housing (C. Cui et al., 2015; Y. Fang & Zhang, 2016). It is also possible that these factors will contribute to wealth accumulation patterns since wealth received early in life self-accumulates generally higher returns on capital than labour (Piketty, 2018). A few variables proxying institutional characteristics of household heads will be included: Native, Hukou, Work unit, and Party_CCP.

Native and Hukou – In my analysis, hukou status and migration are separated. China's hukou system places institutional barriers based on two classifications: hukou type (urban vs. rural) and hukou location (local vs, non-local) (W. Wu, 2006). Thus, in this thesis, hukou will be defined as disparities between urban residents and rural residents, while migration will be defined according to residents and non-local residents. Prior studies in China mainly focus on migration status. It may be not significant in predicting homeownership in less-developed municipalities, but having local hukou still significantly affects homeownership attainment in more-developed municipalities which are the most attractive places to migrants (X. Huang et al., 2014).

Work unit – Job stability is closely related to wealth accumulation, according to precautionary saving. The precautionary saving hypothesis highlights the importance of income uncertainty and job insecurity (Blanchard & Giavazzi, 2006). In general, this means the job insecurity in terms of working in government institutions or working in private sectors could explain part of the high savings rate in China's context. A household head working in a government institution or state-owned enterprise would be a symbol of job stability.

Party_CCP – Sato (2006) showed that meritocracy (measured by years of education) and political status (measured by CCP membership) had different effects on housing inequality. Meritocracy only mattered for households in the private sector, whereas political status had a positive and statistically significant effect on households in the public sector.

Table 5-1 lists the variable definitions used in CHFS.

Table 5-1. CHFS: variable definitions

Variables	Description
Gender	Household head's gender (1=male, 0=female)
Age	Household head's age
Age-square	The square of the household head's age
Marital status	Household head's marriage status
Unmarried	1=single/living together, 0=others
Married	1=married, 0=others
Divorced	1=divorced/window, 0=others
Party_CCP	Household head's party membership (1=CCP member, 0=others)
Native_city	Migration status of household head 1 (1= hukou in the municipality stayed, 0=others)
Native_province	Migration status of household head 2 (1= hukou in the province stayed, 0=other)
Hukou_unify	Household head's Hukou 1 (1= agricultural hukou before unifying, 0=others)
Hukou_transform	Household head's Hukou 2 (1= agricultural hukou before transformation, 0=others)
Education_ jhs	Household head's education (1=illiteracy/elementary school/junior high school, 0=others)
Physical status	Household head's self-reported health status
Good	1=good health, 0=other
Average	1=average health, 0=other
Bad	1=bad health, 0=other
Financial attention	Household head's attention to financial news (1-5 levels, 1= very care, 5=pay no attention)
Financial background	Household head's financial background (1=yes, 0=no)
Financial literacy	Household head's total scores in three questions about financial knowledge
Risk attitude	The level of risk appetite for the head of household (1=high risk, 2= average risk, 3=low risk)
Work status	Vocation type of the head
Employee	1=work as an employee, 0=others
Employer	1=work as an employer, 0=others
Agriculture	1=work as a farmer, 0=others
Other	1=work as other vocation, 0=others
Job status	Job status of household head
Having a job	1=have a job at present, 0=others
Unemployment	1=being unemployed and tend to find a job, 0=others
Exit	1=exit labour market, 0=others
Work unit	Household head working in governments/institutions/state-owned enterprises (1=yes, 0=no)
Party_parent	Household head's father's party membership (1=head's father is a CCP member, 0=other (if vacant, use mother's values))

(*Continued*)

Table 5.1 *(Continued)*

Variables	Description
Hukou_parent	Household head's father's hukou (1= head's father has agricultural hukou, 0=others (if vacant, use mother's values))
Employmenttype	Vocation type of the head's father (if vacant, use mother's values)
Parent1	1=parent was self-employers, 0=others
Parent2	1=parent was self-employers, 0=others
Parent3	1=parent was farmer, 0=others
Parent4	1=parent worked as other vocation, 0=others
Household income	Total household income
Low income	A household that has less than 120% of the median income in all survey periods belongs to the low-income group (1=yes, 0=no)
Family size	The number of family members
Child number	The number of children
Boy number	The number of male children
Whether boy	The household has male child/children (1=yes, 0=no)
Whether debt	The household has housing debts (1=yes, 0=no)
Gift	The amount of the money that the households received from parents
Saving	The difference between total household income and total household consumption
GDP per capita	GDP per capita at provincial level
Urbanisation	Urbanisation rate at the provincial level
Region	The location of the province
East	1=living in eastern China, 0=others
Middle	1=living in middle China, 0=others
West	1=living in western China, 0=others
Owneroccupation	The household lives in an owner-occupied house (1=yes, 0=no)
Homeownership	The household owns houses (1=yes, 0=no)
Years since purchase	The number of years since first purchase of a house
Years own	The number of years of owner-occupation/homeownership
Asset	Total household assets
Asset_housing	The total amount of housing assets
Asset_other	The number of assets without housing
Asset_business	The number of company assets
Asset_financial	The amount of all the financial assets including cash, saving deposits, stocks, bonds, funds, derivatives, wealth management, foreign currency assets, gold, other financial assets, and lending
Asset_risky investment	The amount of high-risk investment and low-risk investment
Asset	Total household assets
Asset	Total household assets
Asset_housing	The total amount of housing assets
Asset_other	The number of assets without housing
Asset_business	The number of company assets

(*Continued*)

Table 5.1 *(Continued).*

Asset_financial	The amount of all the financial assets including cash, saving deposits, stocks, bonds, funds, derivatives, wealth management, foreign currency assets, gold, other financial assets, and lending
Asset_risky investment	The amount of high-risk investment and low-risk investment
Asset_high-risk investment	The number of stocks, funds, derivatives, foreign currency assets
Asset_low-risk investment	The number of bonds, wealth management, and gold
Risk-free financial wealth	The amount of non-risky financial assets including cash, saving deposits, other financial assets, and lending
Debt_other	The number of debts without housing debts
Debt_business	The number of debts in business
Debt_financial	The number of debts in financial assets
Wealth	The difference between total assets and total debts
Log wealth	The logarithm of wealth
Wealth_housing	The difference between housing assets and housing debts
Wealth_other	The difference between other assets and other debts
Wealth_business	The difference between business assets and business debts
Wealth_financial	The difference between financial assets and financial debts
Wealth_risky investment	The difference between risky investments and financial debts
Wealth_high-risk investment	The difference between high-risk investment and debts of high-risk investment
Wealth_low-risk investment	The difference between low-risk investment and debts of low-risk investment

Note: GDP per capita and Urbanisation come from China Statistical Yearbook.

5.2.3 Descriptive statistics and a general picture

In CHFS, as shown in Table 5-2, 70.8% are male heads and the average age of the household heads is 45.29 years old. Consistent with expectations, about 84.8% of heads are married. 12.7% of heads are CCP members. In this sample, most residents have local municipal hukou (73.9%) and local provincial hukou (85.4%). About half of the heads own agricultural hukou before they transformed their hukou status from agricultural hukou to non-agriculture hukou. About half of the heads have an education level less than junior high school. Regarding health status, most people felt they are healthy. When considering the financial background, about 10% had an educational experience in economics or finance. However, average financial knowledge is a bit low. Most households are risk averse. About 20% of heads are self-employers. Most heads (63.1%) make a living as an employee and about one-third of these people work in governments, institutions, or state-owned enterprises. In terms of heads' parents, less than 8% are CCP members. In general, the average household income is ¥70,970 (all price variables deflated in 2009 price). A typical household in China comprises

3.04 members and 1.12 children. Half of the households own at least one male child. Concerning assets and wealth, most households concentrate their assets on housing, accounting for 61.42% of total assets and concentrate their financial assets on cash, deposit, and lending, rather than financial investments. Correspondingly, housing wealth accounts for about 60% of total wealth.

Table 5-2. CHFS: descriptive statistics of main variables

Variable	Obs	Mean	Std.Dev.	Min	Max
Asset	2,994	587.3	1282	0	22597
Asset_housing	2,994	360.7	815	0	12164
Asset_other	2,994	226.6	729.3	0	18460
Asset_financial	2,994	83.81	226.3	0	3641
Asset_risky investment	2,994	27.84	139.2	0	2959
Asset_high-risk investment	2,994	17.37	99.24	0	1624
Asset_low-risk investment	2,994	10.47	73.51	0	1792
Risk-free financial wealth	2,994	55.97	130.5	0	2029
Asset_business	2,994	35.46	280	-158.1	7915
Wealth	2,994	532.7	1206	-486.7	22597
Wealth_housing	2,994	321.6	742.5	-249.5	12164
Wealth_other	2,994	211.1	714	-494.2	18460
Wealth_financial	2,994	88.76	246.2	-69.48	3641
Wealth_risky investment	2,994	27.7	139	-87.67	2959
Wealth_high-risk investment	2,994	17.3	99.14	0	1624
Wealth_low-risk investment	2,994	10.4	73.32	-87.67	1792
Wealth_business	2,994	19.92	269.4	-1014	7835
Head male	2,994	0.708	0.455	0	1
Age	2,994	45.29	10.61	21	65
Age_square	2,994	2164	948.3	441	4225
Marriage_married	2,994	0.848	0.359	0	1
Marriage_ divorced	2,994	0.0855	0.28	0	1
Party_CCP	2,994	0.127	0.333	0	1
Native_city	2,994	0.739	0.439	0	1
Native_province	2,994	0.854	0.353	0	1
Hukou_unify	2,994	0.394	0.489	0	1
Hukou_transform	2,994	0.502	0.5	0	1
Education_ jhs	2,994	0.531	0.499	0	1
Physical status_good	2,994	0.479	0.5	0	1
Physical status_bad	2,994	0.129	0.335	0	1
Finance attention	2,994	3.706	1.068	1	5
Finance background	2,994	0.0835	0.277	0	1
Finance literacy	2,994	1.078	0.868	0	3
Risk attitude	2,994	2.535	0.699	1	3

(*Continued*)

Table 5.2 *(Continued).*

Variable	Obs	Mean	Std.Dev.	Min	Max
Work status_employee	2,994	0.631	0.483	0	1
Work status_employer	2,994	0.199	0.4	0	1
Work status_farmer	2,994	0.0361	0.187	0	1
Job status_having a job	2,994	0.749	0.433	0	1
Job status_unemployment	2,994	0.0798	0.271	0	1
Work unit	2,994	0.3	0.458	0	1
Party_parent	2,994	0.0782	0.268	0	1
Household income	2,994	70.97	130.4	-242.5	2704
Family size	2,994	3.039	1.223	1	11
Child number	2,994	1.118	0.801	0	7
Boy number	2,994	0.625	0.633	0	4
Whether boy	2,994	0.548	0.498	0	1
Whether debt	2994	0.16	0.37	0	1
GDP per capita	2,994	50714	22939	20135	104605
Urbanisation	2,994	61.21	13.63	37.83	89.6
Gift	2,994	2.21	10.05	0	283.5
Saving	2,994	24.75	120.7	-580	2543

Notes: 1) ¥1,000. 2) all monetary variables are deflated by provincial consumer price indices with 2009 as the base year, i.e., setting 2009 CPI=100.

'Owner-occupation', which is defined as the households living in a house which belongs to themselves is the most critical explanatory variable in the empirical analysis. Table 5-3 shows the duration of owner-occupation. As presented in Table 5-3, of the whole basic sample in CHFS (998 households), 454 households (45.49%) are always renters from the survey year of 2013, 249 households (24.55%) have an experience of two-year owner-occupation and 295 households (29.55%) experienced four-year owner-occupation. The results for 'homeownership', which refers to households who own at least one property are reported in Appendix Table A5.1. Since some renters were homeowners in the first year of the survey, the whole basic sample is constituted of 654 households, much less than the sample of 'owner-occupation'. Of all these households, 205 households are always renters, 175 households have an experience of two-year homeownership and 274 households experienced four-year homeownership.

Table 5-3. Duration of owner-occupation for CHFS sample

Duration	Number of households	Per cent (%)
0	454	45.49
2	249	24.55
4	295	29.55
Total	998	100

With respect to the timing of entering owner-occupation (Table 5-4), 379 households (37.98%) became owner-occupiers in 2015. However, only 295 of these households (77.83%) retained their homeownership in 2017 and 84 households (22.17%) lost ownership of the house they had lived in. Of the remaining 619 households (62.02%) who are renters in 2015, 165 households (26.66%) become owner-occupiers in 2017 and 454 households (73.34%) are still renters. The results for homeownership are presented in Appendix Table A5.2. Of all these households (654 households), 336 households became homeowners in 2015 and 113 households became homeowners in 2017, while 62 households who became a homeowner in 2015 lost their homeownership in 2017. To conclude, the number of households who became a homeowner in 2015/2017 and who subsequently ceased to own is relatively similar.

Table 5-4. Timing of getting into owner-occupation for CHFS sample

	Owner-occupier	Renter	Per cent (%)
2013	0	998	0
2015	379	619	37.98
2017	460	538	46.09

As stated above, 379 households entered owner-occupation in 2015 and 165 households entered owner-occupation in 2017, which should have made the total number of owner-occupiers 544 households. This number is higher than 460, the final owner-occupiers at the end of 2017. This difference comes exactly from those who enter owner-occupation in 2015 while losing their owner-occupation in 2017.

Further, I examine the difference between owner-occupiers and renters. There is a total of 998 households in our CHFS samples. Of these, 544 households became owners in the survey year 2015 or 2017 whereas 454 households did not. The former group is referred to as the treatment group whereas the latter group is referred to as the control group. Table 5-5

gives the means for observable household characteristics for the treatment group (column 1) and the control group (column 2). The results differentiate the group who lived in their own house from the control group who were always renters. Additionally, one unanticipated finding was that both renters and owner-occupiers have assets and wealth in the form of housing. This is because, in this analysis, renters are defined as those who live in a house that they rent from someone or organisations so it is possible that they would own houses in other places where they do not live.

Table 5-5. Comparison of owner-occupiers and renters in CHFS

Variables	(1) Owner-occupier	Mean1	(2) Renter	Mean2	(3) Mean Diff	p-Value
Asset	1632	820.5	1362	307.8	512.7	0.00***
Asset_housing	1632	532.7	1362	154.6	378	0.00***
Asset_other	1632	287.9	1362	153.2	134.7	0.00***
Asset_financial	1632	102.7	1362	61.21	41.46	0.00***
Asset_risky investment	1632	38.05	1362	15.6	22.45	0.00***
Asset_high-risk investment	1632	24.12	1362	9.27	14.85	0.00***
Asset_low-risk investment	1632	13.93	1362	6.33	7.6	0.00***
Risk-free financial wealth	1632	64.62	1362	45.61	19.01	0.00***
Asset_business	1632	44.31	1362	24.87	19.44	0.06*
Wealth	1632	743.5	1362	280	463.5	0.00***
Wealth_housing	1632	471.4	1362	142.2	329.2	0.00***
Wealth_other	1632	272.2	1362	137.8	134.3	0.00***
Wealth_financial	1632	110	1362	63.25	46.79	0.00***
Wealth_risky investment	1632	37.97	1362	15.41	22.56	0.00***
Wealth_high-risk investment	1632	24.1	1362	9.16	14.94	0.00***
Wealth_low-risk investment	1632	13.87	1362	6.25	7.62	0.00***
Wealth_business	1632	72.07	1362	47.84	24.23	0.00***
Head male	1632	0.72	1362	0.7	0.02	0.21
Age	1632	44.99	1362	45.65	-0.65	0.09*
Age_square	1632	2143	1362	2188	-45.38	0.19
Marriage_married	1632	0.85	1362	0.84	0.02	0.24
Marriage_ divorced	1632	0.08	1362	0.1	-0.02	0.06*
Party_CCP	1632	0.16	1362	0.09	0.06	0.00***
Native_city	1632	0.82	1362	0.64	0.19	0.00***

(*Continued*)

Table 5.5 *(Continued).*

Variables	(1) Owner-occupier	Mean1	(2) Renter	Mean2	(3) Mean Diff	p-Value
Native_province	1632	0.92	1362	0.78	0.14	0.00***
Hukou_unify	1632	0.32	1362	0.48	-0.15	0.00***
Hukou_transform	1632	0.46	1362	0.56	-0.1	0.00***
Education_ jhs	1632	0.45	1362	0.63	-0.18	0.00***
Physical status_good	1632	0.5	1362	0.46	0.04	0.04**
Physical status_bad	1632	0.12	1362	0.14	-0.03	0.03**
Finance attention	1632	3.61	1362	3.82	-0.22	0.00***
Finance background	1632	0.1	1362	0.06	0.04	0.00***
Finance literacy	1632	1.18	1362	0.96	0.22	0.00***
Risk attitude	1632	2.5	1362	2.57	-0.07	0.01***
Work status_employee	1632	0.65	1362	0.61	0.04	0.02**
Work status_employer	1632	0.2	1362	0.2	0	0.75
Work status_farmer	1632	0.04	1362	0.03	0.02	0.01***
Job status_having a jo.	1632	0.76	1362	0.74	0.02	0.15
Job status_unemploy.	1632	0.08	1362	0.09	-0.01	0.32
Work unit	1632	0.33	1362	0.26	0.07	0.00***
Party_parent	1632	0.08	1362	0.07	0.01	0.2
Household income	1632	80.74	1362	59.27	21.47	0.00***
Family size	1632	3.02	1362	3.07	-0.05	0.24
Child number	1632	1.06	1362	1.19	-0.13	0.00***
Boy number	1632	0.62	1362	0.63	-0.01	0.63
Whether boy	1632	0.55	1362	0.55	0	0.91
GDP per capita	1632	49416	1362	52269	-2853	0.00***
Urbanisation	1632	60.49	1362	62.07	-1.58	0.00***
Gift	1632	2.67	1362	1.66	1.02	0.01***
Saving	1632	30.46	1362	17.92	12.55	0.00***

Note: ***$p < 0.01$, ** $p < 0.01$, ** $p < 0.1$.

Second, we consider the wealth changes (the main outcome variables) for different durations and timings of owner-occupation. The differences in the holdings of all kinds of wealth across durations are presented in Table 5-6. It is unsurprising to see that owner-occupation is associated with more wealth in all kinds of forms and the differences between them and renters are all statistically significant. In general, a longer duration of homeownership is positively correlated with wealth holdings, however, homeowners who stay in homeownership for 4 years are not likely to hold more risky investments (including high-risk investments and low-risk investments) than homeowners who only stay in homeownership for 2 years. The above results are supported by the evidence of the timing of owner-occupation in Table 5-7. Households who enter homeownership hold more wealth

than households who stay in rental markets, while the differences between earlier entry and later entry are not statistically significant.

Table 5-6. Duration of owner-occupation in CHFS

Variable	(1) Mean Renter	(2) Mean 2 years	(3) Mean 4 years	(4) Renter vs 2 years	(5) Renter vs 4 years	(6) 2 years vs 4 years
Wealth	280.03	584.85	877.47	304.82***	597.44***	292.62***
	(680.49)	(1056.66)	(1745.51)	(37.94)	(52.53)	(73.08)
Wealth_housing	142.19	383.70	545.33	241.50***	403.14***	161.64***
	(450.21)	(811.36)	(946.61)	(27.47)	(29.78)	(44.08)
Wealth_other	137.84	201.15	332.14	63.31***	194.30***	130.99***
	(373.35)	(456.14)	(1145.79)	(18.42)	(33.48)	(44.64)
Wealth_financial	63.25	102.24	116.62	38.99***	53.37***	14.38
	(175.36)	(268.32)	(308.57)	(9.70)	(10.23)	(14.45)
Wealth_risky investment	15.41	40.10	36.17	24.69***	20.76***	-3.93
	(87.90)	(181.45)	(158.92)	(5.87)	(5.22)	(8.43)
Wealth_high-risk investment	9.16	24.57	23.70	15.41***	14.54***	-0.87
	(56.86)	(111.12)	(133.01)	(3.66)	(4.08)	(6.13)
Wealth_low-risk investment	6.25	15.53	12.46	9.28***	6.21**	-3.07
	(50.69)	(94.51)	(81.56)	(3.16)	(2.79)	(4.36)
Risk-free financial wealth	47.84	62.14	80.46	14.30***	32.62***	18.32**
	(112.13)	(130.07)	(182.08)	(5.41)	(6.21)	(7.97)
Wealth_business	9.51	9.05	45.11	-0.46	35.60***	36.05**
	(225.13)	(118.50)	(393.72)	(8.84)	(13.08)	(14.95)
Observations	1,362	747	885	2,109	2,247	1,632

Notes: 1) standard errors for means and the difference in means in parentheses.

2) ***$p < 0.01$, ** $p < 0.01$, ** $p < 0.1$.

Table 5-7. Timing of getting into owner-occupation in CHFS

Variable	(1) Mean Renter	(2) Mean year2015	(3) Mean year2017	(4) Renter vs year2015	(5) Renter vs year2017	(6) year2015 vs year2017
Wealth	280.03	802.16	608.86	522.13***	328.83***	-193.30**
	(680.49)	(1635.86)	(1014.20)	(48.70)	(41.11)	(79.45)
Wealth_housing	142.19	508.45	386.14	366.25***	243.95***	-122.30**
	(450.21)	(948.49)	(734.71)	(28.96)	(28.38)	(47.88)
Wealth_other	137.84	293.71	222.72	155.88***	84.88***	-70.99
	(373.35)	(1024.95)	(508.15)	(29.90)	(21.70)	(48.48)
Wealth_financial	63.25	107.69	115.43	44.44***	52.18***	7.74
	(175.36)	(285.10)	(303.85)	(9.31)	(11.40)	(15.67)
Wealth_risky investment	15.41	33.28	48.74	17.87***	33.33***	15.46*
	(87.90)	(146.26)	(213.47)	(4.74)	(7.00)	(9.13)
Wealth_high-risk investment	9.16	21.51	30.04	12.35***	20.88***	8.53
	(56.86)	(120.07)	(130.77)	(3.66)	(4.37)	(6.65)
Wealth_low-risk investment	6.25	11.77	18.69	5.52**	12.44***	6.93
	(50.69)	(75.31)	(111.02)	(2.53)	(3.77)	(4.72)
Risk-free financial wealth	47.84	74.42	66.70	26.57***	18.85***	-7.72
	(112.13)	(169.32)	(138.49)	(5.67)	(6.28)	(8.65)
Wealth_business	9.51	34.42	15.25	24.91**	5.74	-19.17
	(225.13)	(350.79)	(128.21)	(11.62)	(10.70)	(16.22)
Observations	1,362	1,137	495	2,499	1,857	1,632

Notes: 1) Standard errors for means and the difference in means in parentheses.

2) ***$p < 0.01$, ** $p < 0.01$, ** $p < 0.1$.

5.3 Data source 2: Chinese Housing Consumption Survey

The city-level information is unavailable in CHFS for the sake of privacy. Within provinces, the economic situation varies by city, favouring capital cities for instance. Therefore, the effects of homeownership on wealth accumulation may display discrepancies among different cities. For example, households in first-tier cities and second-tier cities may accrue more wealth than households with similar characteristics in third-tier cities, and other-tier cities. The lack of city-level information makes it impossible to control for city-level characteristics which may cause endogeneity problems. Moreover, the data on housing purchase costs and housing trajectory of households are incomplete and unclear in this dataset. A dearth of data on housing purchase costs restricts the possibility of analysing the housing wealth accumulation patterns in Chapter 7. Without housing trajectory data, how housing wealth influences welfare and welfare strategies cannot be examined in Chapter 9.

Nonetheless, these restrictions could be lifted by another survey dataset, CHCS, which is conducted by the Collaborative Innovation Centre for China Economy and School of Economics of Nankai University. On the other hand, the data in CHCS could work as a source of robustness check for the main results found in CHFS. The combination of CHFS and CHCS improves the confidence in the empirical results.

The data collection of CHCS aims to explore housing consumption in urban China, hence only urban households are covered in this data. The CHCS conducted household surveys in 2015, 2016 and 2017. The first-round survey conducted in 2015 collects a sample of 2,053 households and 5198 family members. A total of 2,674 family household samples and 6,769 family member samples were collected in 2016. In 2017, there were 2,783 family household samples and 7,019 family member samples. It is worth mentioning here that the CHCS is only a cross-sectional dataset, which is one of its shortcomings.

Using CHCS, I compiled a comprehensive dataset that contained information on 4,440 households after executing the following sample restrictions. First, the sample is restricted to household heads between 20 and 65 years old to avoid different wealth accumulation behaviours during school or after retirement. Second, only households who stay for more than 6 months are retained. Third, households were dropped due to obvious errors (negative housing assets and negative wages). Fourth, observations with missing information on key variables were also dropped. Fifth, since housing wealth is exclusively owned by

homeowners, I excluded renters from this dataset. Most of the variables in CHCS are similar to that in CHFS. Some new variables are added, as shown in Table 5-8.

Table 5-8. CHCS: variable definitions

Variables	Description
Current housing value	total values of houses that household owns
Price appreciation	the difference between housing present value and housing purchase costs
Debt	a dummy variable indicating whether the household purchased the house with a mortgage loans
Sold house	a dummy variable denoting whether the household sold the houses in the past 5 years
Future selling	a dummy variable presenting whether the household have a plan to sell their houses in the future
Trading up	a dummy variable suggesting whether the household sold a house and purchased a bigger house than the original house
First-time homeowner	a dummy variable indicating whether the household was a first-time home buyer
Multiple property	a dummy variable denoting whether households own multiple properties
Purchase cost	the amount that households paid for buying the houses (including taxes and fees)
First-tier cities	Beijing, Shanghai, Guangzhou, and Shenzhen
Second-tier cities	autonomous municipalities (i.e., Chongqing and Tianjin) and the deputy provincial cities include Harbin, Changchun, Shenyang, Dalian, Jinan, Qingdao, Nanjing, Hangzhou, Ningbo, Xiamen, Wuhan, Chengdu, and Xi'an
Master	whether has a master's and above degree
Four college	whether has a four-year college degree
Three college	whether has a three-year college degree
Middle school	whether has a middle-school degree
Below middle school	education background below middle school
HPF_amount	the aggregate amount that the household has in their HPF saving account
HPF_owner_family	the number of family members that have HPF saving account
HPF_owner	a dummy variable indicating whether the household head has HPF saving account

Descriptive statistics of variables are shown in Table 5-9. Table 5-9 pictures the profile of homeowners in CHCS. Years since purchase in China is on average 10.92 years, and about 44% of homeowners have had housing debts at some point. More than half of the homeowners are first-time purchasers and about one-quarter of the households have multiple properties, which is consistent with Gan's (2018) result. About 18% of households sold houses in the past 5 years and about one in five households planned to sell one of their houses in the future. The samples are equally distributed among first-tier cities and second-tier cities and less distributed in other cities. The heads of households are about 42.15 years old and

less than half of them have a four-college educational background and above. Less than one in nine of the heads are migrants and one-third are CCP members. The majority of them have non-agricultural hukou and more than half of these homeowners worked in public sectors.

Table 5-9. CHCS: descriptive statistics of main variables

Variable	Obs	Mean	Std.Dev.	Min	Max
Current housing value	4,440	1438	2424	0.22	47000
Price appreciation	4,440	792.6	1786	-90	44996
Years since purchase	4,440	10.92	7.609	0	57
Debt	4,440	0.44	0.5	0	1
Sold house	4,440	0.18	0.39	0	1
Future selling	4,440	0.21	0.41	0	1
Trading up	4,440	0.13	0.34	0	1
First-time homeowner	4,440	0.55	0.49	0	1
Multiple property	4,440	0.262	0.44	0	1
Purchase cost	4,440	615.1	1064	0	37000
Region_east	4,440	0.385	0.487	0	1
Region_middle	4,440	0.387	0.487	0	1
First-tier city	4,440	0.114	0.317	0	1
Second-tier city	4,440	0.237	0.425	0	1
Family size	4,440	2.638	0.92	1	8
Child number	4,440	0.738	0.619	0	4
Gender	4,440	1.249	0.432	1	2
Age	4,440	42.15	9.031	20	65
Age_square	4,440	1858	733.9	400	4225
Master	4,440	0.0568	0.231	0	1
Four college	4,440	0.32	0.467	0	1
Three college	4,440	0.27	0.444	0	1
Middle school	4,440	0.312	0.463	0	1
Native_city	4,440	0.934	0.248	0	1
Native_province	4,440	0.973	0.161	0	1
Party_CCP	4,440	0.296	0.457	0	1
Hukou	4,440	0.172	0.377	0	1
Marriage_married	4,440	0.899	0.301	0	1
Work status_employee	4,440	0.739	0.439	0	1
Work status_selfemployer	4,440	0.156	0.363	0	1
Job status_have a job	4,440	0.945	0.227	0	1
Workunit_public	4,440	0.554	0.497	0	1
HPF_amount	4,440	0.802	3.385	0	120
HPF_owner_family	4,440	0.93	0.885	0	4
HPF_owner	4,440	0.598	0.49	0	1
Household income	4,440	130.1	209.2	0.002	8000

Note: ¥1,000.

5.4 Conclusion

Two data sources, CHFS and CHCS, used in this thesis were introduced in detail in this chapter. Variable definitions and descriptive summary were provided to picture the samples. 'Owner-occupation' and 'homeownership' are two important independent variables in this thesis. Background descriptive statistics on owner-occupation were also provided. Concerning assets and wealth, most households concentrate their assets on housing, accounting for 61.42% of total assets. In the main data source, about half of the samples are always renters from the survey year of 2013, about one quarter have an experience of two-year owner-occupation and about 30% experienced four-year owner-occupation. About one in ten households would escape from owner-occupation, entering tenancy again. Owner-occupiers are different from renters in almost every way. A longer duration of owner-occupation is positively correlated with wealth holdings, however, owner-occupiers who stay in ownership for 4 years are not likely to hold more risky investments (including high-risk investments and low-risk investments) than owner-occupiers who only stay in ownership for 2 years.

Data availability regarding housing is still a problem for housing research in China due to the short period of all kinds of survey data. Long-term longitudinal data are required for long-run effects research. This next chapter, 6, will start the empirical analysis using the model illustrated in Chapter 4 and the data described in Chapter 5.

Chapter 6 Owner-occupation and net worth

6.1 Introduction

The finding that homeowners have higher net wealth than renters is well-documented in prior studies (Belsky et al., 2005; Boehm & Schlottmann, 2008; Di et al., 2007; Wind & Dewilde, 2019). It has commonly been assumed in the literature that the favourable financial status of homeowners over renters comes from housing appreciation over the long term (Soaita et al., 2019), leverage and fixed commitments (Rossi & Sierminska, 2018) and a preferential tax system (L. S. Goodman & Mayer, 2018), while the requirements of extremely diligent savings and investment in a high yield instrument for renters to accrue the approximate amount of non-housing wealth are likely to be unrealistic (Beracha & Johnson, 2012; Z. Lin & Vandell, 2007; Somerville et al., 2007). However, these findings are mainly based on the experience of developed countries. Although some studies focusing on China's context do mention the positive effect of housing capital gains on accelerating the accumulation of household wealth (Knight et al., 2020; Y. Wang et al., 2020), most of these studies are a strand of literature on wealth inequality or income inequality in China. Few studies are concerned with the empirical relationship between homeownership and wealth gains. Using household-level survey data, this chapter addresses this gap in the research literature. This chapter presents evidence of the effects of the transition into homeownership on wealth gains, testing H1a and H1b. The specific research question that is associated with this stage of the analysis is as follows:

> [RQ 1] How is net worth affected by the transition into homeownership in urban China?

As the first part of the empirical analysis in this thesis, this chapter directly contributes to the literature on the effects of homeownership on wealth gains by introducing China's case. China's housing market experienced rapid price appreciation from 2009 to 2021. This situation provides a good opportunity to study the effects of the transition from renting to owning on wealth gains.

This chapter is also related to the strand of literature that examines the heterogeneity of homeownership on wealth gains across different groups. Factors such as income (Herbert & Belsky, 2008; Turner & Luea, 2009; Wainer & Zabel, 2020), location and neighbourhood

(Arundel & Hochstenbach, 2020), and ethnicity (Newman & Holupka, 2016) turn out to influence the response of wealth gains to homeownership. Most research in China examines how institutional characteristics and socio-economic characteristics and geographic factors influence wealth inequality and the inequality in access to homeownership (Y. Huang & Yi, 2011; S. Li & Zhao, 2008; Walder & He, 2014; Y. Wang et al., 2020; Q. Zhang et al., 2020), while few investigate how these factors interact with homeownership to generate a different picture of wealth gains.

The most difficult issue facing researchers when they attempt to disentangle the causal relationship between homeownership and wealth gains is endogeneity. Homeowners are distinguished from renters in many ways. Both home tenure choice and wealth are determined by observable and unobservable variables (Dietz & Haurin, 2003; Lersch & Dewilde, 2018; Vestman, 2019; Zavisca & Gerber, 2016). In addition, their relationship is also subject to the reverse causality between homeownership and wealth levels. To solve these problems, I begin by choosing households who were renters in the first survey year and observing their tenure and wealth trajectory over time, which could help to keep the balance of covariates between homeowners and renters by constructing a comparable treatment group (homeowners) and control group (tenants)and decrease the influence caused by endogeneity problems. Then DID model is used to solve the endogeneity problem.

Using DID model to control for selection bias and supported by meeting the requirement of a parallel trend assumption and a placebo test, a series of robustness checks, the results in this chapter show that the causal relationship between homeownership and wealth levels cannot be rejected. This chapter suggests that the transition into owner-occupation has a significantly positive effect on households' wealth gains. This chapter, using heterogeneous analysis investigates the effects of the interaction of transition into homeownership with socio-economic, parental, and geographic characteristics and finds that housing wealth increases vary by households' characteristics.

The chapter is organised as follows: Section 6.2 discusses the main identification strategy and empirical findings. As an indispensable component of this strategy, parallel trend assumption and placebo tests to improve confidence in the results are conducted in this section. Consistent with this purpose, a series of robustness checks are conducted in Section 6.3, and Section 6.4 examines some crucial heterogeneous effects. Section 6.5 concludes this chapter.

6.2 Methodology and main findings

6.2.1 Basic methodology

In this section, I develop an empirical model of the relationship between owner-occupation and net worth accumulation. The basic conceptual model is based on an intent-to-treat framework. Our objective is to compare renters at T_{n-1} who become owner-occupiers at T_n, $T_{n+1}, T_{n+2}, \ldots T_k$ (k is the end of the survey year) to those still renting at these times. Once households become owner-occupiers, they will always be treated as the treatment group. The primary identification strategy is DID model. DID controls for time-invariant differences by computing the difference in outcomes before and after treatment for both the treatment (becoming owner-occupiers at different points in time) and comparison (renter) groups. In settings where there are more than two units and two time periods, the general regression DID model usually takes a two-way fixed effect form (A. C. Baker et al., 2022). To control for region-invariant characteristics, the city-level fixed effect is also included. Our basic model is estimated as:

$$Wealth_{it} = \alpha + \beta Owneroccupation_{it} + X'_{it}\delta + \gamma_i + \lambda_t + \theta_c + \varepsilon_{it}. \quad (6.1).$$

In Equation (6.1), $Wealth_{it}$ is the net worth of household i in period t, γ_i, λ_t, θ_c are household, time, and region fixed effects, X_{it} is a vector of control variables listed in Chapter 5, and ε_{it} is the error term. The household fixed effect could mitigate selection bias as it controls for time-invariant unobservable household characteristics correlated with wealth and homeownership such as the likelihood that owners are better savers than renters since they have to save for a down payment, whilst the time fixed effect could mitigate the endogeneity problem through capturing macroeconomic shocks and trends that shape wealth accumulation over time, such as business cycles, national changes in taxation regulations and laws, and long-term trends in wealth accumulation. The region fixed effect is used to control for differences at the regional level. The variable of interest is $Owneroccupation_{it}$, a dummy variable that equals one after household i becomes owner-occupier and zero otherwise. The coefficient, β, hence indicates the impact of owner-occupation on wealth accumulation.

Control variables such as marital status and job loss are likely to affect household wealth. But there is a possibility that these time-varying covariates may be correlated with

unobservable factors that also affect wealth (Wainer & Zabel, 2020). Furthermore, tenure transition may also be an explanatory variable that causes changes in these covariates, which may make these covariates 'bad controls' (Angrist & Pischke, 2009). In this case, the mediation effect produces, in which an indirect effect of tenure transition is generated through these covariates. Therefore, I report results both with and without these covariates.

Another issue concerns the functional form of the dependent variable. As mentioned in Chapter 4, wealth level is a right-skewness variable which indicates a large number of units concentrate on the low distribution of wealth while there are still some units that own very high wealth. Therefore, both the level value of wealth and the logarithm value of wealth are provided. Using the logarithm of wealth is advantageous since it smooths wealth values, but there are a significant number of households with negative wealth holdings. Following Di et al. (2007)'s practice, 1 unit is assigned to cases with zero or negative values to avoid the loss of the cases when using the logarithm form. Both the level value of wealth and the log transformation of wealth are modelled simultaneously in this chapter.

6.2.2 Owner-occupation and wealth gains

The results of the basic model are reported in Table 6-1. In Table 6-1, I assess the impact of the transition into owner-occupation on wealth accumulation using the level and log values of household wealth in ¥1,000s as the dependent variable. In columns (1) and (3), the regressions simply condition on the household, year and city fixed effects, while columns (2) and (4) additionally include covariate variables.

The results in Table 6-1 indicate that the transition into homeownership is positively related to household wealth accumulation, with all coefficients significant at the 1% level. For example, owner-occupiers have on average ¥423.13 thousand more net worth than tenants without control variables (column (1)) and when these variables are controlled for, the advantage decreases to ¥398.17 thousand (column (2)). The results of using log net worth as a dependent variable and controlling for covariates show that the net worth of owner-occupiers is about 2.11 ($= e^{1.133} - 1$) times higher than that of tenants (column (4)). Since there is no significant difference between the results with and without control variables, only results with control variables will be reported in the following parts of this thesis, unless otherwise indicated. These results are in accordance with H1a postulating that after entering homeownership, households accumulate more net worth compared to remaining in the rental sector.

Table 6-1. Owner-occupation and wealth gains

	Wealth		Log wealth	
	(1)	(2)	(3)	(4)
Owneroccupation	423.134***	398.174***	1.202***	1.133***
	(56.06)	(51.52)	(0.10)	(0.10)
Gender		-31.312		-0.042
		(57.24)		(0.11)
Age		57.483*		-0.007
		(34.15)		(0.06)
Age-square		-0.657*		0.000
		(0.37)		(0.00)
Marital status (ref. unmarried)				
Married		404.464**		0.540**
		(181.54)		(0.23)
Divorced		255.000		0.041
		(187.63)		(0.31)
Party_CCP		107.51		0.154
		(167.56)		(0.24)
Native_city		174.559		0.002
		(157.834)		(0.23)
Native_province		-102.849		-0.138
		(318.37)		(0.36)
Hukou_unify		-33.768		-0.265
		(70.04)		(0.16)
Hukou_transform		-44.775		0.082
		(50.713)		(0.12)
Education_ jhs		-40.077		0.094
		(102.34)		(0.145)
Physical status (ref. average)				
Good		34.576		0.189**
		(51.82)		(0.08)
Bad		-41.067		-0.360***
		(35.53)		(0.13)
Financial attention		0.808		-0.116***
		(28.09)		(0.04)
Financial background		216.358		0.110
		(165.31)		(0.17)
Financial literacy		6.087		0.051
		(30.68)		(0.06)
Risk attitude		-39.841		-0.073
		(46.94)		(0.07)
Work status (ref. other)				
Employee		104.180*		0.217*
		(57.292)		(0.12)
Employer		364.220***		0.559***
		(129.80)		(0.15)

(*Continued*)

Table 6-1. (*Continued*)

	Wealth		Log wealth	
	(1)	(2)	(3)	(4)
Agriculture		166.286**		0.122
		(78.866)		(0.31)
Job status (ref. exit)				
Having a job		93.365*		0.275**
		(49.46)		(0.12)
Unemployment		64.706		-0.093
		(48.26)		(0.14)
Work unit		-4.372		0.018
		(36.289)		(0.097)
Party_parent		-58.516		0.120
		(67.493)		(0.124)
Household income		3.130***		0.003***
		(0.728)		(0.00)
Family size		5.712		0.105*
		(34.26)		(0.06)
Child number		1.115		-0.030
		(46.19)		(0.10)
Boy number		9.962		0.296
		(70.85)		(0.26)
Whether boy		89.627		-0.098
		(101.21)		(0.29)
Gift		-5.868		-0.003*
		(4.04)		(0.00)
Saving		-1.483***		-0.001**
		(0.55)		(0.00)
GDP per capita		0.023***		0.000
		(0.00)		(0.00)
Urbanisation		-70.190***		-0.043*
		(15.32)		(0.03)
Constant	402.234***	1,606.798	4.369***	6.343***
	(22.34)	(1,031.62)	(0.04)	(2.11)
Observations	2,994	2,994	2,994	2,994
Adjusted R-squared	0.5577	0.6119	0.5854	0.6043
Within R-squared	0.0281	0.161	0.0714	0.128
Household FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 6-1 also presents the results of covariates. The results in column (2) indicate that wealth level is positively influenced by age. However, after 43 years old, the wealth level of one household appear to decrease. Compared to households whose head is a single, married households tend to have higher wealth level, which is statistically significant at the 5% level.

Other important factors include work status, job status, household income, saving and regional economic development. Interestingly, saving and urbanisation rate are negatively related to household' wealth level.

One of the particular issues in this table is that the within R-squared seems to be relatively small, especially for the models without controlling for any other variables. Nevertheless, it does not mean that the variable of interest has no explanatory power, as the variable is statistically significant even after including control variables. In panel data analysis, I think, the empirical experience tends to rely more on individual significance and overall significance of the model instead of R-squared or adjusted R-squared. In general, R-squared is low in cross sectional data compared to time series data. Due to the limited within variation in time-varying predictors, the within R-squared will be probably low too.

In fact, although most of papers which are related to this paper do not report R-squared, in a similar paper written by Kaas et al. (2019), as mentioned in the literature review chapter, the R-squared ranges from 0.134 to 0.554. Wainer and Zabel (2020)'s paper, where the independent variable is the duration of homeownership and the dependent variables are the total wealth and the components of wealth, employs fixed effects model and shows that the R-squared changes from 0.02 to 0.16, quite similar to the within R-squared in this table. For another thing, other papers that use the same method only report adjusted R-squared, such as Fauver et al. (2017) and Y. Li et al., (2017). Following this practice, I also report the adjusted R-squared in Table 6-1, whose magnitude is similar to Fauver et al. (2017)'s and Y. Li et al. (2017)'s results.

6.2.3 Testing for parallel trend assumption

As discussed in Chapter 4, one of the most important assumptions to ensure the internal validity of DID model is the parallel trend assumption, which requires that in the absence of treatment, the wealth difference between the treatment and control group is constant over time. That is to say, the change in wealth for the control group is the same as for the treatment group. I examine the dynamics of the relationship between homeownership and wealth accumulation by including a series of dummy variables in the standard regression Equation (6.1) to trace the year-by-year effects of homeownership on net worth:

$$Wealth_{it} = \alpha + \beta_1 Owneroccupation\_4_{it} + \beta_2 Owneroccupation\_current_{it} + \beta_3 Owneroccupation\_2_{it} + \gamma_i + \lambda_t + \theta_c + \varepsilon_{it}. \quad (6.2)$$

where $Owneroccupation\_4_{it}$ equals one for households in the 4th year before becoming owner-occupier, and $Owneroccupation\_current_{it}$ equals one for households in the year of owner-occupation, while $Owneroccupation\_2_{it}$ equals one for households in the 2nd year after becoming owner-occupier. Figure 6-1 plots the results of wealth and Figure 6-2 displays the results of the logarithm of wealth and both with 95% confidence intervals.

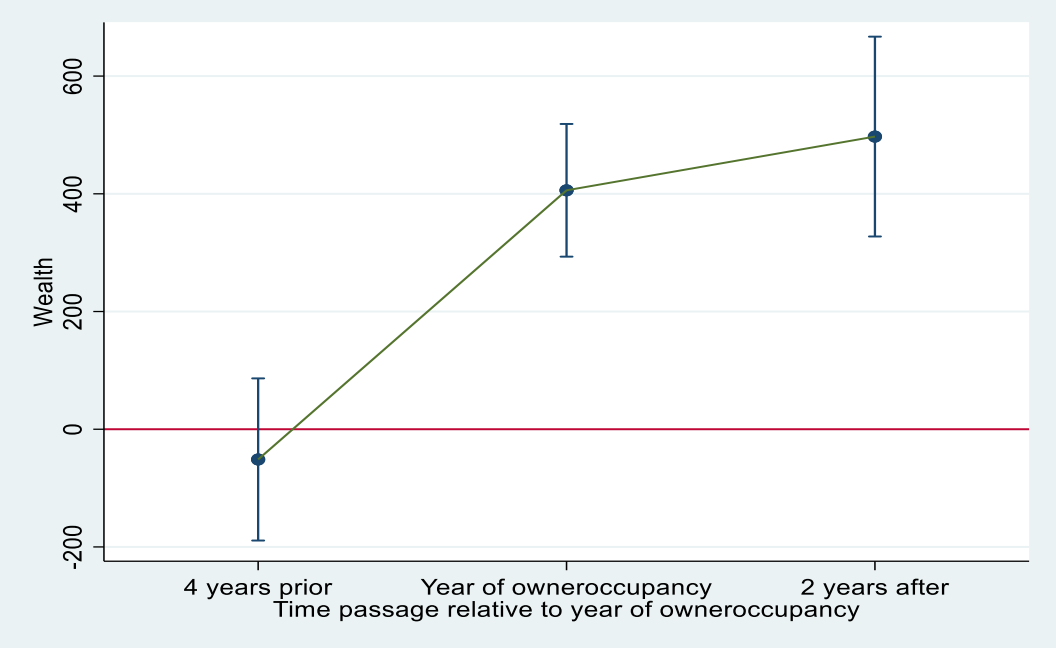

Figure 6-1. The dynamic impact of owner-occupation on wealth

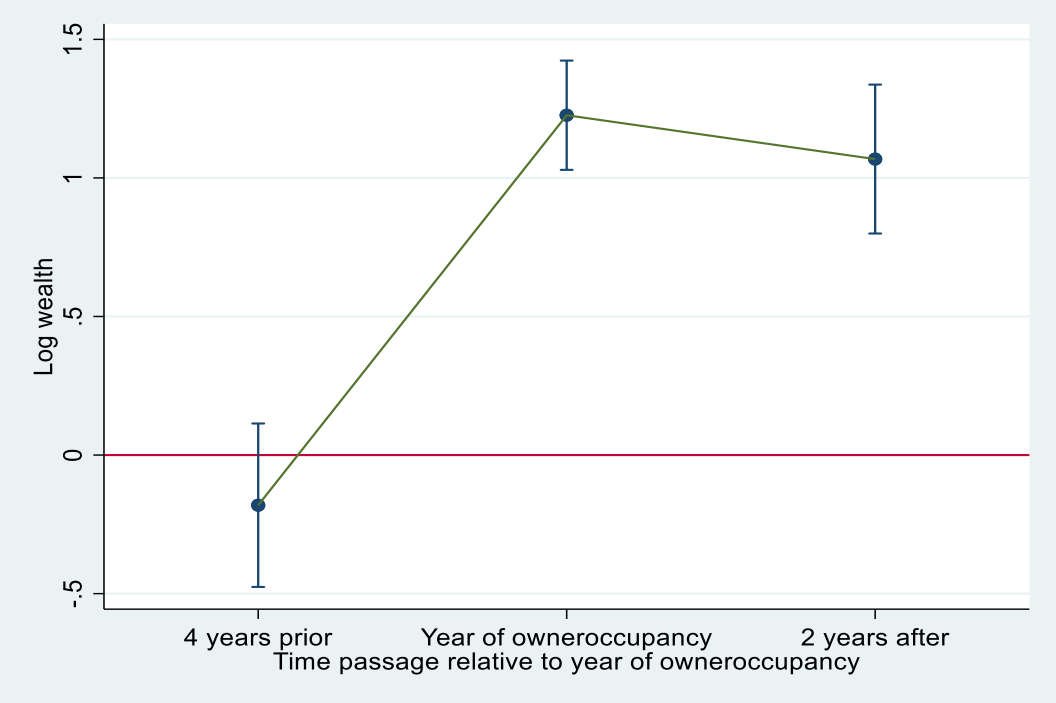

Figure 6-2. The dynamic impact of owner-occupation on the logarithm of wealth

Figure 6-1 and Figure 6-2 illustrate two critical points: the difference in wealth did not predate the acquisition of the owner-occupation, and the impact of owner-occupation on wealth accumulation materialises very quickly. As shown, the coefficient on the owner-occupation dummy variables is insignificantly different from zero for years before homeownership, with no trends in wealth prior to owner-occupation. Next, note that wealth/logarithm of wealth increases immediately after households become owner-occupiers, such that $Owneroccupation\_current$ is positively and significant at the 1% level. Thus, the particular mechanisms and channels connecting homeownership with wealth must be fast-acting. The positive effect of homeownership and wealth accumulation persists 2 years later. In sum, changes in wealth do not precede owner-occupation and owner-occupation has a positive effect on wealth accumulation.

6.3 Robustness check

6.3.1 Placebo test

An important test of DID model is the placebo effect, which verifies that the relationship between treatment and outcomes does not arise from other policies or random factors but rather from the treatment. To make this possible, I exclude households who became owner-occupiers during the survey year of 2015 from the whole sample and just keep households who were renters during the whole period and households who became owner-occupiers during the survey year of 2017. Further, I delete the data for the year 2017 from this dataset. For these remaining households, they were all renters during the survey year of 2013 and 2015. Then I assume the samples who were owner-occupiers during the survey year 2017 had been owner-occupiers during the survey year 2015. As there are only two periods, the traditional DID model is employed:

$$Wealth_{it} = \alpha + \beta_1 Treat\_owneroccupation_{it} + \beta_2 Time_{it} + \beta_3 Treat\_owneroccupation_{it} * Time_{it} + X'_{it}\delta + \varepsilon_{it}, \quad (6.3)$$

where $Treat\_owneroccupation_{it}$ is equal to one for households who were assumed to be owner-occupiers in 2015 (who were only owner-occupiers in 2017 but renters in 2015) and zero otherwise. $Time_{it}$ equals one in 2015 and zero in 2013. β_3, the coefficient of the interaction term of $Treat\_owneroccupancy_{it}$ and $Time_{it}$ therefore denote the impact of owner-occupation on wealth accumulation. If the positive relationship between

homeownership and wealth accumulation in Table 6-1 is driven by other unobservable factors, such as time-varying macroeconomic factors, then β_3 would still be significant in the estimation of Equation (6.3). If β_3 is insignificant, then we can postulate that this positive relationship in Table 6-1 arises from the fact of transferring into owner-occupation.

The results are reported in Table 6-2. Table 6-2 indicates that the positive relationship between owner-occupation and wealth does not come from other random effects. All the coefficients of the interaction term become insignificant. This placebo test, therefore, shows that becoming an owner-occupier does have a significantly positive effect on wealth accumulation.

Table 6-2. Placebo test for the relationship between owner-occupation and wealth

	Wealth (1)	Log wealth (2)
Treat_owneroccupation	89.667	0.237
	(57.04)	(0.16)
Time	-93.274**	-0.030
	(43.53)	(0.13)
Treat_owneroccupation*Time	53.824	0.257
	(76.66)	(0.23)
Constant	-288.201	2.241**
	(278.00)	(1.03)
Observations	1,238	1,238
R-squared	0.374	0.369
Controls	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

The results of the parallel trend assumption and placebo test support the argument that the endogeneity issues of owner-occupation have been relieved. Owner-occupiers (the treatment group) are not significantly different from renters (the control group) in terms of wealth level before they become owner-occupiers, so wealth level does not influence the allocation of the treatment. And the relationship between owner-occupation and wealth cannot be attributable to other random factors. The examination of sample selection bias and common trend factors can help to strengthen the confidence in the positive relationship between owner-occupation and wealth accumulation. There are large increases in wealth that can be attributed to owner-occupation.

6.3.2 The use of homeownership

As was noted before, renters defined in this thesis could own houses in other places, such as their hometowns (renter-owner). This is true. As Y. Huang et al. (2020b) suggest, there is a segment of homeowner investors who own one or more properties but they do not live in any of their owned homes instead they live in rental units owned by others due to several reasons. Therefore, I exclude households who own houses in the first survey year from the whole sample, leaving the total number of observations changing to 1,962. Then I replace owner-occupation with homeownership, which is a simple indicator for whether a household owns a house, with no restrictions on whether living in the owned house. I rewrite Equation (6.1) as follows:

$$Wealth_{it} = \alpha + \beta Homeownership_{it} + X_{it}'\delta + \gamma_i + \lambda_t + \theta_c + \varepsilon_{it} \quad (6.4)$$

where $Homeownership_{it}$ equals one after household i owns a house in time t and zero otherwise.

Results are reported in Table 6-3, using level value and log value of wealth respectively. The results of this subsample remain consistent with the previous estimation in Table 6-1. Consistent with anticipation, these results are greater than the results of the whole sample, as this is the pure comparison between households owning houses and households without any houses. In general, households who transited from renting to owning have much more net wealth than the control group and the difference is statistically significant at the 1% level. Correspondingly, the pass of the placebo test and parallel trend assumption also supports this positive result, as shown in Appendix Table A6.1, Figure A6.1 and Figure A6.2.

Table 6-3. Homeownership and wealth gains

	Wealth		Log wealth	
	(1)	(2)	(3)	(4)
Homeownership	524.242***	459.566***	1.761***	1.655***
	(53.28)	(46.61)	(0.12)	(0.12)
Constant	145.085***	1,149.407	3.538***	6.520**
	(23.97)	(956.10)	(0.06)	(2.53)
Observations	1,962	1,962	1,962	1,962
Within R-squared	0.0652	0.199	0.138	0.203
Controls	No	Yes	No	Yes
Household FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

6.3.3 The use of duration

One important determinant of wealth accumulation is the duration of homeownership. To get a detailed picture, following the approach of Wainer and Zabel (2020), I substitute years since purchasing for owner-occupation. The fixed-effect model for wealth for household i in period t is specified as

$$Wealth_{it} = \alpha + \beta Years\ since\ purchase_{it} + X'_{it}\delta + \gamma_i + \lambda_t + \theta_c + \varepsilon_{it} \qquad (6.5)$$

where $Years\ since\ purchase_{it}$ is the number of years since first purchase of a house. In actuality, some owners will revert to renting so that the total years of owner-occupation for these households will be less than the years since first purchase. Therefore, I also estimate the regression of wealth in the years of owner-occupation, $Years\ own_{it}$.

Results based on the fixed-effect model are reported in Table 6-4. Columns (1) and (2) are results about $Years\ since\ purchase_{it}$ and columns (3) and (4) exhibit results regarding $Years\ own_{it}$. An additional year since first purchase increases net worth by ¥134.14 thousand on average (column (1)). Using the logarithm of wealth as the dependent variable, the result shows that an additional year since first purchase results in a 33.24% increase in wealth on average (column (2)). Coefficients of $Years\ own_{it}$ are greater than corresponding coefficients of $Years\ since\ purchase_{it}$.

Table 6-4. Duration of homeownership and wealth gains

	Wealth (1)	Log wealth (2)	Wealth (3)	Log wealth (4)
Years since purchase	134.142***	0.287***		
	(19.61)	(0.03)		
Years own			175.825***	0.389***
			(21.08)	(0.03)
Constant	1,504.228	6.022***	1,733.214*	6.531***
	(1,031.93)	(2.13)	(1,021.62)	(2.11)
Observations	2,994	2,994	2,994	2,994
Within R-squared	0.160	0.100	0.173	0.123
Controls	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

The impact of $Years\ since\ purchase_{it}$ and $Years\ own_{it}$ on wealth might not be linear. For example, there may be extra costs associated with first purchase (such as transaction costs paid to agencies) so the impact of the initial years of homeownership on wealth is likely to be less than in subsequent years. I allow for this nonlinearity by including dummy variables for each possible length of ownership for households in the treatment group. Corresponding with Equation (6.5), I also replace $Years\ since\ purchase_{it}$ with $Years\ own_{it}$.

$$Wealth_{it} = \alpha + \beta_1 Years\ since\ purchase2_{it} + \beta_2 Years\ since\ purchase4_{it} + X'_{it}\delta + \gamma_i + \lambda_t + \theta_c + \varepsilon_{it}. \quad (6.6).$$

Results for Equation (6.6) are shown in Table 6-5. There is a pattern that more years since first purchase and owning lead to greater wealth. For households that purchased a house in 2015, their wealth holdings were ¥702.84 thousand higher than the control group in 2017 (column (3)). Note that the coefficient on $Years\ since\ purchase2$ is the increase in average wealth over the 2 years since first purchase. If we divide this number by two, we get the average impact of an additional year since first purchase on wealth, which was ¥187.47 thousand. Then we subtract the coefficient for $Years\ since\ purchase2$ from the coefficient for $Years\ since\ purchase4$ gives the change in wealth from going from 2 to 4 years since first purchase. Dividing this by two gives the average impact of an additional year since first purchase on wealth between years two and four, which was ¥66.73 thousand. The results show that the yearly gains are nonlinear.

Table 6-5. Yearly gains of years since purchase

	Wealth (1)	Log wealth (2)	Wealth (3)	Log wealth (4)
Years since purchase2	374.946***	1.162***		
	(52.87)	(0.10)		
Years since purchase4	508.397***	0.995***		
	(81.71)	(0.14)		
Years own2			352.723***	1.090***
			(51.68)	(0.10)
Years own4			702.835***	1.419***
			(90.70)	(0.14)
Constant	1,570.760	6.388***	1,732.976*	6.462***
	(1,027.50)	(2.12)	(1,023.03)	(2.11)
Observations	2,994	2,994	2,994	2,994
Within R-squared	0.163	0.129	0.173	0.132
Controls	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

6.4 Heterogeneous effect

In this section, I analyse the heterogeneity that influences the strength of the relationship between homeownership and wealth accumulation. Enormous variation in response of wealth to homeownership exists across households. I categorise the heterogeneous factors into four groups: household economic characteristics; household social characteristics; parental characteristics; geographic characteristics. Household economic characteristics mainly concern financial situation and labour income security. Household social characteristics include migration status and hukou status. Since intergenerational features play an increasingly significant role, parental characteristics including employment type and hukou constitute another group of heterogeneous factors. The last one is geographic characteristics, discussing the influence of the location of the household. I examine the interaction of owner-occupation and potential heterogeneous household characteristics:

$$Wealth_{it} = \alpha + \beta_1 Owneroccupation_{it} + \beta_2 Owneroccupation_{it} * Heterogeneous\ Factor_{it} + \beta_3 Heterogeneous\ Factor_{it} + X'_{it}\delta + \gamma_i + \lambda_t + \theta_c + \varepsilon_{it} \quad (6.7)$$

where $Heterogeneous\ Factor_{it}$ refers to the variation of household characteristics, β_1 is the partial effect of owner-occupation, and β_3 is the partial effect of household heterogeneity, holding all other variables fixed. β_2 is the key coefficient of interest, capturing the sensitivity of owner-occupation on wealth holding in present with the variation of household characteristics.

I first test the heterogeneous effects of owner-occupation across household economic characteristics. The first variable to show household economic characteristics is whether the household belongs to the low-income group (*lowincome*), which is an indicator variable of whether the household has less than 120% of the median income in all survey periods. Prior literature shows that low-income households accumulate less wealth than other income groups (Di et al., 2007; Newman & Holupka, 2016; Wainer & Zabel, 2020), owing to all kinds of reasons, such as a higher possibility to purchase an old house in a poor neighbourhood and receive predatory loans, the fact that unexpected events could easily force them out of homeownership. Another variable is *work unit*, showing whether the household head works in governmental departments, institutions and state-owned enterprises. Households employed in public sectors may have more opportunities to purchase an affordable house in a good location than those who work in other sectors due to compulsory housing provident funds schemes in public sectors, higher contribution from employers to housing provident funds and other forms of financial support from their employers to purchase a house, such as housing subsidies.

Table 6-6 reports the estimates of these two factors. Column (1) in Table 6-6 indicates that, as expected, low-income owner-occupiers accumulate ¥237.21 thousand less in wealth than non-low-income owner-occupiers, which is significant at the 1% level. Column (3) shows that owner-occupiers working in public sectors on average accumulate ¥118.33 thousand more in wealth than those who work in other sectors, however, this is statistically insignificant. This result suggests that there is no significant difference between homeowners in the public sector and homeowners in the non-public sector.

Table 6-6. Heterogeneity of owner-occupation across economic characteristics

	Wealth	Log wealth	Wealth	Log wealth
	(1)	(2)	(3)	(4)
Owneroccupation	449.405***	1.006***	359.119***	1.108***
	(62.49)	(0.10)	(64.54)	(0.11)
Owneroccupation*lowincome	-237.211***	0.588***		
	(68.62)	(0.21)		
Owneroccupation *workunit			118.333	0.075
			(84.50)	(0.14)
workunit			-42.499	-0.006
			(40.69)	(0.11)
Constant	1,625.184	6.298***	1,384.543	6.202***
	(1,025.85)	(2.10)	(1,044.51)	(2.12)
Observations	2,994	2,994	2,994	2,994
Within R-squared	0.164	0.133	0.162	0.129
Controls	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

To further evaluate the heterogeneous effects, I present the impacts of migration status and hukou status on the relationship between owner-occupation and wealth accumulation. I interact owner-occupation with dummy variables (*native_city* and *native_province*) indicating whether the household head is a native or not. If the living city is consistent with the place in the household registration system, then the household is native in terms of city-level (*native_city*=1). If the province of residence is the same as the place in the household registration system, the household is native in terms of provincial level (*native_province*=1). Another indicator of social characteristics is hukou status: agricultural hukou and non-agricultural hukou. However, the current hukou status could be misleading. To solve the problems caused by urban and countryside division, governments started reforming the household registration system and requiring the cancellation of agricultural and non-agricultural household registration. Some provinces implemented this policy and replaced agricultural and non-agricultural household registration with unified resident registration. Therefore, there is no "agricultural hukou" or "non-agricultural hukou" shown in the registration system for some households. Instead, only "resident hukou" can be seen from this system. Furthermore, some migrants changed their hukou status from "agricultural hukou" to "non-agricultural hukou" when their situation met the requirements of their living place. To refrain from bias caused by these changes, I use the hukou status before households

changed it to “resident hukou” (*hukou_unify*) or “non-agricultural hukou” (*hukou_transfer*). If household heads have agricultural hukou, *hukou_unify* and *hukou_transfer* are equal to 1 and 0 otherwise.

Table 6-7 presents a differential impact of owner-occupation on wealth depending on the above-mentioned characteristics. The coefficients for interaction terms in column (1) show that if the owner-occupier is native at the city level, they could accrue no more wealth than a migrant owner-occupier. The result in column (3) also presents an insignificant impact on the wealth accumulation for natives at the provincial level. Columns (5), (6), (7) and (8) of Table 6-7 show that owner-occupiers with agricultural hukou are likely to accumulate less wealth than owner-occupiers with non-agricultural hukou.

To test the additional effect of parental characteristics, I introduce two variables: hukou of parent and employment type. *Hukou_parent* is an indicator variable for whether the parent had agricultural hukou. The baseline data comes from the father of the household head. When the father’s data is absent, this is filled in by the mother’s data. The reference group of employment type is parents who worked as an employee. *Employmenttype_parent2* equals one if parents were self-employers and *Employmenttype_parent2* is equal to one when parents were farmers.

The results of the interaction of owner-occupation and parental characteristics are presented in Table 6-8. Columns (1) and (2) indicate that owner-occupiers whose parents came from the countryside of China accrue ¥259.27 less wealth compared with owner-occupiers whose parents have non-agricultural hukou when they make a transformation in tenure, which is significant at the 1% level. The results in columns (3) and (4) show that both owner-occupiers whose parents were peasants and whose parents worked for themselves abate the aggregate effect of homeownership on wealth gains. All these effects are statistically significant.

The prominent influence of parents’ homeownership and the relatively limited impact of transmitted socioeconomic status on a child’s access to homeownership have been hotly discussed in recent years (C. Cui et al., 2020). Nevertheless, it is somewhat surprising to see that parents’ socioeconomic status influences the size of wealth gains that owner-occupiers could get from homeownership. With the increasing housing prices, the down payment needed to purchase a house in a good location with a higher potential for price appreciation is correspondingly increasing. Intergenerational transfers in the forms of heritage and gifts

play a critical role in helping kids enter homeownership (C.-C. Lee et al., 2016). However, owner-occupiers whose parents have agricultural hukou or were engaged in farming are less likely to provident adequate financial help for their kids. This financial constraint imposed by the socioeconomic status of parents may lead to owner-occupiers purchasing a house with smaller space in a suboptimal location or even second-hand houses, which may presumably lead to fewer wealth gains accrued from homeownership.

We further test the heterogeneous effects of owner-occupation across regions shown in Table 6-9. Table 6-9 shows the results regressions of owner-occupation on the interaction of owner-occupation with dummy variables for the region. Following common practice, all provinces are divided into three groups: eastern China, middle China and western China. Eastern China covers Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, Hainan. Middle China includes Shanxi, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, and Hunan. The rest of the provinces and autonomous municipalities are divided into western China. If the province that households locate in belongs to eastern China, then *region_east* equals one and zero otherwise. *Region_middle* is equal to one if the province locates in middle China. Households living in western China are the reference group (*Region_middle)*. Conditional on regions, Table 6-9 shows a significant positive effect on wealth accumulation. Owner-occupiers located in eastern China gain about ¥382.77 thousand more in wealth than owner-occupiers in western China and the effects are statistically significant at the 1% level. Compared with owner-occupation in western China, owner-occupation in middle China contributes ¥5.77 thousand more to household wealth, although there is no significant difference.

Similarly, I also report the results for homeownership, which are displayed in Appendix Table A6.2, Table A6.3, Table A6.4, and Table A6.5. The heterogeneous results for homeownership are almost similar to the results for owner-occupation, with some nuances and differences. The differences exist in three aspects: *native_city, employmenttype_parent2*, and *region_middle*. For *native_city* and *region_middle*, in contrast to the insignificant results in the owner-occupier sample, the results in the homeowner sample are positively significant. While for the left one, the result changes to be insignificant. The results in this section are in accordance with H1b assuming that enormous variation of wealth holdings exists across households, which must be attributed to heterogeneous household characteristics.

Table 6-7. Heterogeneity of owner-occupation across social characteristics

	Wealth	Log wealth	Wealth	Log wealth	Wealth	Log wealth	Wealth	Log wealth
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Owneroccupation	320.838*	0.848***	545.866*	0.649***	453.396***	1.234***	483.857***	1.290***
	(164.71)	(0.17)	(318.49)	(0.24)	(55.31)	(0.11)	(62.02)	(0.11)
Owneroccupation*native_city	92.850	0.342*						
	(169.71)	(0.18)						
Native_city	141.926	-0.118						
	(159.01)	(0.24)						
Owneroccupation*native_province			-160.705	0.526**				
			(321.59)	(0.25)				
Native_province			-69.870	-0.245				
			(327.65)	(0.37)				
Owneroccupation*hukou_unify					-174.592*	-0.320**		
					(104.84)	(0.16)		
Hukou_unify					18.554	-0.169		
					(70.77)	(0.17)		
Owneroccupation*hukou_transfer							-206.570**	-0.380***
							(88.71)	(0.14)
Hukou_transfer							25.089	0.210
							(56.68)	(0.13)
Constant	1,515.595	6.007***	1,600.983	6.362***	1,178.807	5.560***	908.850	5.060**
	(1,056.10)	(2.11)	(1,030.03)	(2.11)	(1,037.55)	(2.11)	(1,046.23)	(2.10)
Observations	2,994	2,994	2,994	2,994	2,994	2,994	2,994	2,994
Within R-squared	0.162	0.130	0.162	0.130	0.163	0.130	0.164	0.131
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 6-8. Heterogeneity of owner-occupation across parental characteristics

	Wealth	Log wealth	Wealth	Log wealth
	(1)	(2)	(3)	(4)
Owneroccupation	520.144***	1.300***	526.374***	1.393***
	(65.31)	(0.12)	(64.23)	(0.12)
Owneroccupation*hukou_parent	-259.273***	-0.356**		
	(94.16)	(0.15)		
Owneroccupation*employmenttype_parent2			-263.152*	-0.610**
			(139.99)	(0.31)
Owneroccupation*employmenttype_parent3			-274.622***	-0.549***
			(100.76)	(0.16)
Constant	911.479	5.389**	1,068.992	5.236**
	(1,042.47)	(2.10)	(1,032.38)	(2.09)
Observations	2,994	2,994	2,994	2,994
Within R-squared	0.166	0.131	0.166	0.135
Controls	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 6-9. Heterogeneity of owner-occupation across geographic characteristics

	Wealth	Log wealth
	(1)	(2)
Owneroccupation	229.796***	0.861***
	(80.75)	(0.17)
Owneroccupation*region_east	382.774***	0.336*
	(105.79)	(0.19)
Owneroccupation*region_middle	5.766	0.409**
	(111.96)	(0.20)
Constant	646.166	5.606***
	(1,049.44)	(2.13)
Observations	2,994	2,994
Within R-squared	0.170	0.131
Controls	Yes	Yes
Household FE	Yes	Yes
Year FE	Yes	Yes
City FE	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

6.5 Conclusion

In this chapter, I analysed how owner-occupation affects households' wealth accumulation. I used DID identification strategy to estimate the wealth's response to the tenure change. The evidence I presented identified the causal effect of owner-occupation on wealth holdings. This chapter shows strong support for the positive effect of homeownership on wealth accumulation.

I found that a change from renting to owner-occupation is positively associated with wealth gains. To further validate the research design, I conducted a series of robustness checks. First, a placebo test was conducted. Second, recognising the difference between owner-occupation and homeownership, I replaced owner-occupation with homeownership. Similar results are achieved using this replacement, which is supported by the satisfaction of the parallel trend assumption. Third, considering the importance of the duration of owner-occupation on wealth holdings, I conducted the regressions of wealth holdings on the duration of owner-occupation, which controls for all the other unobserved differences between owner-occupiers and renters. The results showed that an additional year of owner-occupation positively contributes to households' wealth holdings. In actuality, the duration of owner-occupation is one of the channels through which homeownership affects wealth gains.

Further, heterogeneous effects of owner-occupation on wealth holdings were presented. The effect of owner-occupation on wealth gains varied across household economic characteristics, household social characteristics, parental characteristics and geographic features. Owner-occupiers in eastern China gained more wealth than others, which intensifies the aggregate impact of owner-occupation on wealth. Conversely, owner-occupiers with low income and agricultural hukou, those whose parents worked as a farmer or self-employed rather than being employed, and those whose parents had agricultural hukou, gained less wealth than others, which attenuates the owner-occupation on wealth gains. Contrary to expectations, employer type and migration status turn out to play a negligible role in wealth gains, which contrasts with prior research. Nevertheless, the results for migration status, parental's employment type and region in middle China should be explained with caution.

Although the causal link between owner-occupation and wealth gains are identified by the DID analysis and supported by the series of robustness check, the mechanisms or channels

from owner-occupation to wealth gains are not clear in this chapter, namely why owner-occupation is beneficial to wealth gains has not been fully examined in this chapter. Performing sub-analysis to see if owner-occupation has a similar/different effect on components of wealth is indispensable to tease out diverse mechanisms and would further enhance our confidence in the causal link between homeownership and wealth gains. The next two chapters will focus on the compositions of wealth: housing wealth and non-housing wealth. According to the CHFS, the two components account for about 80% of the total household wealth in urban China.

Chapter 7 Housing wealth accumulation

7.1 Introduction

Housing wealth in China accounts for about 75% of a household's total wealth (Xie & Jin, 2015). In contrast with the dominant role that housing wealth plays in total household wealth, the ways in which housing wealth is accumulated and how the accumulation pattern has transformed have rarely theoretically and empirically been discussed in existing studies. This chapter aims to fill in this gap in the research literature. This chapter mainly explores the shifting housing accumulation patterns and what factors would impact households' housing wealth gains, thereby testing H2a to 2d. The specific research question that is addressed in this stage of the analysis is as follows:

[RQ 2] In what ways has housing wealth been accumulated in urban China?

In prior literature, two main ways have been identified to contribute to housing wealth accumulation: housing price appreciation and fixed commitments. Whether and to what extent a homebuyer will materialise the potential benefits of owning while avoiding succumbing to the risks depends on market conditions, the timing of purchase, the holding period, location and neighbourhood, and mortgage terms (Belsky et al., 2005; L. S. Goodman & Mayer, 2018; Newman & Holupka, 2016).

Through a comparative analysis between the global context and China's context, this chapter argues that the housing wealth accumulation pattern has transformed from an era that heavily relied on savings to a period that more depends on capital appreciations, which would generate wide socio-economic consequences for households and the economy. Following this comparative analysis, an empirical analysis of how housing wealth is accumulated in China and how the gains vary by housing characteristics and households' characteristics, using data from CHFS and CHCS, are presented. The empirical results suggest that housing wealth in China is mainly accumulated through housing price appreciation and mortgage repayments, with housing price appreciation dominating. The favourable status of homeowners over renters in wealth holdings could arise more from housing price appreciation rather than meeting fixed, regular mortgage commitments or changed saving behaviour. Housing wealth gains vary by housing characteristics and households' characteristics.

The discussion in this chapter offers some important insights. First, as the beginning of an attempt to explain the causal link between homeownership and wealth gains, it provides evidence on how the favourable status of homeowners in wealth holdings over tenants arises and how different groups of people experience distinct housing wealth gains. Secondly, it underpins the investigation of how homeownership and housing wealth are linked to socio-economic consequences for the household and the economy in the longer term, which would be further discussed in Chapter 9.

This chapter proceeds as follows. Section 7.2 starts by providing an introductory global viewpoint on housing wealth accumulation patterns and then integrates China's case into the global context. Section 7.3 presents the main models and empirical findings related to the housing wealth accumulation patterns, using CHFS and CHCS, respectively. In Section 7.4, housing characteristics that influence housing wealth accumulation in China both using CHFS and CHCS are presented. Similar to Chapter 6, Section 7.5 conducts some heterogeneous analyses to investigate how household characteristics would interplay with homeownership to produce varied results. Section 7.6 concludes this chapter.

7.2 Housing wealth accumulation patterns

7.2.1 Shifting housing wealth accumulation in a global context

As was alluded to in Chapter 1, homeownership has long been considered, by governments and households, an effective means by which to rebalance savings and consumption across the life cycle of households and to spread wealth over different cohorts and generations. Such policy and societal beliefs have long been crucial in Australia (since the early 1900s), the USA (since the 1930s) and the UK and Canada (since 1945)[4].

Across the OECD economies, real house prices were relatively stable until the mid-1970s (OECD, 2021). Paying down mortgages moved earlier life-cycle household income, via savings for down payment and mortgage repayments, to later life cycle stage holdings of housing assets. This process was accelerated by high rates of general price inflation which persisted until the late 1980s, which effectively wrote down the real value of mortgage debt quickly relative to post-1990 experiences (Forrest & Murie, 1995a, p.66). This period can

[4] Some part of section 7.2.1 draws on one technique report of the author as a co-author: Maclennan, D., Long, J., & Leishman, C. (2021). The author was in charge of the literature review and review in this report.

be referred to as the ‘savings’ era. Homeownership in the setting of low house price inflation was a savings strategy that reflected productive effort, formed solid wealth accumulation systems, and contributed to the reduction of wealth inequalities.

Three takeaways feature this type of housing wealth accumulation pattern. Firstly, housing wealth was accumulated by households primarily consequent to their work efforts and spending and savings habits across their life cycle. Secondly, alongside this characteristic, inheritance and parental support to purchase homes were a much less significant element in house purchases than today. Thirdly, households faced quite different choices about their asset portfolios as housing was not always the best investment and housing tenure choice (Beracha & Johnson, 2012). The argument that renting resulted in more wealth holdings than homeownership mainly arises from research which focuses on this period (e.g., Beracha & Johnson, 2012; Goetzmann & Spiegel, 2002; J. Goodman, 1998). Frequent trading-up or down-sizing was not common during this period. Rental choices remained an alternate, broader, and longer choice option for households. Such choices were, of course, much impacted by household asset choices available and tenure options (Goetzmann & Spiegel, 2002).

Over the last half century (since the 1980s), that effort-housing equity relationship has broken-down and unearned house price appreciation is now the main mode of accruing housing wealth in most advanced economies and most developing counties, switching from a ‘savings’ to a ‘speculation’ basis for home-ownership. Housing asset accumulation no longer reflects the effort and steady saving but housing speculation behaviours. In the former era households mainly passively accept the housing gains that arise, whereas now borrowing, leveraging and moving strategies are definitive of the ‘speculative’ era. The latter pattern can be mirrored through at least four aspects.

First, savings of a household through working are no longer sufficient to meet the rising entry deposits. Mortgage borrowing, inheritances and parental support then play an increasingly important role in helping young adults attain homeownership (Forrest & Murie, 1995, p.4).

Second, fixed commitments through mortgage repayments account for an increasingly smaller share of total housing values. Home equity increases partly and gradually come from asset appreciation. In broad terms seniors, who disproportionately hold housing wealth have, in effect, may save and pay for less than a quarter of the wealth they now hold. For instance,

Maclennan (2012) estimates that households over 65 in the UK on average had acquired around 80 per cent of their housing wealth through price gains rather than savings.

In addition, homeownership has been privileged over rental in almost every way, especially in terms of financial support, tax exemption, and social reputation (Christophers, 2021). Rental becomes a temporary and transitional option, which indicates that the majority of households would end up with homeownership at some phase of the life cycle. Moreover, the penalty for staying in the rental sector is quite high, due to the rising ownership entry prices.

Last but not least, a more speculative search for price uplift/capital gains seems common. Existing homeowners take capital gains and leverage them to expand their purchasing power, trade up to larger and/or more expensive dwellings, fight for second homeownership, and/or private rental investment. In this sense, wide access to mortgages plays a vital role in the emergence and rise of these speculative behaviours. Due to the development of the mortgage market and wider financial deregulation, the 1970s (until the early 1980s) were a period marked by high general inflation and high-interest rates (Collard & Dellas, 2007). Mortgages were expensive to service, but the real value of outstanding debt fell rapidly in the high inflation environment (McCown, 2002; Wilcox, 1983). After the 1980s, during the long boom with surplus global savings, the environment for mortgage lenders and borrowers was one of low real interest rates and inflation rates (Collard & Dellas).

In reality, Germany and the UK may represent well the extremes of the two different approaches to housing as a means of capital accumulation, namely by steady saving through making a deposit and paying a mortgage (Germany) or combining that approach with a more speculative search for price uplift/capital gains (the UK) (Lersch & Dewilde, 2018). Germany, in many respects, has adopted this ‘savings’ approach to homeownership longer than most OECD economies. In contrast, in the UK, since the early 1970s, wealth accumulation in housing has been primarily driven by rising prices and facilitated through the process of ‘trading up’ – a strategy that allows buyers to leverage off capital gains by moving rapidly and frequently to secure ownership of a much higher value asset (Forrest & Murie, 1995, p.3).

Alongside the discussion on the role of savings and capital gains play in accumulating housing wealth, national experiences of households accumulating housing wealth display both contrasts and commonalities, which further sheds some light on the effects of housing

on wealth inequality in different contexts. An important consideration in both western countries with significant stocks of public housing and land, notably the UK, and the socialist and post-socialist societies of the former Soviet Union (Lux, 2003; Scanlon & Whitehead, 2004; Stephens et al., 2015) and some eastern Asian countries, has been the transfer of public assets at discounted prices to private owners. By 2010, in the UK, a two million growth in homeownership after 1980 had been attributable to sales of municipal housing at deep price discounts to tenants(Whitehead, 2010), thus markedly increasing private housing wealth (Forrest & Murie, 1995a). Privatisation of public housing works as a windfall for those households, which benefited older generations and could never occur again in modern times if housing policy does not admit it.

The characteristics of the 'savings' era made it possible that there could be a long history of homeownership in advanced economies simultaneously both decreasing wealth inequalities and spreading wealth holdings in 'savings' era. Now, two decades into this millennium and after a much longer period of the 'speculative' era, there is a central concern that rising house prices outpacing income growth have decreased homeownership rates, which are not only holding back wealth creation for the society but also, with spreading housing un-affordability, overwhelming the intended redistributive effects of housing policies.

7.2.2 Housing wealth accumulation in China

In China, before getting into the 'speculative' era, there is also a period of the 'savings' era, possibly from 1988 to 2009. As explained in Chapter 2, the housing reform since 1988 provided middle-class households especially those who worked in public organisations an opportunity to purchase the house at heavily discounted prices. These discounted prices, principally based on the construction costs were within the acceptable range of households' financial arrangements, which enabled most middle-class households to purchase it with their savings and/or informal borrowing from relatives. This 'savings' era continued after the end of housing reform in 1998 until 2009 when housing prices increase steadily. During this period, households could purchase commercial housing at affordable prices. It is also this period that was characterised by the large governmental financial and policy support for social housing problems. For high-income households and middle-income households, they could purchase commercial housing, which had high-quality and large potential for price growth. For low-income households, they were eligible to purchase affordable social housing at low prices or rent social houses (ECH, CRH, and CPH). The dual system enabled

most urban households to have affordable homeownership. Homeownership, in this sense, spreads wealth among most households and reduces wealth inequality, making the homeownership rate peak in 2010 (Q. Zhang et al., 2020).

This saving pattern made households face retirement with an asset and no required rental or mortgage costs, moving earlier life-cycle household income, via savings and mortgage repayments, to later life cycle stage holdings of housing assets, reflecting their working efforts, and spending and saving habits. Inheritance and parental support played a relatively small role during this time since their parents or grandparents were actually in a poor financial situation due to the long-term wars. Although mortgage loans were available in the middle stage of the 'savings' era (since 1998), only a very small number of households relied on these loans to obtain their homeownership. Furthermore, compared with 25-30 years of mortgage instalments in advanced economies in the 'savings' era and present in China, for those households who had a loan or borrowed from relatives, 10-15 years were entirely enough to pay off the loans and/or borrowing. In the meantime, renting also reminded a profitable choice for these households, given the cheap rental and equivalent living standards. Thus, these features are consistent with that in advanced economies.

The context since then has altered for generations who were born during the 1980s, and especially for those who were born after the 1990s. As discussed in Chapter 2, housing prices in China have risen steadily since 2009 (Macdonald et al., 2012). The continual one-way upward trajectory in housing prices since 2003 in China has formed a strong belief that purchasing houses is one of the safest and the most profitable forms of investment (L. Li & Wu, 2014; J. Zhao & Li, 2017). As mentioned before, housing prices have been rising faster than income per capita in China since 2015.

Accompanying the rising housing prices, nevertheless, is the housing affordability issue in China. The latest China Statistical Yearbook (NBSC, 2021) from the NBSC suggests that it would take 6.68 years of saving in 2020 to save the down payment (30%) for a $90m^2$ condominium home. In first-tier cities, this situation is worse. For example, in Beijing, up to 11 years are needed to save a down payment and in Shanghai, about 9.51 years are required to save for a 30% down payment. This affordability issue is not alone in the homeownership market. The average rental wage, which is defined as the hourly wage that a full-time worker must make to rent an average two-bedroom apartment using no more than 30% of their

income, across all of China is ¥37.88/h ($6.01/h). The required rental wage is much higher in some metropolitan areas, for instance, ¥113.64/h ($18.04/h) in Beijing.

This average data, however, may underestimate the housing affordability issue. The measure of housing affordability needs to be pertinent to and reflect the circumstances of groups, particularly low-income households and first-time buyers (Meen, 2018). He emphasises that the measure should capture the distributive outcomes across households rather than concentrating simply on average. The data indicate that a minimum-wage worker in Beijing needs to work 238.1 hours a week to rent a two-bedroom apartment (NBSC, 2022). It would take more than 50 years of median household income in Beijing to buy an average apartment, while this ratio is around 15 years in London and 10 years in New York (Hale, 2022).

This changing situation implies that reliance on savings is no longer enough to meet the rising entry deposits for most low- and middle-income households. Consequently, multifaceted and combined modes are deployed by these households to secure their access to homeownership in the future. First, they choose to delay their entry into homeownership, and long-term renting becomes widespread, especially in metropolitan areas. Second, intergenerational co-residence has gained popularity in recent years. Third, the owning-renting phenomenon can be frequently seen in metropolitan areas ((Y. Huang et al., 2020b). Fourth, parental support, informal borrowing from relatives and friends, and finally, mortgage loans from HPF and commercial banks are playing an increasingly important role in financing households to access and retain homeownership, as detailed in Chapter 2.

Corresponding with the second feature of the ‘speculative’ era, in China, housing price appreciation accounts for an increasing share of the housing equity gains. The longer the households stay in homeownership, the higher the proportion of capital gains in the housing value is. According to NBSC, in 2010, among urban households, the homeownership rate reached 89.3%, among which 40.1% own privatised public housing (F. Wu, 2015), most of the privatised public housing was owned by the older generations who were born before the 1980s. Older generations in urban areas benefited most from the privatisation of public housing. These households who entered homeownership during this time experienced great housing price appreciation and wealth gains since then. Figure 7-1, which plots the proportion of price appreciation in housing value in 2015/2016/2017, perfectly exemplifies this trend and phenomenon. For households who acquired homeownership before 1998, around 80 per cent of the house value comes from housing price appreciation (the sudden

jump of the proportion around 1978 could be due to a sample selection problem since the samples for this period are small in this survey). After 1998, the proportion of price appreciation in housing value decreased steadily but still, is greater than 50 per cent for households who entered homeownership before 2009. Unsurprisingly and reasonably, this proportion decreases further for households who became a homeowner since 2009, given the short duration of homeownership and higher purchase costs. These results from this figure are quite consistent with Maclennan (2012)'s estimation that households over 65 in the UK on average had acquired around 80 per cent of their housing wealth through price gains rather than savings.

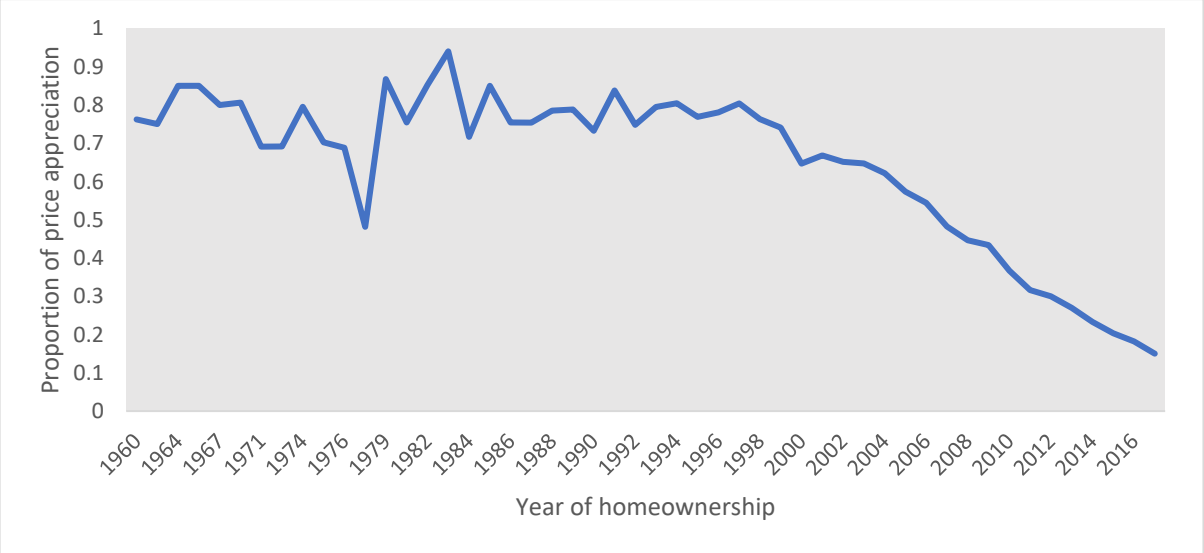

Figure 7-1. The proportion of price appreciation in housing present value
Source: calculated by the author through using CHCS

Concerning the third characteristic of the second pattern, homeownership is quite beneficial in many ways, as discussed in Chapter 2. The interest rates of mortgage loans (especially loans from HPF) are relatively low and so are the taxes that households need to pay for holding houses and trading up. For instance, the housing property tax is still on pilot in Shanghai and Chongqing since 2011. A plan to expand this pilot to more cities has been put on the agenda in 2021. Nonetheless, this expansion plan has been interrupted by the decrease in housing prices since the start of 2022 (Ministry of Finance of the People's Republic of China, 2022). Therefore, the fact that there is still no property tax allows households to buy and hold additional housing without enduring the annual costs from property taxes as in Western economies. Additionally, mortgage interests along with maintenance and improvement fees can be deducted from income, and value-added tax and income tax on capital gains on the sale of the only residential property do not have to be paid. The

privileging of homeownership through subsidised tax systems can also serve to incentivise homeowners to be speculative through trade-up. This makes a home purchase a comparably profitable investment, even when there is no capital appreciation in the future. Relying on the favourable tax system, investment in housing acquires a privileged status over other portfolio choices.

The returns of housing investments are appealing, compared with the investment in the financial market. Figure 7-2 presents the total return (the ratio of price appreciation to purchase costs) and yearly return (the ratio of average yearly price appreciation to purchase costs) for homeownership. As the figure shows, on average the total return and yearly return for households who became a homeowner before 1995 were quite large, although fluctuated. Although the average yearly return decreased for households who entered homeownership after 1995, especially for households who purchased houses between 2007 and 2015, housing investment is still profitable. And since 2015, the yearly return for households choosing to become a homeowner increased.

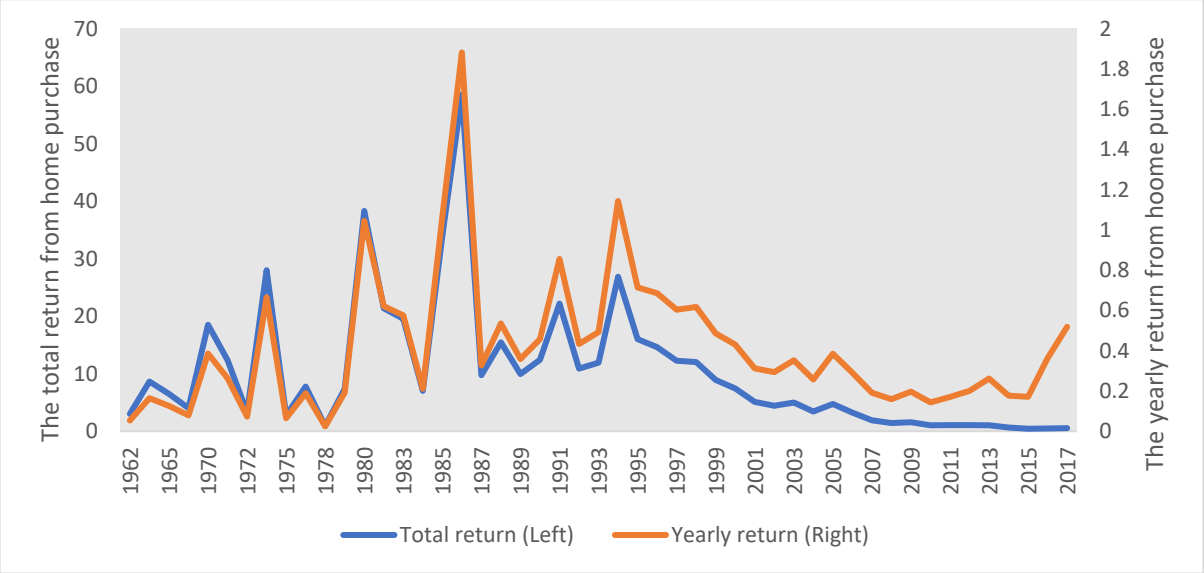

Figure 7-2. Total growth rate and yearly growth rate
Source: Calculated by the author through using CHCS

Consistent with the fourth feature of the 'speculative' era, existing homeowners in China also take capital gains and leverage those gains to expand their purchasing power, trade up to larger and/or more expensive dwellings, and fight for second homeownership, and/or private rental investment. According to CHCS, of all the surveyed homeowners, about one in seven households had ever sold their house in the past five. Concerning the reasons for selling, about 60% of these households wanted to purchase a new house. Of these households,

about 86.32% traded up their house. At the same time, more than 20% of Chinese households own multiple homes (Figure 7-3), a ratio much higher than in other advanced economies (Gan, 2018; Y. Huang et al., 2020b). Correspondingly, the vacancy rate is unreasonably high, increasing from 18.4% in 2011 to 21.4% in 2017 (Gan, 2018). Among all the vacant houses, long-term vacancy contributes the largest share, with a ratio of 8.1% (Gan, 2018). Unlike the 'buy-to-let' in the United Kingdom, in China, their business model relies on equity uplifts (and longer-term sales) rather than rental incomes versus costs (with long-run replacement). A speculative strategy has been developed and favoured by some households, especially high-income households.

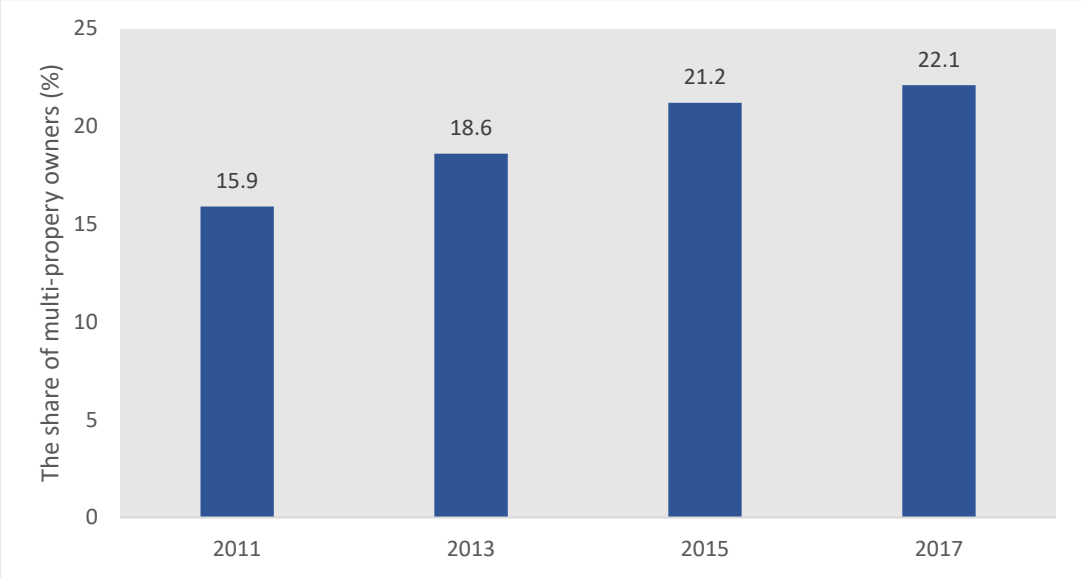

Figure 7-3. Households owning multiple homes in urban China
Source: Gan (2018).

All these aforementioned features in China are consistent with the takeaways of the second pattern that occurred in advanced economies since the 1980s, namely the 'appreciation' era. Compared with other advanced economies (mainly OECD countries), the 'saving' era in China is much shorter and later (from 1988 to 2009, while the 'saving' era in advanced economies is roughly from the 1930s to 1980s), whereas the 'appreciation' era is much later and stronger (since 2009 until now, since 1980s in advanced economies). Considering the delayed and rapid development of the housing market in China, this tendency appears to be quite reasonable.

Nowadays, like in advanced economies, the savings for a down payment is more crucial for getting access to homeownership than mortgage repayments in urban China. Talent, hard work and disciplined saving for the future are not enough for younger Chinese to thrive in

housing markets as their parents did. With prices decoupling from earnings since 2015 in China, homeownership has become increasingly unaffordable for urban Chinese residents, especially for young, low-income and immigrant households. The decrease in the homeownership rate since 2010 in China has proved housing unaffordability problem (Q. Zhang et al., 2020). As a result of the housing affordability problem, long-term renting, intergenerational co-residence or sub-optimal locational choice become the common choice of low- and middle-income households, which suggests that reducing the short-run affordability burdens by selecting housing attribute outcomes probably compromises their capabilities to accumulate and use human capital in the long term, influencing the capability to earn more permanent income. Wealth inequality has been exacerbated by this housing system, which will be further discussed in Chapter 9.

7.3 Models and main findings

In this section, the empirical evidence on housing wealth accumulation patterns through model establishment is discussed. The hypotheses concerned in this section include: in China, homeowners augment housing wealth mainly via price appreciation and mortgage repayments, with housing price appreciation dominating (H2a). The favourable status in wealth holdings of Chinese homeowners over renters, at least until mid-2022, could arise from housing price appreciation rather than from fixed commitments and changed saving behaviour (H2b).

7.3.1 Fixed commitments and housing wealth accumulation: evidence from CHFS

In Chapter 3, the effects of fixed commitments on wealth accumulation are highlighted. The periodic debt repayments going toward house equity increase over time, which may not be achieved by renters. I examine this channel by investigating the relationship between transition into owner-occupation and saving:

$$Saving_{it} = \alpha + \beta Owneroccupation_{it} + X_{it}'\delta + \gamma_i + \lambda_t + \theta_c + \varepsilon_{it} \quad (7.1).$$

In Equation (7.1), $Saving_{it}$ refers to the total yearly household income minus total household expenditure. The results are reported in Table 7-1. Column (1) shows that the transition into owner-occupation is negatively related to saving. Average saving amount declines by about ¥6.50 thousand when entering owner-occupation from rented

accommodation, which is significant at the 5% level. Similar but stronger results can be found in column (3) by replacing owner-occupation with homeownership, as we did in Chapter 6. Considering the average residual income in the three waves of the survey is ¥24.75 thousand, the decline in the average saving rate in China would be 26.25% (=-6.50/24.75). This result is consistent with the findings of Lersch & Dewilde (2018), who report the negative effect of entering mortgaged homeownership on saving rate (a reduction of the saving rate of 14% in the UK and 15% in Germany).

Table 7-1. Saving and owner-occupation

	Saving (1)	Saving_mortgage (2)	Saving (3)	Saving_mortgage (4)
Owner-occupation	-6.496**	-1.976		
	(3.11)	(3.10)		
Homeownership			-9.450***	-4.923
			(3.26)	(3.20)
Constant	-22.118	-63.145	-2.133	-32.473
	(59.93)	(60.06)	(61.29)	(61.42)
Observations	2,994	2,994	1,962	1,962
Within R-squared	0.831	0.834	0.789	0.802
Controls	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

It has been argued that mortgage repayments are partly enforced saving (Forrest & Murie, 1995b), which can be used to increase home equity. Households may consider these enforced saving as partly fungible with monetary saving, hence they may reduce the amount saved in addition to mortgage repayments (Skinner, 1993). Due to data limitations, Lersch & Dewilde (2018) are unable to provide evidence for the trade-off between enforced savings through principal repayments and active savings in their study. In this paper, since the data on monthly mortgage repayments are available, this trade-off can be accounted for. To examine this potential channel, I use saving plus yearly mortgage repayments as the dependent variable.

The results are shown in column (2) of Table 7-1. The significantly negative effect of owner-occupation on savings in column (1) now changes to be insignificant. Correspondingly, the robustness test using homeownership as the independent variable (column (4)) is identical to the main results in column (2). These results show that in China, there is a trade-off

between enforced saving through principal repayments and active saving (residual saving). These results also support the argument that when residual saving is combined with mortgage repayments, there is no significant difference in saving behaviour between owners and renters. Homeownership would not change households' saving behaviour, contrasting with the argument of (Di et al., 2007; Mathä et al., 2017). This is also in marked contrast to the findings in Rossi & Sierminska (2018) in the U.S. and Somerville et al. (2007) in Canada, which emphasise the absence of disciplined saving of tenants. Tenants in China appear to cultivate a habit of disciplined saving and tenants are not likely to save less than homeowners. This implies that the role of fixed commitments of homeownership in accumulating wealth in China is not as important as that in other advanced economies.

The findings in Table 7-1 support that once households enter homeownership, they would reduce the residual saving as they use part of the saving to make mortgage repayments. Therefore, there is a trade-off between fixed commitments and residual saving. When residual saving is combined with mortgage repayments, there is no significant difference in saving behaviour between owners and renters. These results do support the view that mortgage repayments contribute to wealth accumulation (H2a), while the favoured status of homeowners over renters in wealth holdings does not arise from mortgage repayments and changed saving behaviour in China (H2b).

7.3.2 Housing price appreciation and housing wealth accumulation: evidence from CHCS

As stated in Chapter 5, city-level information is inaccessible in CHFS, and housing purchase costs appear incomplete in this dataset. The lack of this information makes controlling for city-level variables and analysing how much housing equity increases come from price appreciation impossible. These shortcomings could be overcome by using CHCS, which has never been empirically discussed in prior research. As noted in Chapter 5, the CHCS was a cross-sectional dataset conducted in 2015, 2016 and 2017.

I explore the relationship between years since first purchase and housing price appreciation using the following regression:

$$PA_i = \alpha + \beta Years\ since\ purcahse_i + W_i'\delta + \gamma_c + \lambda_t + \varepsilon_i. \quad (7.2)$$

where PA_i is the difference between housing present value and purchased costs and $Years\ since\ purchase_i$ is the number of years since purchasing the owned house and if the households own more than one house, the years would be the period since the earliest purchase of an owned house. W_i' is a vector of control variables described in Chapter 5, γ_c is a set of dummy variables controlling for city-constant unobservables and λ_t is a set of dummy variables controlling for time trends. The reason why I control for yearly effect is that this cross-sectional dataset consists of three-year surveys and time differences may exist in these surveys. Since housing price appreciation is related to housing present value, I also report the results of housing present value.

The results for Equation (7.4) are reported in Table 7-2. On average, an additional year of homeownership is associated with about ¥30.302 thousand increase in housing appreciation, and a ¥32.779 thousand rise in housing current value, which are all significant at the 1% level. Based on the data provided by C. Li & Fan (2020), the average family housing wealth increased from 73,300 yuan in 2001 to 635,600 yuan in 2017. Therefore, the yearly average housing wealth growth was about 35,143.74 yuan. Combining these data, we could assume that in China, about 86.22% of the growth in housing equity comes from housing price appreciation and the rest of the gains (13.78%) in housing wealth arise from yearly mortgage repayments. This is in accordance with H2a highlighting the role of housing price appreciation and fixed commitments in wealth accumulation and H2b assuming housing equity increases for current Chinese households mainly arising from housing price appreciation.

Table 7-2. Homeownership and price appreciation

	Price appreciation (1)	Housing current value (2)
Years since purchase	30.302***	32.779***
	(4.44)	(4.26)
Constant	-211.821	-26.986
	(407.35)	(449.77)
Observations	4,440	4,440
R-squared	0.364	0.655
Controls	Yes	Yes
City FE	Yes	Yes
Year FE	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

7.4 Exploring factors influencing housing wealth

In this section, the hypothesis that the extent to which housing wealth can be built and accumulated depends on a complex of factors: duration; location; timing of purchase; housing type; mortgage status (H2c) is tested, using evidence both from CHFS and CHCS.

7.4.1 Evidence from CHFS

In this section, I establish fixed effect models to explore factors that influence housing wealth accumulation by using evidence from CHFS. I first investigate how the duration of owner-occupation/homeownership affects households' stock of housing wealth by conducting the following regression:

$$HWealth_{it} = \alpha + \beta Years\ since\ purchase_{it} + X'_{it}\delta + \gamma_i + \lambda_t + \theta_c + \varepsilon_{it} \qquad (7.3)$$

where $HWealth_{it}$ is the total housing assets net of the outstanding balance of housing debts and borrowings, where applicable, and $Years\ since\ purchase_{it}$ is the number of years since first purchase of a house. As mentioned in Chapter 6, in actuality, some owners will revert to renting so that the total years of owner-occupation for these households will be less than the years since first purchase. Therefore, I also estimate the regression of wealth in the years of owner-occupation, $Years\ own_{it}$. All other variables are the same as in Equation (6.1). The impact of $Years\ since\ purchase_{it}$ and $Years\ own_{it}$ on housing wealth might not be linear. I allow for this nonlinearity by including dummy variables for each possible length of ownership/homeownership for households in the treatment group. Therefore, the below regression is estimated to examine the non-linearity of housing wealth accumulation:

$$HWealth_{it} = \alpha + \beta_1 Years\ since\ purchase2_{it} + \beta_2 Years\ since\ purchase4_{it} + X'_{it}\delta + \gamma_i + \lambda_t + \theta_c + \varepsilon_{it} \qquad (7.4).$$

The results are presented in Table 7-3. Column (1) shows that an additional year since first purchase increases housing wealth by ¥109.10 thousand. Column (2) reports the result of years of owner-occupation, which shows that an additional year of owner-occupation is associated with ¥143.67 thousand more in housing wealth. As anticipated, this is larger than the result of the year since purchase. The results for the homeownership sample are reported in columns (3) and (4), respectively. Quite similar consequences are presented. According to Wainer & Zabel (2020), since years of homeownership is more likely to be susceptible to

endogeneity issues than years since first purchase, the result of the latter variable may be more credible. These results do accord with H2a postulating housing wealth being accumulated and part of H2c postulating the importance of duration.

Table 7-3. Housing wealth and years since purchase

	Owner-occupation		Homeownership	
	(1)	(2)	(3)	(4)
Years since purchase	109.097***		118.588***	
	(12.86)		(11.67)	
Years own		143.669***		151.434***
		(13.40)		(12.80)
Constant	1,077.500	1,264.766*	1,489.687*	1,711.810**
	(733.91)	(723.52)	(780.95)	(762.26)
Observations	2,994	2,994	1,962	1,962
Within R-squared	0.153	0.173	0.191	0.219
Controls	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Equation (7.4) allows for a nonlinear impact of years since first purchase on housing wealth. Separate dummy variables are included for 2 and 4 years of owner-occupation. Results are given in Table 7-4. There is a pattern that more years since first purchase led to greater housing wealth. For instance, in the owner-occupation sample, for households that purchased a house in 2015, their wealth holdings were ¥356.14 thousand (measured in years since first purchase), and ¥335.41 thousand (measured in years of owner-occupation) higher than the control group in 2015, while ¥399.95 thousand (measured in years since first purchase), and ¥553.82 thousand (measured in years of owner-occupation) higher than the control group in 2017. Furthermore, the results also imply that the yearly increase in housing wealth shows a decreasing effect. In a similar vein, the results for the homeownership sample are reported in columns (3) and (4). Still, the effects found above receive support from this analysis.

Taking the findings in Table 7-3 and Table 7-4 together, the duration of owner-occupation turns out to play a critical role in accumulating housing wealth. The longer a household stays in homeownership, the more wealth they would accrue. Nonetheless, the yearly effect appears to decrease. This evidence corroborates the findings of a great deal of the previous work in this field.

Table 7-4. Housing wealth and yearly effect

	Owner-occupation		Homeownership	
	(1)	(2)	(3)	(4)
Years since purchase2	356.140***		413.813***	
	(36.14)		(35.37)	
Years since purchase4	399.954***		443.624***	
	(53.25)		(47.54)	
Years own2		335.413***		400.827***
		(35.07)		(34.37)
Years own4		553.820***		585.451***
		(56.30)		(52.60)
Constant	1,163.546	1,254.090*	1,429.370*	1,644.950**
	(728.59)	(723.15)	(764.91)	(756.99)
Observations	2,994	2,994	1,962	1,962
Within R-squared	0.164	0.174	0.215	0.227
Controls	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Another important factor that influences the extent to which a household could benefit from owner-occupation is the geographic location. In actuality, this is also related to one of the mechanisms through which homeownership helps wealth accumulation: housing price appreciation. H. Fang et al.'s (2015) report that in China, housing prices had an average annual real growth rate of 13.1 per cent, 10.5 per cent, and 7.9 per cent in first-tier cities, second-tier cities, and third-tier cities, respectively from 2003 to 2013. House price appreciation varies by geographic location. Although I cannot investigate the effect of years of homeownership on housing wealth across city levels, I split the full sample into three groups: households in eastern China, households in middle China, and households in western China.

Apart from housing wealth, I also estimate Equation (7.3) using housing assets (without minus debts and borrowings) as the dependent variable in columns (1), (3) and (5) of Table 7-5. Consistent with expectation, the wealth gains for an additional year since first purchase are largest in eastern China, followed by middle China, and then western China. The results show that an additional year since first purchase raises housing wealth by ¥191.00 thousand; moreover, the estimated effect is statistically distinct from zero at the 1% level for homeowners in eastern China. Families in middle China show lower housing wealth gains than those in eastern China, with a much smaller magnitude in columns (3) and (4), which

are significant at the 1% level. Unsurprisingly, because the western region has had much lower growth rates in housing prices in recent years, homeowners in this area have much lower home equity gains. The results for the homeownership sample are presented in Appendix Table A7.1, with similar finding from this table. These results support part of H2c in relation to the importance of location.

Further, I explore how the timing of purchase and the maintenance of owner-occupation would exert an influence on housing wealth gains using Equation (7.3). I divide the group of owner-occupiers who acquired their ownership in 2015 into two groups: those who retained their homeownership until the period of 2017 and who lost their ownership status in 2017 and then compare the housing wealth accumulation of these owner-occupiers with renters by replicating the regression analysis Equation (7.3). I also replicate this regression analysis to households who became owner-occupiers in the period 2017.

The results are presented in Table 7-6. The effects for owners in 2015 and owners in 2017 are reported in columns (1) and (4), respectively. The results show that becoming an owner-occupier in 2017 implies more benefits than becoming an owner-occupier in 2015, providing support for the importance of the timing of purchase. An additional year since first purchase increased housing wealth by ¥100.06 thousand and ¥203.84 thousand on average for the 2015 group and 2017 group, respectively. Column (2) is the result for owner-occupiers who kept their ownership during the two periods and column (3) shows the finding for homeowners who failed to retain their ownership. Column (2) suggests that every additional year since first purchase increased housing wealth by ¥129.50 thousand. The results in column (3), however, indicate that the loss of homeownership leads to insignificant results. The results support the idea that staying in ownership is positively related to housing wealth gains. Almost similar results can also be got for the sample of homeowners in Appendix Table A7.2. This is in accordance with H2c, which claims the importance of the maintenance of homeownership.

Table 7-5. Housing wealth across the region: owner-occupation

	Eastern China		Middle China		Western China	
	Asset	Wealth	Asset	Wealth	Asset	Wealth
	(1)	(2)	(3)	(4)	(5)	(6)
Years since purchase	205.277***	190.998***	67.236***	63.940***	48.884***	42.436***
	(31.67)	(28.97)	(12.14)	(11.82)	(10.89)	(9.85)
Constant	-1,047.278	-755.271	-1,635.474*	-1,242.695	-1,056.874	-52.795
	(1,699.28)	(1,597.46)	(894.42)	(875.04)	(1,252.63)	(1,093.23)
Observations	1,311	1,311	870	870	813	813
Within R-squared	0.213	0.184	0.142	0.129	0.126	0.119
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 7-6. Housing wealth and timing of purchase: owner-occupation

	Owner2015	Owner20151	Owner20152	Owner2017
	(1)	(2)	(3)	(4)
Years since purchase	100.056***	128.498***	16.279	203.844***
	(13.54)	(14.19)	(23.26)	(29.68)
Constant	791.211	1,065.028	-242.969	69.517
	(833.95)	(850.08)	(727.95)	(724.85)
Observations	2,499	2,247	1,614	1,857
Within R-squared	0.154	0.214	0.0811	0.159
Controls	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

7.4.2 Evidence from CHCS

Apart from housing wealth, I am especially interested in housing price appreciation heterogeneity. However, as noted above, the city-level information and housing purchase costs are incomplete in CHCS. Therefore, the evidence from CHCS will be employed. Since municipal information is available now, to compare the impacts of years of homeownership across different tiers of cities, I split the sample into three categories. Based on the classification of Y. Fang et al. (2015), the first-tier cities include Beijing, Shanghai, Guangzhou, and Shenzhen. The second-tier cities cover autonomous municipalities (i.e., Chongqing and Tianjin) and the deputy provincial cities include Harbin, Changchun, Shenyang, Dalian, Jinan, Qingdao, Nanjing, Hangzhou, Ningbo, Xiamen, Wuhan, Chengdu, and Xi'an. The remaining prefecture-level cities are defined as third-tier cities. Then I repeat Equation (7.2) only on housing value appreciation. Columns (1), (2) and (3) of Table 7-7 report the results. Great disparities exist across different tiers of cities. The results show that an additional year of homeownership raises household housing value appreciation by ¥73.424 thousand; moreover, the estimated effect is statistically distinct from zero at the 1% level for households in first-tier cities. Homeowners in second-tier cities show lower yearly housing value appreciation than those in first-tier cities, with a slightly smaller magnitude in column (2). The lowest yearly housing value appreciation gains occur in third-tier cities, with an additional year of homeownership accompanied by ¥19.849 thousand more in housing value appreciation (Column (3)). The result is still significant at the 1% level. These results further support H2c postulating the importance of location at the city level.

Table 7-7. Homeownership and price appreciation across cities

	First-tier cities	Second-tier cities	Third-tier cities
	(1)	(2)	(3)
Years since purchase	73.424***	31.997***	19.849***
	(28.24)	(5.00)	(2.32)
Constant	5,171.158*	-735.115	-148.759
	(2736.062)	(668.29)	(275.50)
Observations	504	1,053	2,883
R-squared	0.313	0.158	0.251
Controls	Yes	Yes	Yes
City FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

I also stratify the sample into three groups based on the source of the primary residence. There are eight sources in CHCS: (1) Houses purchased from work units where household members work; (2) Houses belong to work units; (3) Houses obtained from welfare housing distribution; (4) Houses purchased directly from commercial housing market; (5) Second-hand houses; (6) Affordable house purchased from governments at subsidized prices; (7) Small property right houses which are built on collectively owned land; (8) Houses from other sources. I categorise these sources into three classes: One class includes house source types of (1), (2), (3), and (6). These houses are purchased with the help government to some extent. The second class covers (4) and (5), which are purchased directly from the commercial housing markets. The third class comprises (7) and (8), including the rest source of houses. Then repeat the regression of Equation (7.2).

The results of this stratification are reported in Table 7-8. Consistent with expectations, commercial housing undergoes the most rapid yearly price appreciation, followed by houses subsidised by the government. The coefficients are significant at the 1% level. Yearly housing value appreciation of other sources is relatively smaller than commercial housing and government subsidised houses since most of these houses are composed of self-built houses or small property right houses, whose transaction in the formal housing market will be constrained. This is in accordance with H2c which supposes that housing type is of importance.

Table 7-8. Homeownership and price appreciation across housing types

	Governmental Subsidy (1)	Commercial market (2)	Other sources (3)
Years since purchase	20.885***	49.481***	15.005**
	(4.75)	(8.87)	(1.20)
Constant	-565.128	87.517	-426.452
	(634.98)	(583.45)	(735.26)
Observations	1,627	2,258	555
R-squared	0.458	0.373	0.418
Controls	Yes	Yes	Yes
City FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Next, I examine the extent to which the impact varies by mortgage status. I investigate whether households who had housing debts when they purchased the house could accrue more housing appreciation by interacting debt status with years of homeownership:

$$PA_i = \alpha + \beta_1 Years\ since\ purchase_i + \beta_2 Debt_i + \beta_2 Years\ since\ purchase_i * Debt_i + X_i'\delta + \gamma_c + \lambda_t + \varepsilon_i. \quad (7.5)$$

where $Debt_i$ denote whether household i have housing debts in the owned houses when this household purchases these houses. Other control variables are the same as those in Equation (7.2). I also present the results on housing current value in column (1) of Table 7-9. Column (1) displays results on housing appreciation. The results in column (2) suggest that each additional year of homeownership is associated with ¥60.56 thousand more in price appreciation for households that have mortgages versus ¥16.37 thousand more in price appreciation for households that have no mortgage. The results are significant at the 1% level. This is in accordance with H2c which supposes that mortgage status is of importance.

Table 7-9. Homeownership and price appreciation by debts

	Housing appreciation (1)	Housing present value (2)
Years since purchase	16.372***	19.335***
	(4.10)	(3.79)
Years since purchase*Debt	44.194***	42.129***
	(7.55)	(7.40)
Debt	-427.200***	-423.429***
	(86.30)	(85.03)
Constant	241.978	409.057
	(417.20)	(426.10)
Observations	4,440	4,440
R-squared	0.371	0.658
Controls	Yes	Yes
City FE	Yes	Yes
Year FE	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

The plausible reason that lies behind the positive effect of debt is that at the beginning of homeownership, the housing wealth accumulation could be indifferent to partial homeowners and outright homeowners, or partial homeowners accrue less housing wealth than outright homeowners. As time goes on, partial homeowners could narrow this gap and catch up with outright homeowners.

Therefore, I explore how the marginal effect of housing debt ownership on housing price appreciation varies by years of homeownership, which is plotted in Figure 7-4. The figure suggests that compared to households without housing debts, the marginal effects for debt owners increase as years accrue; the marginal effects for debt owners are lower than those without housing debts when years of homeownership are less than 10 years; when becoming a homeowner for more than 10 years, the marginal effects for debt owners exceed those without housing debts. Correspondingly, I also report the marginal effects for debt owners and households without housing debts, respectively. The results are shown in Figure 7-5, which suggests that the marginal effects for debt owners increase much fast than that for households without housing debts. Although the marginal effects in the early years are smaller than in households without debts, they could catch up rapidly.

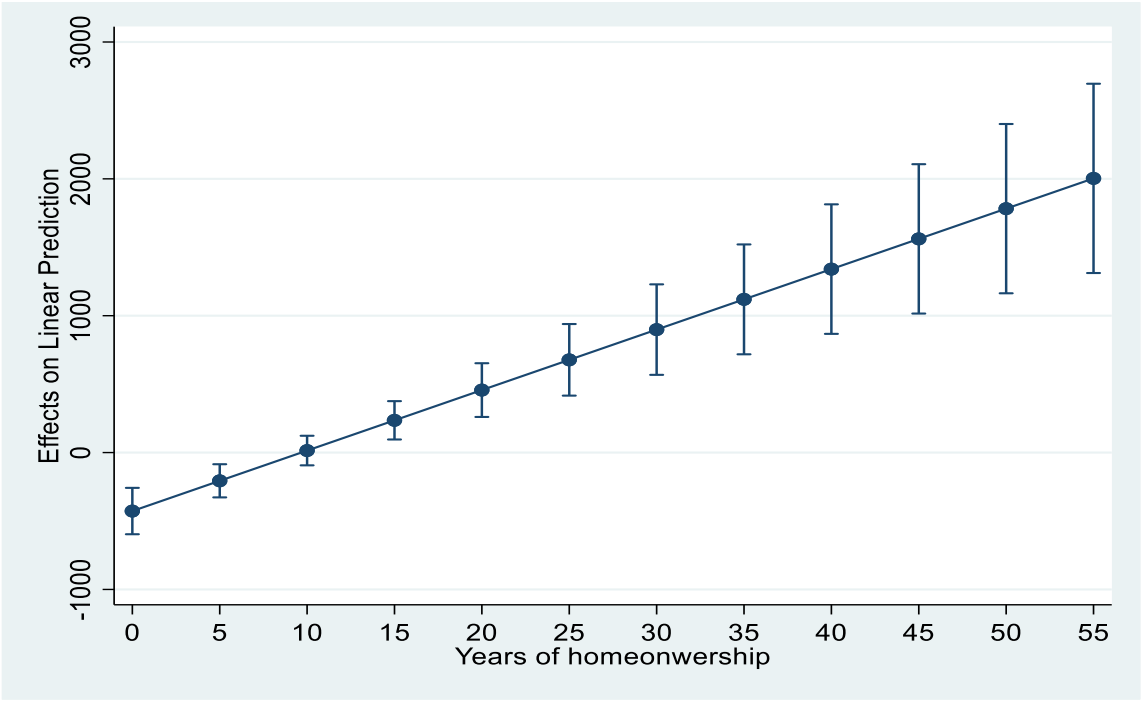

Figure 7-4. Average marginal effects of debt ownership

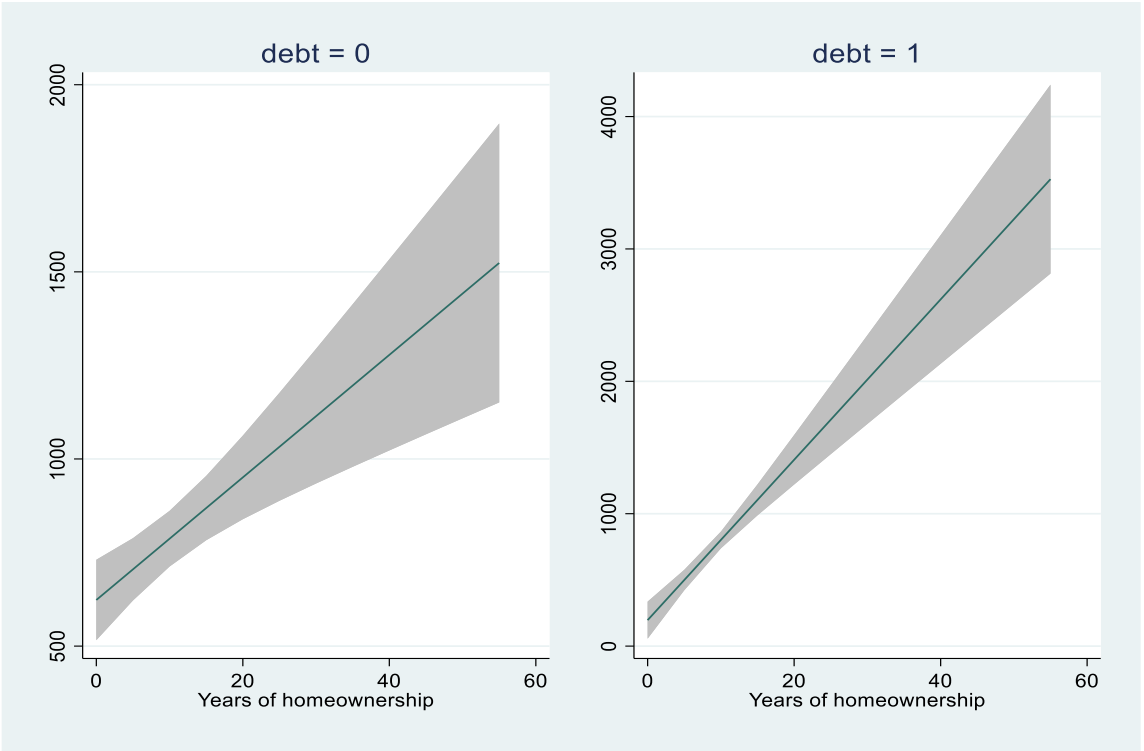

Figure 7-5. Comparing average marginal effects of debt ownership

I provide potential reasons for the higher housing price appreciation for homeowners with housing debts. One is that by holding other things constant, homeowners with debts are more likely to be multiple-property homeowners and make trading-up in housing markets. I

examine whether homeowners with debts are more likely to undergo housing changes by estimating the following logit model:

$$Log\frac{P(Y_i=1)}{P(Y_i=0)} = \alpha + \beta Debt_i + \gamma_c + \lambda_t + \varepsilon_i \quad (7.6).$$

The dependent variable, Y_i, takes a variety of outcomes, including $Multi-property_i$, which is defined to be 1 if household i owns more than one house and 0 otherwise, $First-time\ homeowner_i$, which is equal to 1 if household i is a first-time homeowner and equals to 0 otherwise, and $Trading\ up_i$ which is a dummy variable denoting whether the present house is larger than the previous house if homeowners are not first-time purchasers. Year dummies and city dummies are also included. Thus, the estimated coefficient β measures the average difference between homeowners that ever have housing debts and other homeowners.

The results, as reported in columns (1), (2) and (3) of Table 7-10, suggest that homeowners who have housing debts are more likely to be multiple property owners, less likely to be first-time purchasers, and more likely to trade up. The marginal effect indicates that, without controlling for other observables, homeowners with housing debts on average are 11.8 percentage points more likely to be multiple property owners than the households without debts, and the difference is statistically significant at the 1% level. Furthermore, homeowners with housing debts on average are 2.8 percentage points less likely to be first-time purchasers. I then examine whether homeowners with debts are more likely to trade up. The results are shown in column (3). The marginal effects imply that homeowners with a mortgage are 13.2 percentage points more likely to trade up their house when they are not first-time purchasers, which is significant at the 1% level. Multiple property owners and trading-up owners are supposed to own more housing assets and housing wealth. And then homeowners with housing debts tend to experience higher yearly housing wealth growth.

Table 7-10. Debt, multiple-property homeowner, first-time homeowner and trade-up

	Multiple property		First-time homeowner		Trading up	
	Coef.	Marginal effect	Coef.	Marginal effect	Coef.	Marginal effect
	(1)		(2)		(3)	
Debt	0.640***	0.118***	-0.119*	-0.028*	0.402***	0.132***
	(0.07)	(0.01)	(0.07)	(0.02)	(0.10)	(0.00)
Constant	-0.948***		0.076		-0.757***	
	(0.15)		(0.15)		(0.15)	
Observations	4,431		4,440		4,405	
Controls	No		No		No	
City FE	Yes		Yes		Yes	
Year FE	Yes		Yes		Yes	
Pseudo R^2	0.0442		0.0297		0.0399	

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

7.5 Heterogeneous effect: evidence from CHFS

In this section, I investigate how housing wealth gains are sensitive to heterogeneous household characteristics by interacting years since first purchase with these characteristics [5], to test H2d:

$$Wealth_{it} = \alpha + \beta_1 Years\_since\_purchase_{it} + \beta_2 Years\_since\_purchase_{it} * Heterogeneous\ Factor_{it} + \beta_3 Heterogeneous\ Factor_{it} + X'_{it}\delta + \gamma_i + \lambda_t + \theta_c + \varepsilon_{it} \quad (7.7).$$

The heterogeneity in household economic status is presented in columns (1) and (2) of Table 7-11. The coefficient values of 125.21 and -69.13 on the years since purchase and interaction variables, respectively in column (1), suggest that each additional year since first purchase is associated with ¥125.21 thousand more in housing wealth holdings for high-income households versus ¥56.09 thousand more in housing wealth holdings for low-income households, which are significant at the 1% level. The results in column (2) imply that compared to households who work in non-public sectors, households whose heads worked in public sectors on average accrue ¥41.43 thousand more for each additional year since first purchase, which is significant at the 5% level.

[5] These heterogeneous factors are the same as those in Chapter 6. I will refer readers to check the definitions in that chapter.

Table 7-11. Heterogeneity: economic characteristics

	(1)	(2)
Years since purchase	125.211***	93.016***
	(15.05)	(15.36)
Years since purchase*lowincome	-69.125***	
	(15.43)	
Years since purchase*workunit		41.432**
		(20.42)
workunit		-53.960*
		(29.45)
Constant	1,117.682	802.982
	(727.41)	(733.63)
Observations	2,994	2,994
Within R-squared	0.157	0.155
Controls	Yes	Yes
Household FE	Yes	Yes
Year FE	Yes	Yes
City FE	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Second, I investigate the additional effect of household social characteristics over years since first purchase. The household social characteristics include migrant status and hukou status. The results are reported in Table 7-12. The results are similar to those in chapter 6, which show that the coefficients of the interaction terms of migrations status are statistically insignificant, while significant for the coefficients of the interaction terms of hukou status. The results in columns (1) and (2) suggest that the null hypothesis that there is no difference in the yearly housing wealth gains between native households and migrants cannot be rejected. In terms of hukou status, the results in column (4) suggest that housing wealth gain for an additional year since first purchase for agricultural hukou is ¥53.58 thousand less than for households with non-agricultural hukou, which is significant at the 1% level.

Table 7-12. Heterogeneity: social characteristics

	(1)	(2)	(3)	(4)
Years since purchase	110.797***	144.392***	120.219***	135.051***
	(26.47)	(42.20)	(15.67)	(19.01)
Years since purchase*native_city	-1.954			
	(27.86)			
Native city	-9.439			
	(87.31)			
Years since purchase*native province		-38.320		
		(43.45)		
Native province		308.654*		
		(169.82)		
Years since purchase*hukou unify			-34.632*	
			(17.71)	
Hukou unify			-20.520	
			(53.02)	
Years since purchase*hukou transfer				-53.582***
				(19.28)
Hukou transfer				21.799
				(42.40)
Constant	1,083.964	1,096.470	790.026	481.997
	(740.80)	(733.72)	(733.15)	(728.98)
Observations	2,994	2,994	2,994	2,994
Within R-squared	0.153	0.153	0.154	0.157
Controls	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Further, I also examine the additional effect of parental characteristics on housing wealth accumulation. Results are presented in Table 7-13. The results in column (1) indicate that compared with households whose parents have non-agricultural hukou, households whose parents own agricultural hukou accrue ¥55.47 thousand less in housing wealth for an additional year of homeownership. Column (2) displays the effect of parental employment type. The reference group is households whose parents were employees. The results suggest that there is no difference in yearly housing wealth gains between households whose parents were employees and whose parents were self-employed. However, households whose parents were farmers accrue less in housing wealth for an additional year of homeownership and the yearly gain difference could be ¥73.51 thousand.

Table 7-13. Heterogeneity: parental characteristics

	(1)	(2)
Years since purchase	134.817***	140.895***
	(18.05)	(17.71)
Years sincepurchase*hukou_parent	-55.468***	
	(21.34)	
Years since purchase*employmenttype_self-employment		-31.915
		(43.40)
Years since purchase*employmenttype_farmer		-73.511***
		(21.43)
Constant	577.965	650.698
	(741.30)	(724.97)
Within R-squared	0.157	0.160
Controls	Yes	Yes
Household FE	Yes	Yes
Year FE	Yes	Yes
City FE	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

To recapitulate, in this section, H2d is tested. The results show that the increases in housing wealth do vary with the household's characteristics. Of all these characteristics, household economic status (income and work unit), hukou status, and parental characteristics are of significance. However, the migration status plays no role in the housing wealth gains.

7.6 Conclusion

Homeowners are generally found to be wealthier than tenants, and most of this advantage in wealth arises from the accumulation of housing wealth, which may not be met by tenants' accumulation of other wealth types. As the second part of the empirical analysis and the first part to explain the causal link through mechanism analysis, this chapter explores housing wealth accumulation patterns and factors that impact housing wealth accumulation in the context of China. The research findings of this chapter are enumerated below.

First, housing market processes are moving away from a savings and repayments approach to the accumulation of housing assets via housing price appreciation. Between the period 1988 to 2009, when market-oriented housing reform started and the housing market experienced stable price growth, households in China relied on savings to build wealth. When housing prices increased rapidly since 2009, the effort-housing equity relationship has broken-down and unearned house price appreciation is now the main mode of accruing

housing wealth. Reliance on active savings is no longer enough to meet the rising entry deposits for most low- and middle-income households. Consequently, multifaceted and combined modes are deployed by these households to secure their access to homeownership in the future. Housing price appreciation accounts for an increasing share of the housing equity gains. Homeownership is quite beneficial in many ways. A speculative strategy has been employed by some households, while housing policies are not well prepared to cope with the challenges caused by speculation activities.

Secondly, the empirical results in this chapter show that both fixed commitments and house price appreciation helps to accumulate housing wealth, with house price appreciation dominating. The empirical evidence also suggests the negative effect of transition into homeownership on the residual saving. This mirrors the trade-off between active saving and enforced savings. There is no significant difference in saving behaviour between homeowners and renters. The favourable status of homeowners over renters in terms of wealth holdings mainly would come from house price appreciation rather than fixed commitments through mortgage repayments and changed saving behaviour.

Thirdly, I examined the importance of holding period, retaining the homeownership, the timing of purchase, the location of housing, the source of houses in accruing housing wealth, and mortgage status. The empirical results support the idea that the duration of homeownership turns out to play a critical role in accumulating housing wealth. The longer a household stays in homeownership, the more wealth they would accrue. This chapter indeed supports that there is a difference in housing wealth accumulation between homeowners who retain their homeownership and who lose their homeownership. This timing of purchase also turns out to make a difference in accumulating housing wealth. Especially, the geographic location of housing turns out to be extremely important for households to benefit from homeownership. House price appreciation varies by geographic location and great disparities exist across different regions and city tiers. Households in eastern China and first-tier cities experience more housing value appreciation than households in other areas. Additionally, commercial housing undergoes the most rapid yearly housing value appreciation, followed by houses subsidised by the government and houses from other sources. The analysis also suggests that at the beginning of homeownership, the yearly housing wealth accumulation could be indifferent to partial homeowners and outright homeowners, or partial homeowners accrue less housing wealth than outright homeowners. As years accrue, a significant catch-up effect is founded for

homeowners with housing debts, narrowing the wealth gap between partial homeowners and outright homeowners, possibly due to homeowners who have housing debts are more likely to be multiple property owners, less likely to be first-time purchasers, and more likely to trade up.

Fourthly, the heterogeneous effect across household characteristics is explored. The results suggest that each additional year since first purchase is connected with more housing wealth gains for high-income households, households heads who worked in the public sector and with non-agricultural hukou, households whose parents work as employees and self-employers than for low-income households, households whose head works in non-public sectors, households with agricultural hukou, households whose parents were peasants. No significant difference between native households and migrant households is found in this chapter.

The next chapter examines the effect of owner-occupation on non-housing wealth.

Chapter 8 Owner-occupation and non-housing wealth

8.1 Introduction

After examining the housing wealth accumulation patterns and factors that influence housing wealth accumulation in the last chapter, this chapter aims to explore the relationship between owner-occupation and non-housing wealth, as another imperative sub-analysis to identify the causal link between homeownership and wealth gains and test H3a to H3d. As two pivotal components of non-housing wealth, financial wealth and business wealth will be specially noted. It is widely believed that homeowners not only accumulate housing wealth, but they are likely to accrue more other types of wealth, which contributes to the situation in which homeowners garner a wealth advantage that goes further beyond their housing equity and profits from house price gains. The specific research question that is linked to this stage of the analysis is as follows:

> [RQ 3] How does the transition into homeownership influence the accumulation of non-housing wealth, especially financial and business wealth?

This chapter first relates to the literature on the relationship between housing and non-housing wealth. The existing literature concerning the effect of homeownership on non-housing wealth shows contradictory results. The positive impact of homeownership on non-housing wealth is found in early research, such as Di et al. (2007), Grinstein-Weiss et al. (2013) and Turner and Luea (2009). With the advancement of research methods in solving endogeneity problems, recent studies tend to find evidence of negative effects (Beracha & Johnson, 2012; Kaas et al., 2019; Rappaport, 2010), and insignificant effects as well (Dietz & Haurin, 2003; Zavisca & Gerber, 2016), which argue that the difference in accruing the non-housing wealth between homeowners and renters could be driven by selection bias or omitted time-invariant variables.

This chapter also connects to the relevant literature on the effect of housing on household portfolio choices, namely the structure of financial assets. In this strand of research, the wealth effect, crowding-out effect, and collateral effect are the three pillars that help explain the whole picture of this effect. On the one hand, some research stresses that wealth improvement from housing capital gain allows households to be less risk-averse and engage

in riskier investments in equity products (Campbell & Cocco, 2007; Cardak & Wilkins, 2009; Chetty & Szeidl, 2007; Shum & Faig, 2006; Sinai & Souleles, 2005; Wachter & Yogo, 2010). On the other hand, the fixed commitments and overinvestment in housing could reduce the demand for financial assets (Chetty et al., 2017; Cocco, 2005; Flavin & Yamashita, 2002; Grossman & Laroque, 1990; Heaton & Lucas, 2000; Yamashita, 2003). Furthermore, in some cases, higher housing prices increase collateral values and the net wealth of borrowers, a situation that may provide homeowners with more liquidity and easy access to the stock market (Canner et al., 2002). In the context of China, accenting the effects of housing on households' portfolio decisions, particularly the possibility and degree of participation in risky financial assets such as stocks can also be found (e.g., Z. He et al., 2019; X. Shi et al., 2020; J. Zhao & Li, 2017; Q. Zhou et al., 2017).

In a similar vein, this chapter relates to the literature on exploring the effect of housing on business start-ups. Three main channels are identified in existing research: crowding-out channel, wealth channel, and collateral channel. One strand of these studies has found a negative relationship between homeownership and self-employment, for instance, Sinai and Souleles (2005), Davidoff (2006), and Bracke et al. (2014, 2018), highlighting that the high risk of mortgage repayments of homeownership could crowd out the possibility to start a business. Another strand of prior research tests the wealth channel from homeownership to entrepreneurship. These studies suggest that positive wealth shocks from housing capital gains could increase preferences for self-employment (Hurst & Pugsley, 2011; Kerr et al., 2015). The most outstanding and frequently examined channel of the three channels, nonetheless, lies in the collateral channel, which has drawn the most attention from researchers in the area of behavioural studies. Housing can be used as collateral that enables households to relax borrowing constraints, have better access to credit and thus start a business (Berger et al., 2018; Connolly et al., 2015; Corradin & Popov, 2015; Harding & Rosenthal, 2017; Lustig & Van Nieuwerburgh, 2010; Ortalo-Magné & Rady, 2006; Schmalz et al., 2017). In China's context, the effect of housing on self-employment, namely the possibility of becoming an entrepreneur is also similar (S. Liu & Zhang, 2021).

For the separate part of non-housing wealth, there are a few studies that link homeownership and financial wealth holdings (e.g., Kaas et al., 2019; Lersch & Dewilde, 2018). Further, nearly no research can be found in exploring the direct relationship between homeownership and business wealth holdings. Unsurprisingly, the mechanisms from homeownership to non-housing wealth are also unclear. This chapter will fill in these voids in the research literature

by directly examining the relationship between home tenure choice and non-housing wealth (including financial wealth and business wealth) in the context of China. Enlightened by the literature, this chapter will use the wealth effect, collateral effect, and crowding-out effect to explore the possible mechanisms by which the link between homeownership and non-housing wealth (including financial wealth (assets) and business wealth (assets)) could be established.

In recent years since 2009, China has experienced rapid housing price appreciation, generating considerable wealth gains for homeowners. This creates a good opportunity to examine the existence of wealth effect, whose test relies on the fluctuations in housing wealth. Nonetheless, the continual one-way rise in house prices in China has also formed a strong belief that purchasing houses is a profitable investment over other assets. Accompanied by the underdevelopment of the financial market in China and the asymmetrical information between buyers and sellers, China's situation creates a good atmosphere to verify the existence and magnitude of the crowding-out effect. To some extent, due to the high restrictions on collateral, the collateral effect may not be as effective as this in advanced economies, which is worth studying further in this chapter.

To solve the endogeneity problem, the main research method used in this chapter is similar to Chapter 6, namely DID model. In a similar vein, a series of robustness checks will also be implemented. Considering the special data characteristics in financial assets and business assets, where a large number of households do not own any of them, the Tobit model and Poisson model will also be employed in this chapter.

Using CHFS, this chapter finds that there is no significant difference in non-housing wealth holdings between owner-occupiers and renters. The collateral effect does play a role in the relationship between homeownership and business wealth holdings, while this effect is indiscernible in the link between homeownership and financial wealth holdings. In terms of the wealth effect, significant results are found in both the financial wealth holdings (except for low-risk financial wealth) and business wealth holdings, although it turns out that the wealth effect may not be attributed to the changes in risk preference, awareness of financial information and financial knowledge. Regarding the crowding-out effect, the investment in housing assets significantly reduces the holdings of financial wealth, while evidence of the crowding-out effect cannot be found for high-risk financial wealth and business wealth holdings. Combining these effects, the impact of homeownership on non-housing wealth

holdings may be ambiguous in different contexts. It is also possible that insignificant results could arise from the short observation period in this survey.

The rest of this chapter proceeds as follows: Section 8.2 develops the models which will be used to estimate the impact of housing on non-housing wealth accumulation (including financial wealth and business wealth). The main results are displayed in Section 8.3, and Section 8.4 conducts a series of robustness checks including a subsample whose acquisition of houses would be more likely to be endogenous, to support the results presented in Section 8.3. Section 8.5 examines mechanisms through which the relationship between homeownership and financial wealth and business wealth could be constructed: collateral effect, wealth effect, and crowding-out effect. Section 8.6 summarises this chapter and explores its limitations of the chapter.

8.2 Model establishment

In this section, I provide the solution to the specification and offer the intuition for households' non-housing wealth (including financial wealth and business wealth) responses to owner-occupation. To investigate the impacts of ownership on non-housing wealth, I construct the basic empirical specification by using DID model which goes as follows:

$$NHWealth_{it} = \alpha + \beta Owneroccupation_{it} + X_{it}'\delta + \gamma_i + \lambda_t + \theta_c + \varepsilon_{it} \quad (8.1)$$

where $NHWealth_{it}$ is a set of variables including non-housing wealth, financial wealth (financial assets net of financial debts) and business wealth (business assets net of business debts). Other variables are the same as those in Chapter 6. Since non-housing debts account for a small share of assets, these variables are closely related to assets. Therefore, an examination of asset variables may help to better understand the relationship between ownership and non-housing wealth. The results on non-housing assets (including financial assets and business assets) will also be provided.

In this thesis, financial assets include cash, saving deposits, stocks, bonds, funds, derivatives, wealth management, foreign currency assets, gold, other financial assets, and lending. Based on risk, I decompose financial assets into risky investments and risk-free financial wealth including cash, saving deposits, other financial assets, and lending. The former risky investment can be further divided into two types: high-risk investment including stocks, funds, derivatives, and foreign currency assets; and low-risk investment consisting of bonds,

wealth management, and gold. To fully examine the effect of homeownership on financial wealth (assets), analyses replicating Equation (8.1) on the segments of financial wealth (risky investment, high-risk investment, low-risk investment, and risk-free financial wealth) will be offered.

Since a large number of households do not own any amount of risky investment (including high-risk investments and low-risk investments), risky investment is greater than or equal to zero, the Tobit model will be employed. The Tobit model can be described in terms of a latent variable:

$$Riskyinvestment_{it}^{*} = \alpha + \beta Owneroccupancy_{it} + X_{it}'\delta + \gamma_i + \lambda_t + \theta_c + \varepsilon_{it} \qquad (8.2)$$

$Riskyinvestment_{it}^{*}$ is a latent variable that can be written as a linear function of the regressors and the observed variable $Riskyinvestment_{it}$ satisfies:

$$Riskyinvestment_{it} = \begin{cases} Riskyinvestment_{it}^{*} & if\ Riskyinvestment_{it}^{*} > 0 \\ 0 & if\ Riskyinvestment_{it}^{*} \leq 0 \end{cases}$$

$Riskyinvestment_{it}$ represents a set of variables including risky financial assets, high-risk financial assets and low-risk financial assets of household i in period t.

When the response is nonnegative and takes a lot of zeros, the fixed effects Poisson estimator is often the most convincing due to its robustness (Nichols, 2010; Wooldridge, 1999). Considering the benefits of the fixed effects Poisson model, I employ the Poisson model as well to estimate the impacts of owner-occupation on risky investments. Although business wealth (assets) is also a variable that takes on the value of zero with positive probability and other values are continuous, there are some negative values, which restricts the use of the Tobit model and Poisson model on business wealth and assets.

The holding of financial wealth (assets) and business (assets) are linked to the participation in financial wealth and business wealth, namely whether the household participates in financial investment and business project. As the literature suggests, an increasing number of studies in China have investigated the impact of housing (housing wealth or housing capital gains) on participation in stock investment and business start-ups (e.g., He et al., 2019; Liu and Zhang, 2021; Shi et al., 2020; Zhao and Li, 2017; Zhou et al., 2017), all supporting the positive effect of housing equity increase in promoting the probability of participating in

financial investment or business creation. To better capture the effect of home tenure on the holdings of financial wealth and business wealth, I, therefore, also examine the effect of transition into homeownership on the behaviours in the financial market and self-employment, I conduct basic regression using the Logit model:

$$Log\frac{P(Y_{it}=1)}{P(Y_{it}=0)} = \alpha + \beta Owneroccupancy_{it} + X_{it}'\delta + \gamma_i + \lambda_t + \theta_c + \varepsilon_{it} \quad (8.3)$$

where Y_{it} include a set of variables, *Business, StockOwnership* and *BondOwnership*. *Business* equals one if the household operates a business project and zero otherwise. *StockOwnership* is equal to one if the household participates in high-risk investment and zero otherwise, *BondOwnership* is equal to one if the household takes part in low-risk investment and zero otherwise.

8.3 Empirical results

Table 8-1 presents the estimates of the baseline model that corresponds with Equation (8.1). Columns (1) and (2) of Table 8-1 report the results of owner-occupation on non-housing assets and non-housing wealth, respectively. Columns (3) and (4) present the results on financial assets and financial wealth (financial assets minus debts that belong to financial assets), whilst the results on business assets and wealth (business assets minus business debts) are reported in columns (5) and (6). All coefficients are statistically non-significant, showing that owner-occupiers are not likely to own more non-housing wealth (assets) and its components, i.e., financial wealth (assets) and business wealth (assets) than tenants.

As mentioned in Section 8.2, considering financial assets can be categorised into risky investment and risk-free investment and risky investment can be further partitioned into high-risk investment and low-risk investment, I investigate the effects of owner-occupation on risky investments, high-risk investments, low-risk investments, and risk-free financial wealth, respectively. The results on categorised financial wealth holdings are reported in Table 8-2. All these results are still insignificant and the results for assets and wealth are generally consistent.

Table 8-1. Owner-occupation and non-housing wealth holdings

	Non-housing		Financial		Business	
	Asset	Wealth	Asset	Wealth	Asset	Wealth
	(1)	(2)	(3)	(4)	(5)	(6)
Owner-occupation	37.905	34.408	-1.084	4.208	9.760	6.263
	(34.01)	(33.90)	(10.63)	(11.34)	(15.42)	(15.42)
Constant	232.179	431.427	-58.608	20.293	13.706	212.954
	(636.02)	(629.48)	(248.12)	(261.45)	(236.47)	(218.27)
Observations	2,994	2,994	2,994	2,994	2,994	2,994
Within R-squared	0.114	0.0996	0.101	0.0957	0.0827	0.0619
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 8-2. Owner-occupation and categorised financial wealth holdings

	Risky investment		High-risk investment		Low-risk investment		Risk-free financial
	Asset	Wealth	Asset	Wealth	Asset	Wealth	Asset/Wealth
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Owner-occupation	-3.219	-2.948	-0.725	-0.635	-2.494	-2.313	7.157
	(7.26)	(7.25)	(4.62)	(4.61)	(4.86	(4.85)	(7.15)
Constant	40.666	37.649	-1.454	0.614	42.12	37.035	-17.356
	(140.13)	(139.42)	(99.17)	(99.02)	(90.42)	(89.68)	(170.83)
Observations	2,994	2,994	2,994	2,994	2,994	2,994	2,994
Adjust-squared	0.562	0.564	0.534	0.534	0.355	0.357	0.471
Within R-squared	0.0934	0.0938	0.0485	0.0482	0.0765	0.0777	0.058
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Following that, I also use the Tobit model and Poisson model to estimate the effects of owner-occupation on risky financial assets (including high-risk financial assets and low-risk financial assets). The reason I use the variables of assets rather than wealth is that wealth, in some cases, could be negative. The reason also applies to paying no attention to business assets as some households have non-positive business assets. The results of the Tobit model

are reported in Table 8-3 and the results of the Poisson model are presented in Table 8-4. These results suggest, as expected, insignificant effects.

Table 8-3. Owner-occupation and non-housing assets: Tobit model

	Risky investment	High-risk investment	High-risk investment
	(1)	(2)	(3)
Owner-occupation	-2.810	-11.911	15.917
	(20.85)	(23.06)	(19.74)
Constant	-640.772	-386.415	-507.529
	(398.92)	(430.61)	(408.24)
Observations	2,994	2,994	2,994
Number of households	998	998	998
Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
City FE	Yes	Yes	Yes
Wald chi2	497.7	295.2	294.4

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 8-4. Owner-occupation and non-housing assets: Poisson model

	Risky investment	High-risk investment	High-risk investment
	(1)	(2)	(3)
Owner-occupation	-0.185	-0.170	0.031
	(0.17)	(0.19)	(0.37)
Observations	1,050	657	753
Number of households	350	219	251
Controls	Yes	Yes	Yes
Household FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
City FE	Yes	Yes	Yes
Wald chi2	343.8	200.2	383.7

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

The results of Equation (8.3) are presented in Table 8-5. Columns (1), (3) and (5) show the effect of home tenure on participation in business projects, high-risk investments, and low-risk investments using fixed-effect models. Results of Logit models are correspondingly reported in columns (2), (4) and (6). The results suggest that homeowners are not more likely to participate in business projects, high-risk investments, and low-risk investments. In general, the results in this table indicate that the behavioural changes in terms of inducing

people to participate more in the financial market and business start and business investment cannot be generated.

Table 8-5. Owner-occupation, business, stock, and bond ownership

	Business		StockOwnership		BondOwnership	
	(1) FE	(2) Logit	(3) FE	(4) Logit	(5) FE	(6) Logit
Owner-occupation	0.015	0.132	-0.019	-0.391	0.024	0.032
	(0.02)	(0.42)	(0.02)	(0.36)	(0.02)	(0.32)
Constant	0.109		0.038		-0.913**	
	(0.37)		(0.37)		(0.43)	
Observations	2,994	621	2,994	468	2,994	717
Within R-squared	0.2		0.0238		0.0562	
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes	Yes	Yes
LR chi2		216.2		54.69		157.2

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Combining the results in the above tables, the transition into owner-occupation is not associated with more holdings of non-housing wealth, financial wealth, and business wealth. The results reject H3a which postulates a positive influence on non-housing wealth holdings. Additionally, Owner-occupiers are also not more likely to participate in business projects, high-risk investments and low-risk investments, compared to households retaining in the rental market during the whole survey period. Thus, the results indicate that the favourable status in wealth holdings of homeowners over renters does not arise from owner-occupation accumulating more non-housing wealth. Homeowners owing more non-housing wealth than renters may just arise from self-selection.

8.4 Robustness check

As noted in Chapter 6, the use of owner-occupation as the independent variable may be biased since some tenants may own houses in other places. These households' holdings of financial wealth and business wealth may also be influenced by owning houses in other places. For example, tenants who have houses in other places also benefit from housing capital gains and thus change their risk preference or these tenants' left income is reduced due to the overinvestment in the houses they owned and then they have no sufficient assets

to invest in financial investment and business. Possibly, these tenants use the houses they own at other places as collateral to apply for a loan and invest in financial wealth and business wealth. In such a case, homeownership would appear to have little or no effect on financial wealth holdings and business wealth holdings, whereas homeownership plays a role in the holdings of financial wealth and business wealth.

Hence, I replace owner-occupation with homeownership, as I did in Chapter 6. The results using homeownership as the independent variable are presented in Table 8-6. The results are generally identical to the main results presented in Table 8-1 and Table 8-2. All results are statistically insignificant except for non-housing wealth. The results in column (1) show that the transition into homeownership is positively associated with non-housing wealth holdings as a total, which is significant at the 10% level. The results generally support no significant role that the transition into homeownership plays in promoting the holdings of financial wealth and business wealth.

Table 8-6. Homeownership and non-housing wealth holdings

	Non-housing	Financial	Risky investment	High risk	Low risk	Risk-free	Business
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Homeownership	42.154*	16.993	5.024	1.922	3.102	11.969	-8.573
	(24.79)	(11.96)	(6.03)	(4.31)	(3.71)	(8.16)	(7.18)
Constant	-248.49	166.552	98.772	29.045	69.727	67.78	-171.73
	(452.2)	(282.22)	(144.95)	(107.32)	(88.48)	(192.01)	(159.69)
Observations	1,962	1,962	1,962	1,962	1,962	1,962	1,962
Within R-squared	0.0864	0.104	0.145	0.0748	0.117	0.0464	0.0465
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

The housing market in China is complex with the existence of market operation, governmental help, and financial aid from work units. Under this specific context of the housing market in China, the acquisition of houses for some households, such as affordable houses purchased from governments, houses obtained from inheritance as a present, and

houses purchased at a discount price from the work units where household members work, cooperative-constructed houses obtained from the work units, and houses obtained from shantytown renovation programs is beyond the family's control and independent of the family's financial arrangements, hence the related housing variables for these households are reasonable to be considered exogenous to some extent.

To solve the endogeneity problems existing in owner-occupation, especially for the problem of reverse causality, I conduct a robustness check by examining particularly those households whose houses were acquired exogenously by the unique features of the housing system in China. In CHFS, house sources are listed as the following types in 2013: (1) Houses purchased directly from housing markets; (2) Affordable houses purchased from governments, such as economic and comfortable houses, limited price houses; (3) Houses obtained from inheritance as a present; (4) Houses purchased at a discount price from the work units where household members work; (5) Cooperative-constructed houses obtained from the work units; (6) Self-built houses; (7) Houses obtained from shantytown renovation programs; (8) Small property houses; (9) Houses sources are not clear. I categorise these sources into two groups: One class includes house source types of (1), (6), (8), and (9). These houses are correlated with households' financial situation or other time-variant variables, which may simultaneously influence related housing variables and financial wealth arrangement. Another class includes the rest house sources (2), (3), (4), (5), and (7). Houses in this class are less likely to be influenced by households' decisions. For instance, houses in (4) and (5) rely on the status of work units. Houses in (2) and (7) are the decision made by local governments. Houses inherited from parents or grandparents can be an instrumental variable for homeownership (Kaas et al., 2019). The homeownership for such houses is independent of households' financial wealth holdings, and thus can be reasonably regarded as exogenous. I only keep households whose houses belong to the second class. The robustness check on this subsample could decrease the possibility that the relationship between related housing variables and non-housing wealth holdings is driven by other time-variant variables, which would help to understand the causal link between homeownership and non-housing wealth.

The result of this robustness check by repeating the basic model Equation (8.1) is reported in Table 8-7. In this subsample, housing variables can be treated as being exogenous. The results are still statistically non-significant in all cases, showing that we cannot reject the

null hypothesis that there is no significant difference in financial wealth holdings and business wealth holdings between owner-occupiers and renters.

Table 8-7. Endogenous owner-occupation and non-housing wealth holdings

	Non-housing	Financial	Risky investment	High risk	Low risk	Risk-free	Business
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Owner-occupation	59.63	-17.685	-19.177	-10.405	-8.772	1.492	62.395
	(57.37)	(26.65)	(16.36)	(11.27	(9.69)	(14.37)	(45.2)
Constant	-196.426	521.588	617.706**	338.531*	279.175	-96.12	-247.786
	(883.04)	(514.21)	(280.13)	(196.08)	(179.59)	(295.6)	(387.71)
Observations	942	942	942	942	942	942	942
Within R-squared	0.155	0.185	0.175	0.0978	0.206	0.133	0.129
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

8.5 Mechanisms

Both the main results and those of the robustness checks suggest that the transition into owner-occupation is not associated with more holdings of non-housing wealth, financial wealth, and business wealth. In the existing literature regarding the effect of housing on the probability to invest in the financial market and start a business, wealth effects, crowding-out effects and collateral effects are frequently noted. More specifically, the potential reasons that housing would increase the probability to participate in the financial market and translate to becoming an entrepreneur are that housing capital gains alleviate household credit constraints, reduce risk aversion, increase awareness of financial information, and help the acquisition of knowledge. Meanwhile, housing could be used as collateral to finance financial investment and business investment, while the negative effect of the probability arises from the overinvestment in housing assets decreasing the available assets and the intention to keep the risk level constant when overinvestment raises the overall risk. Borrowing from this strand of literature, I investigate these channels one by one in the following section, testing H3b, H3c, and H3d.

8.5.1 Collateral effect

In most advanced economies, one channel through which owner-occupation could influence financial wealth holdings and business wealth holdings is that housing can be used as collateral to credit financially constrained households. If they do not own a house, it may be impossible for them to start a business and/or expand their business due to the constraints on their financial situation. In China, like in France, an institutional feature is that only houses without a mortgage can be used as collateral for other loans informal financial market (Z. He et al., 2019). Nonetheless, many finance companies provide loans to businesses. Homeowners with partial property rights could increase their odds of receiving loans from the informal financial sector when they hold housing. Additionally, the number of loans could be higher compared with them not being a homeowner. However, most households would use their houses to invest in a business or start a business rather than participate in financial markets. So, it could be assumed that the collateral effect would only work for business wealth investment while not for financial investment.

I examine the direct effect of owner-occupation on total debts minus housing debts, debts in financial investment and debts in business. I first examine the effect of owner-occupation on total debts minus housing debts using the fixed effect estimate, Tobit estimate and Poisson estimate. The results are shown in columns (1), (2) and (3) of Table 8-8. None of the estimates is statistically significant. The results on financial debts are also insignificant. Using the fixed-effect model, the results in column (4) show that the transition into owner-occupation makes no difference in debts in financial investment. In terms of business debts, the results using the fixed-effect model (column (5)) and Tobit model (column (6)) are statistically insignificant, while the results of coefficient and incidence-rate ratios using the Poisson model (columns (7) and (8)), however, are both significant. In conjunction with the insignificant results on business assets and business wealth in Table 8-1, the significant effect on business debt using the Poisson model tends to show that the transition into owner-occupation creates greater levels of debt accumulation, without translating into wealth gains for households, consistent with the idea of Montgomerie & Büdenbender (2015). The results for homeownership are reported in Appendix Table A8.1, which also supports the insignificant effect on financial investment and the significant effect on business investment.

In summary, the results in Table 8-8 suggest that the collateral effect may not exert an influence on debts in financial investment, however, the collateral effect is moderately

discernible for debts in business. The results presented in this section partly support H3b postulating that the collateral effect may only work in promoting business wealth while not in financial wealth holdings.

8.5.2 Wealth effect

Another potential mechanism through which the transition into homeownership might affect financial wealth holdings and business wealth holdings is via a wealth effect. I first directly examine the effects of log housing wealth on financial wealth holdings and business wealth. Since the links between log housing wealth and financial wealth and business wealth will be nonlinear, I add the quadratic of log housing wealth into these specifications. Further, I also report the results of Tobit models for risky investments, high-risk investments and low-risk investments.

The results for financial wealth and business assets/wealth are reported in Table 8-9, Table 8-10, and Table 8-11, respectively. All the results using different specifications are statistically significant, except for the estimate of the low-risk investment. It turns out that the relationship between housing wealth, financial wealth holdings and business wealth holdings is nonlinear and U-shaped. When housing wealth is relatively small, housing equity is negatively related to financial wealth holdings and business wealth holdings. As housing wealth increases, housing wealth is positively correlated with financial wealth holdings and business wealth holdings. As an example, the U-shaped relationship between the log housing wealth and total financial wealth is plotted in Figure 8-1 and the corresponding marginal effect is graphed in Appendix Figure A8.1. Figure 8-1 indicates that when log housing wealth is less than 2.88, the increase in housing wealth leads to a decrease in total financial wealth, while when log housing wealth is greater than 2.88, the increase in housing wealth leads to a rise in total financial wealth. Correspondingly, Appendix Figure A8.1 shows that the marginal effect of log housing wealth is negative at first and then translates into positive and only the marginal effect on the turning point is not statistically significant from zero.

Table 8-8. Collateral effect: debts and owner-occupation

	Debt_other			Debt_finance	Debt_business			
	FE	TOBIT	POISSON	FE	FE	TOBIT	POISSON	
	(1) Coe.	(2) Coe.	(3) Coe.	(4) Coe.	(5) Coe.	(6) Coe.	(7) Coe.	(8) Irr
Owner-occupation	3.497	-15.422	0.282	-0.271	5.253	43.652	0.745*	2.107***
	(4.16)	(10.63)	(0.25)	(0.2)	(3.56)	(31.88)	(0.42)	0.88
Constant	-199.248*	-526.131**		3.017	-157.204*	-1,145.81		
	(104.39)	(207.77)		(4.87)	(91.65)	(782.02)		
Observations	2,994	2,994	1,428	2,994	2,994	2,994	387	
Within R-squared/Wald chi2	0.071	355.6	114.4	0.0145	0.0753	208.2	191.6	
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Household FE	Yes	/	Yes	Yes	Yes	/	Yes	
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
City FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Simonsohn and Nelson (2014) and Simonsohn (2018) argue that relying on the quadratic to predict the U-shaped relationship, nevertheless, could be problematic because the quadratic could be still significant where a true U-shape is not present so the statistical significance of the coefficient on the quadratic would be a necessary but not a sufficient condition for the evidence of the existence of nonlinearity. They provide new instructions for testing the U-shaped relationship. To more precisely document the nonlinear relationship between log housing wealth and non-housing wealth holdings, I generate three new variables to test the U-shaped relationship based on Simonsohn and his colleague's instructions. The first one is *Housingwealth_low*, which is equal to the difference between the log housing wealth and the turning point when the logarithm value is less than the turning point and zero otherwise. The second added variable is *Housingwealth_high,* which is defined as the difference between log housing wealth and the turning point when the log housing wealth is great than the turning point and equal to zero otherwise. The third variable is *High_1*, which equals one if the log housing wealth is greater than the turning point and zero otherwise.

The results are shown in Table 8-13. All the coefficients on *Housingwealth_low* and *Housingwealth_high* are opposite so the relationship between log housing wealth and financial wealth holdings and business wealth holdings is U-shaped. However, most of the coefficients on *Housingwealth_low* are insignificant while all the coefficients on *Housingwealth_high* are statistically significant except for low-risk financial investment. This could be because most observations have log housing wealth greater than the turning points, so only the relationship on the right side would be meaningful. Taken together, the significant coefficients on *Housingwealth_high* suggest the existence of the wealth effect, with no wealth effect existing on low-risk investments, such as bonds, partly supporting H3c.

Table 8-9. Wealth effect: housing wealth and total financial wealth, risky investments and risk-free investments

	Financial	Risky investment_wealth	Risky investment_asset			Risk-free
	FE	FE	FE	TOBIT	POISSON	FE
	(1)	(2)	(3)	(4)	(5)	(6)
Lnwealth_housing	-22.736***	-10.763**	-10.745**	-29.182**	-9.138***	-11.973***
	(7.35)	(4.57)	(4.57)	(12.12)	(2.22)	(4.3)
Lnwealth_housingwealth^2	3.947***	1.896**	1.897**	5.437***	1.829***	2.051***
	(1.29)	(0.83)	(0.83)	(1.74)	(0.32)	(0.75)
Constant	44.865	51.065	54.158	-689.961*		-6.2
	(260.31)	(138.41)	(139.14)	(397.79)		(171.34)
Observations	2,994	2,994	2,994	2,994	2,994	2,994
Within R-squared/Wald chi2	0.103	0.0991	0.0987	515.9		0.0626
Controls	Yes	Yes	Yes	Yes		Yes
Household FE	Yes	Yes	Yes	/		Yes
Year FE	Yes	Yes	Yes	Yes		Yes
City FE	Yes	Yes	Yes	Yes		Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 8-10. Wealth effect: housing wealth and high-risk investment and low-risk investment

	High-risk investment_wealth	High-risk investment_asset			Low-risk investment_wealth	Low-risk investment_asset		
	FE	FE	TOBIT	POISSON	FE	FE	TOBIT	POISSON
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lnwealth_housing	-7.627**	-7.580**	-30.148**	-3.468**	-3.136	-3.165	-10.765	-1.088
	(3.66)	(3.66)	(13.37	(1.54)	(3.05)	(3.06)	(11.74)	(1.19)
Lnwealth_housingwealth^2	1.449**	1.450**	5.122***	0.589***	0.447	0.448	2.475	0.25
	(0.67)	(0.67	(1.91)	(0.22)	(0.54)	(0.54)	(1.67)	(0.17)
Constant	9.575	7.483	-404.617		41.489	46.674	-562.963	
	(98.72)	(98.86)	(428.51)		(89.5)	(90.25)	(408.32)	
Observations	2,994	2,994	2,994	2,994	2,994	2,994	2,994	2,994
Within R-squared/Wald chi2	0.0553	0.0558	305.6		0.0784	0.0772	298.7	
Controls	Yes	Yes	Yes		Yes	Yes	Yes	
Household FE	Yes	Yes	/		Yes	Yes	/	
Year FE	Yes	Yes	Yes		Yes	Yes	Yes	
City FE	Yes	Yes	Yes		Yes	Yes	Yes	

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 8-11. Wealth effect: housing wealth and business assets/business wealth

	Wealth_business (1)	Asset_business (2)
Lnwealth_housing	-18.569*	-18.809*
	(10.80)	(10.80)
Lnwealth_housingwealth^2	3.510**	3.442**
	(1.73)	(1.71)
Constant	231.947	31.728
	(217.85)	(234.15)
Observations	2,994	2,994
Within R-s squared	0.0654	0.0856
Controls	Yes	Yes
Household FE	Yes	Yes
Year FE	Yes	Yes
City FE	Yes	Yes

Notes: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Table 8-12. Incorporated results for the wealth effect

	Finance	Risky invest.		High-risk		Risk-free	Business
	FE	FE	TOBIT	FE	TOBIT	FE	FE
lnwealth_housing^2	3.947	1.896	1.829	1.449	0.589	2.051	3.51
lnwealth_housing	-22.736	-10.763	-9.138	-7.627	-3.468	-11.973	-18.569
TP_log housing wealth	2.88	2.84	2.50	2.63	2.94	2.92	2.65
TP_housing wealth	17.81	17.12	12.18	13.87	18.92	18.54	14.15

Source: Author's tabulation.

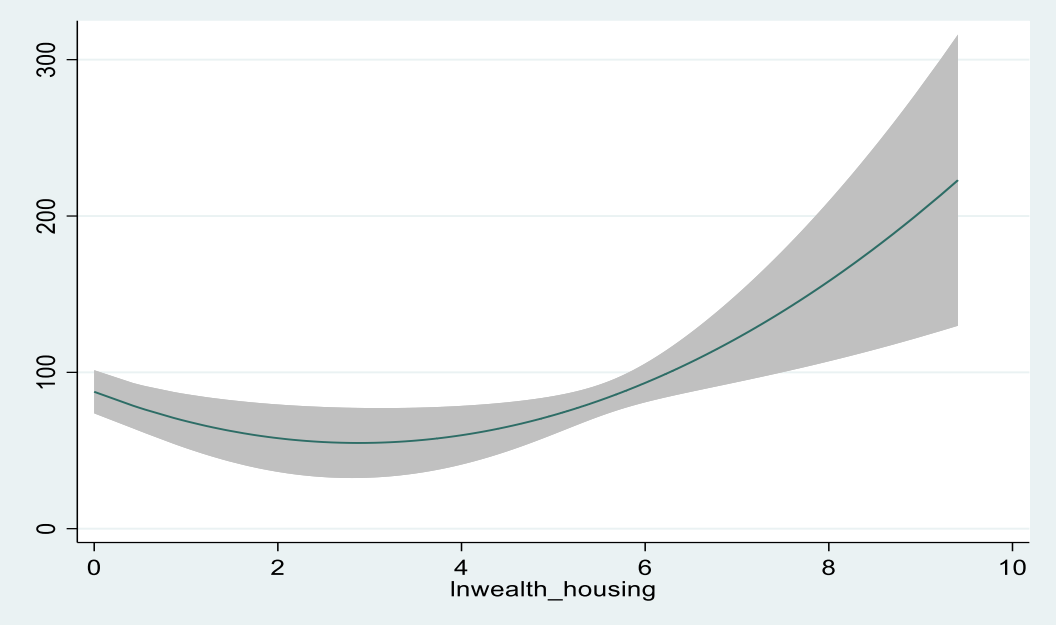

Figure 8-1. The effects of log housing wealth on total financial wealth

Table 8-13. Test for U-shape of the wealth effect

	Financial	Risky invest.	High-risk	Low-risk	Risk-free	Business
	(1)	(2)	(3)	(4)	(5)	(6)
Housingwealth_low	-10.051*	-2.159	-3.496	-0.438	-8.133**	-24.381
	(5.28)	(3.17)	(4.38)	(1.18)	(3.38)	(29.98)
Housingwealth_high	17.327**	8.022*	6.533**	1.418	8.919**	15.625*
	(6.81)	(4.15	(3.02	(2.94)	(4.13)	(8.06)
Constant	24.268	48.839	2.85	39.092	-24.399	172.878
	(261.06)	(138.66)	(99.28)	(89.59)	(171.4)	(233.81)
Observations	2,994	2,994	2,994	2,994	2,994	2,994
Within R-squared	0.0998	0.0965	0.0525	0.078	0.0608	0.0647
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Since in the existing literature, the wealth effect is closely related to the reduction in risk aversion, I then investigate whether the transition into owner-occupation affects households' taste for risk. I explore this mechanism by exploiting the information on household risk preference in CHFS. The question in CHFS used to denote risk attitude is "What is your choice among combinations of risk and return?" This question originally has 5 answers to indicate risk preference and I restructured it to 3 levels. Households with high-risk preference are equal to 1, households with middle-risk preference are equal to 2 and households with low-risk preference are equal to 3. Column (1) of tests whether owner-occupation makes households more likely to choose high-risk and high-return investments over low-risk and low-return alternatives, using a fixed-effect model. The fixed effect results in column (1) show that there is no statistically significant difference in risk preference between owner-occupiers and tenants.

I also test whether the transition into owner-occupation can increase financial wealth holdings and business wealth holdings by changing households' degree to which households care about financial knowledge and information. The question to indicate this in CHFS is "What is your degree of concern for economic and financial information?" The answers comprise extremely concerned, very concerned, generally concerned, a little concerned, and not concerned at all. The results for this indicator are similar to the results for risk preference (column (2) of Table 8-14).

Further, I examine whether the transition into owner-occupation is accompanied by more knowledge in finance and economics. This indicator is the sum of the scores of three questions: “Given a 4% interest rate, how much would you have after 5 years if you have 100RMB at first?”, “With an interest rate of 5% and an inflation rate of 3%, after saving money in the bank for 1 year, can you buy more or less than last year?”, and “Do you think stocks have greater risks than equity funds?”. The score is equal to 1 if the respondents correctly answered this question and 0 otherwise. Hence, the highest score for a household is three. The results are presented in column (3) of Table 8-14. All the estimates are statistically insignificant.

The results in Table 8-14 show that the transition into owner-occupation is not accompanied by changes in risk preference, awareness of financial information and financial knowledge. This suggests that in the short term, the widely cited wealth effect in terms of changing risk preference, awareness of financial information and financial knowledge is not as effective in promoting owner-occupiers to accumulate more financial wealth and business wealth as in other economic and behavioural outcomes, e.g., business start (S. Liu & Zhang, 2021). Correspondingly, the effect of homeownership on risk preference, awareness of financial information and financial knowledge is reported in Appendix Table A8.2. No significant effect can be found in this table too. It is worth noting, however, that this insignificance could be attributable to the short survey period. The changes in risk preference, awareness of financial information and financial knowledge may be time-consuming activities. There is a possibility that in the long term, homeowners could be more oriented toward non-housing wealth accumulation via transformation in risk preference, awareness of financial information and financial literacy.

In sum, the positive effect of housing wealth on financial wealth holdings and business wealth holdings suggests the existence of wealth effect except for low-risk financial investment. However, the changes in risk preference, awareness of financial information and financial knowledge fail to hold. There is a possibility that the widely recognised wealth effect may work through other potential channels. The results in this section are partly in accordance with H3c which supports that the wealth effect enables homeowners to hold more financial wealth and business wealth. However, they reject the effect of risk preference, awareness of financial information and financial knowledge on wealth effect.

Table 8-14. Risk preference, financial attention, financial knowledge

	Risk preference	Financial attention	Financial knowledge
	(1)	(2)	(3)
Owneroccupation	-0.024	-0.043	0.046
	(0.04)	(0.06)	(0.05)
Constant	1.548*	4.108***	0.513
	(0.79)	(1.32)	(1.12)
Observations	2,994	2,994	2,994
Within R-squared	0.0205	0.0308	0.0114
Controls	Yes	Yes	Yes
Household FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
City FE	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

8.5.3 Crowding-out effect

I now provide some evidence on another possible mechanism: the crowding-out effect. Like the wealth effect, the crowding-out effect is also widely cited as a potential channel in the relationship between housing wealth increase and the participation in investment in financial assets and business starts and business investment. In the extant literature, the crowding-out effect could work through two aspects. The first is the widely recognised background risk argument: overinvestment in housing assets exposes households to more undiversifiable risk, thereby they are reluctant to get exposed to the additional risk brought by risky investments such as stock investments and business starts. In addition to this risk argument, the high concentration of housing assets reduces the number of assets that could be put aside by households to accumulate other portfolios.

To examine the crowding-out effect, I utilise the ratio of housing assets to total household assets (housing share) as the independent variable. Possibly, the relationship between housing share and non-housing wealth holdings would be nonlinear. Therefore, I add the quadratic of housing share into the estimates. Aside from general fixed-effect estimates for all specifications, I also provide a Tobit estimator and Poisson estimator for risky investments, high-risk investments, and low-risk investments. Then I investigate the effect of housing shares on financial wealth holdings and business wealth holdings.

The results on financial wealth holdings are reported in Table 8-15 and Table 8-16. The results are statistically significant and support the existence of the crowding-out effect on

financial wealth. The negative coefficients on the quadratic of housing share suggest that the housing share is not always negatively correlated with financial wealth holdings. The relationship is inverted U-shaped. When the ratio of housing assets to total household assets is less than the turning point, the ratio is positively related to financial wealth holdings. When the housing share exceeds this point, the increase in the housing share would decrease financial wealth holdings. These turning points are presented in Table 8-18, ranging from 0.37 to 0.40, varying across different specifications. Taking total financial wealth as an example, I plot the relationship between housing share and total financial wealth holdings in Figure *8-2* and the corresponding marginal effect in Appendix Figure A8.2. When housing share is less than 0.38, an increase in housing share leads to increase in the holdings of total financial wealth. When the housing share is greater than 0.38, the increase in housing share is associated with a reduction in the holdings of total financial wealth. Appendix Figure A8.2 shows that only the marginal effect on the turning point is not statistically significant from zero. As Table 8-18 shows, in general, the turning point of housing share for financial wealth is close to 0.40. Considering on average housing assets account for about 0.75 of total household assets conditional on households who own houses, for most households in China, the effect of housing share on financial wealth holdings would lie on the right side of Figure *8-2*, which indicates the existence of crowding-out effect on financial wealth holdings.

For the crowding-out effect on business assets and business wealth, the results turn out to be statistically insignificant. The results are explored in Table 8-17. The coefficients using the fixed-effect model are insignificant. It has been argued that housing wealth changes exert no impact on the exit of business. Once households enter business operation, it would be difficult to retreat their investment in the short term. This could partly explain the insignificant result of housing share on business investment.

Following Simonsohn and Nelson's (2014) and Simonsohn's (2018) instructions, I also test the credibility of these U-shaped relationships. Similar to the methods in testing the U-shape for housing wealth, three new variables are generated. The first one is *Housingshare_low*, which is equal to the difference between the ratio of housing assets to total household assets and the turning point when the ratio is less than the turning point and zero otherwise. The second added variable is *Housingshare_high*, denoting the difference between housing share and the running point when the housing share is great than the turning point and equal to zero otherwise. The third variable is *High_2*, which equals one if the housing share is greater than the turning point and zero otherwise. Table 8-19 presents the results. All the coefficients

on *Houshingshare_low* and *Housingshare_high* have the opposite sign and in most cases, these coefficients are significant at the 1% level and 5% level, except for high-risk financial wealth and low-risk financial wealth. For high-risk investment, the coefficient of the fixed-effect model on *Housingshare_high* is insignificant and for low-risk investment, the coefficient of fixed effect on *Houshingshare_low* is insignificant. Therefore, the results show that there are statistically significant U-shapes between the ratio of housing assets to total household assets and financial wealth holdings. Nevertheless, the U-shape for high-risk financial investment and low-risk financial investment should be explained with caution.

To sum up, I find considerable crowding out of the financial wealth holdings by housing wealth. The crowding-out effect is obvious for total financial wealth, risky investments, low-risk investments and risk-free financial wealth, while no evidence of the crowding-out effect can be found for high-risk investment and business wealth. The crowding-out effect arises from risk aversion and overinvestment, according to the extant literature. Considering all these different measures, high-risk financial investment and business investment have the highest risk, while the crowding-out effect does not play a role in these two investments. It may imply that the crowding-out effect in China is mainly in the form of overinvestment. The results partly support H3d which proposes that homeownership would reduce households' holding of financial wealth due to the crowding-out effect.

Table 8-15. Crowding-out effect: housing share, total financial wealth, risky investment and risk-free investment

	Financial	Risky investment_wealth	Risky investment_asset				Risk-free
	FE	FE	FE	TOBIT		POISSON	FE
	(1)	(2)	(3)	(4) Coe.	Marginal effect	(5)	(6)
housing2asset	267.063***	88.553**	89.894**	533.474***	92.122***	3.888***	178.510***
	(59.99)	(35.98)	(36.04)	(96.31)	(16.91)	(0.86	(33.05)
housing2asset^2	-355.873***	-115.494***	-117.078***	-665.873***	-114.985***	-5.360***	-240.380***
	(65.47)	(36.9)	(36.97)	(108.16)	(19.08)	(1.00)	(37.38)
Constant	104.28	65.459	68.872	-638.496			38.821
	(265.23)	(145.65)	(146.45)	(394.46)			(168.79)
Observations	2,994	2,994	2,994	2,994	2,994	1,050	2,994
Within R-squared/ Wald chi2	0.123	0.102	0.102	530.5		361.8	0.0916
Controls	Yes	Yes	Yes	Yes		Yes	Yes
Household FE	Yes	Yes	Yes	/		/	Yes
Year FE	Yes	Yes	Yes	Yes		Yes	Yes
City FE	Yes	Yes	Yes	Yes		Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 8-16. Crowding-out effect: housing share, high-risk investment, and low-risk investment

	High-risk_wealth	High-risk_asset				Low-risk_wealth	Low-risk_asset			
	FE	FE	TOBIT		POISSON	FE	FE	TOBIT		POISSON
	(1)	(2)	(3) Coe.	Marginal effect	(4)	(5)	(6)	(7) Coe.	Marginal effect	(8)
Housing2asset	51.867**	53.543**	459.568***	52.822***	3.945***	36.686	36.351	400.412***	40.589***	4.258***
	(23.53)	(23.63)	(106.79)	(12.53)	(0.92)	(22.65)	(22.65)	(94.46)	(9.77)	(1.52)
Housing2asset ^2	-65.593***	-67.323***	-615.027***	-70.690***	-5.230***	-49.901*	-49.755*	-464.421***	-47.077***	-5.971***
	(23.20)	(23.32	(122.11)	(14.43)	(1.05)	(25.61)	(25.61)	(104.89)	(10.88	(1.76)
Constant	15.187	13.364	-307.426			50.271	55.508	-601.893		
	(106.07)	(106.13)	(427.05)			(90.3)	(91.25)	(407.14)		
Observations	2,994	2,994	2,994	2,994	657	2,994	2,994	2,994	2,994	753
Within R-squared/ Wald chi2	0.053	0.0535	318.3		265.9	0.082	0.0808	303.1		458
Controls	Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes
Household FE	Yes	Yes	/		Yes	Yes	Yes	/		Yes
Year FE	Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes
City FE	Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 8-17. Crowding-out effect: housing share and business assets business wealth

	Business_wealth (1)	Business_asset (2)
Housing2asset	-97.653	-89.386
	(89.83)	(93.57)
housing2asset^2	89.186	66.247
	(89.81)	(93.70)
Constant	205.736	15.532
	(223.56)	(242.77)
Observations	2,994	2,994
Within R-squared	0.0630	0.0843
Controls	Yes	Yes
Household FE	Yes	Yes
Year FE	Yes	Yes
City FE	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 8-18. Incorporated results for the crowding-out effect

	Finance	Risky investment		High-risk		Low-risk		Risk-free
	FE	FE	TOBIT	FE	TOBIT	FE	TOBIT	FE
Housing2asset^2	-355.873	-115.494	-114.985	-65.593	-70.691	-49.901	-47.077	-240.38
Housing2assetTP	267.063	88.553	92.122	51.867	52.822	36.686	40.589	178.51
	0.38	0.38	0.40	0.40	0.37	0.37	0.43	0.37

Source: Author's tabulation.

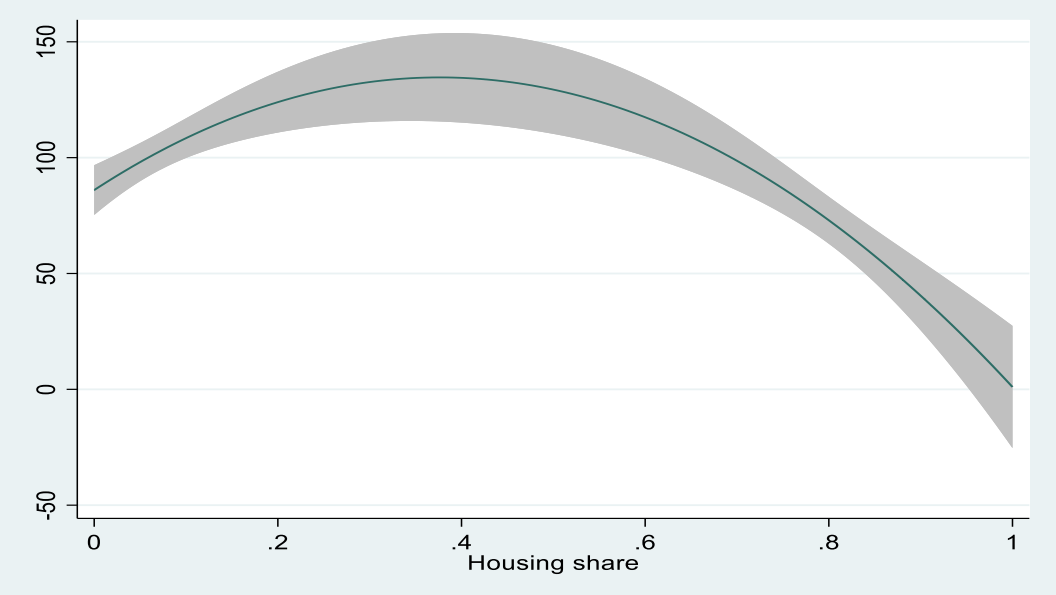

Figure 8-2. The effects of housing share on total financial wealth

Table 8-19. U-shape test for the crowding-out effect

	Financial	Risky invest.	High-risk	Low-risk	Risk-free
	(1)	(2)	(3)	(4)	(5)
Housingshare_low	264.187***	91.032**	83.768***	1.998	169.409***
	(73.51)	(41.10)	(31.05)	(30.97)	(47.90)
Housingshare_high	-219.965***	-66.874***	-20.535	-42.462**	-154.282***
	(44.53)	(25.54)	(16.69)	(17.43)	(25.60)
Constant	189.559	95.547	40.765	51.678	92.889
	(265.06)	(144.50)	(105.33	(89.86)	(168.71)
Observations	2,994	2,994	2,994	2,994	2,994
Within R-squared	0.125	0.103	0.0566	0.0833	0.0934
Controls	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Taken together, the findings thus far indicate that the collateral effect, wealth effect, and crowding-out effect on financial wealth holdings and business wealth holdings are mixed. And nuances exist among different types of non-housing wealth. The results of the channels discussed in this section are summarised in Table 8-20. The collateral effect plays a role in the relationship between owner-occupation and business wealth holdings, while this effect is indiscernible in the link between owner-occupation and financial wealth holdings. In terms of the wealth effect, significant results are found in both the financial wealth holdings (except for low-risk financial wealth) and business wealth holdings, although it turns out that the wealth effect may not be attributed to the changes in risk preference, awareness of financial information and financial knowledge. Regarding the crowding-out effect, the investment in housing assets significantly reduces the holdings of financial wealth, while the evidence of the crowding-out effect cannot be found for high-risk financial wealth and business wealth holdings. Therefore, combining these effects, the net impact of homeownership on financial wealth holdings and business wealth holdings may be ambiguous.

Table 8-20. Collateral effect, wealth effect, crowding-out effect and saving

	Financial					Business
	Total financial wealth	Risky investment	High-risk investment	Low-risk investment	Risk-free financial wealth	
Collateral effect (+)	×	×	×	×	×	✓
Wealth effect (+)	✓	✓	✓	×	✓	✓
Crowding-out effect (-)	✓	✓	×	✓	✓	×

Source: Author's tabulation.

8.6 Conclusion

Homeownership contributes to the accumulation of wealth through the increase in housing equity, mainly attributable to housing price appreciation. It has still been unclear whether homeownership plays a role in promoting the accumulation of non-housing wealth. As a second part to find the empirical evidence of the causal link between homeownership and wealth gains and the channels from owner-occupation to wealth accumulation, this chapter examines the relationship between owner-occupation and non-housing wealth. Considering financial wealth and business wealth account for a large share of non-housing wealth, I further investigate the association between owner-occupation and financial wealth and business wealth.

Using data from the CHFS and controlling for sufficient covariates, time-constant household characteristics and time trends to make a comparison between comparable owners and tenants and drawing on a series of robustness checks, this chapter finds that the transition into owner-occupation does not help owner-occupiers to accumulate more non-housing wealth (assets), financial wealth (assets) and business wealth (assets). Homeowners are found to own more non-housing wealth. The current study suggests that selection rather than causation drives the higher non-housing wealth among homeowners compared to tenants found in earlier studies. If households' time-constant characteristics drive the relationship between homeownership and non-housing wealth holdings (financial wealth holdings and business wealth holdings as well), then with time-constant characteristics being controlled

for, non-housing wealth holdings would no longer respond to the transition into homeownership. In this chapter, it turns out that the differences in non-housing wealth holdings (financial wealth and business wealth) between homeowners and renters disappear after considering the time-constant selection. So, the differences in non-housing wealth between homeowners and tenants appear to arise from selection bias.

I further explore why there is no difference between owner-occupiers and tenants, which can be possibly due to the coexistence of collateral effect, wealth effect, and crowding-out effect. The findings thus far unravel that the collateral effect, wealth effect, and crowding-out effect on financial wealth holdings and business wealth holdings are mixed. And nuances exist among different types of non-housing wealth.

In this chapter, the collateral effect does play a role in the relationship between homeownership and business wealth holdings, while this effect is indiscernible in the link between homeownership and financial wealth holdings. Nonetheless, the collateral effect does not translate into wealth gains for households. In terms of the wealth effect, significant results are found in both the financial wealth holdings (except for low-risk financial wealth) and business wealth holdings, although it turns out that the wealth effect may not be attributed to the changes in risk preference, awareness of financial information and financial knowledge. Regarding the crowding-out effect, the investment in housing assets significantly reduces the holdings of financial wealth, while the evidence of the crowding-out effect cannot be found for high-risk financial wealth and business wealth holdings. The crowding-out effect in China is mainly in the form of overinvestment. Therefore, combining these effects, the impact of homeownership on financial wealth holdings and business wealth holdings may be ambiguous in different contexts.

Another possible reason for the insignificant results, nonetheless, could arise from the short observation period in this survey. Possibly, any behavioural changes invariably require time. In the short term, a transition into homeownership may not necessarily lead households to participate more in the financial market and business investment. Nevertheless, there is a chance that behavioural changes could happen in the middle or long run. This, in actuality, becomes one of the shortcomings of this chapter.

Chapter 9 Housing wealth, wealth inequality and housing strategies

9.1 Introduction

The results in Chapters 6 to 8 suggest that the favourable status of homeowners in wealth holdings over renters (Chapter 6) principally comes from the accumulation of housing wealth through housing price appreciation (Chapter 7) rather than from mortgage repayments, changed saving behaviour (Chapter 7), and the holdings of non-housing wealth (Chapter 8), at least until mid-2022. Housing capital gains also vary across housing characteristics and households' socio-economic characteristics (Chapters 6 and 7). The accumulation and distribution of wealth through housing price appreciation is likely to play a role for the households and the economy in the long term. Theoretically and empirically, the accumulation and distribution of housing wealth, and their socio-economic consequences in modern economies, have been widely discussed in European economies (Forrest, 2021; Forrest & Hirayama, 2018; Forrest & Murie, 1995b; Smith & Searle, 2010; Soaita et al., 2020). They have, however, received less attention in Chinese housing research and policy debates. This chapter discusses the socio-economic consequences (in terms of wealth inequality and housing strategies) of the accumulation and distribution of wealth through homeownership against the background of rising house prices. The specific research questions that are answered in this stage of the analysis are as follows:

> [RQ 4] Under the circumstances of rising housing prices, how are homeownership and housing wealth accumulation linked to wealth inequality in China?
>
> [RQ 5] Under existing conditions, what role does the accumulation of wealth through homeownership play in households' housing strategies?

This chapter suggests that with rising housing prices outstripping income growth, there is a possibility that housing wealth accumulation would transform from spreading wealth and reducing wealth inequality to a mechanism that contributes to wealth inequality. It also induces some households to take speculative strategies to accumulate wealth and further impose upward pressure on housing prices, generating affordability problems.

It is worth noting here that obviously, the empirical analysis implemented in this chapter is distinguished from that in Chapters 6 to 8. Section 9.2 relies on earlier literature and secondary data sources to present evidence and Section 9.3 mainly draws upon secondary data sources and displays preliminary results, without constructing econometric models. The comprehensive examination of these questions through establishing econometric models would rely on future research. The purpose of this chapter is to build a theoretical framework by discussing the main possibilities connecting housing wealth accumulation, wealth inequality and housing strategies.

This chapter is structured as follows. Section 9.2 examines the socio-economic consequences of housing concerning three aspects of wealth inequalities through drawing on earlier studies and secondary data sources: location, tenure, and intergenerational differences and transfers. It incorporates China's literature and data with the international context. How passive, active and pro-active strategies are deployed by households in China are discussed in Section 9.3 using data from CHCS. Section 9.4 concludes this chapter.

9.2 Housing wealth and wealth inequality

It has become clear, over the last half century and across major advanced economies, that housing outcome are major influences shaping the distributions of wealth in modern economies[6] (Forrest & Murie, 1995b; Maclennan & Miao, 2017; Maclennan & Tu, 1998; OECD, 2022a; Soaita et al., 2020). In international studies, there is a strong cross-country negative correlation between homeownership and wealth inequality (Causa et al., 2019; M. Kuhn et al., 2020) and have helped low-income households to accumulate wealth (Wainer & Zabel, 2020). In essence, the effects of extending the ownership share via access to mortgage finance on overall inequality offset any rising inequality in certain areas (M. Kuhn et al., 2020).

An emerging strand of literature has showcased that monetary policy may influence the short-run dynamics of wealth inequality. Due to the interdependence of the housing and mortgage markets with monetary policy, these distributional influences may have become reinforced after the Global Financial Crisis. In general, the findings suggest that increases in housing prices decrease wealth inequality in the euro area, the United States, the United

[6] Section 9.2 draws upon some materials from one technique report: MacLennan, D., Long, J., & Leishman, C. (2021). The author of this thesis mainly reviewed the literature and gave comments on this technique report.

Kingdom and Canada (Bivens, 2015; Domanski et al., 2016; O'Farrell & Rawdanowicz, 2017). In their results, unconventional monetary policies, such as quantitative easing, might have had the most significant effects on the dynamics of wealth inequality through changes in equity returns and house prices.

Despite the major price increases, Kindermann and Kohls (2018) provide strong European evidence that larger shares of homeownership within a nation or a region still result, as reported for earlier eras, in smaller overall wealth inequalities. The evidence for OECD economies provided by Causa et al. (2019) supports this conclusion for post-1990 outcomes. They also observe, in a policy summary of the prior OECD review of housing wealth and homeownership, that across the OECD 'housing had become the asset of the middle classes (as poorer households were generally unable to own and richer households had significant housing assets but also greater stocks of other assets).

The wider European and OECD patterns appear to be supported by the estimates for the U.S., where Bivens (2015) found that rising house prices reduced inequality because home equity represented such a large share of middle-class wealth. Therefore, housing price increases enhance the wealth of the bottom 90 per cent of homeowners. In a similar vein, O'Farrell and Rawdanowicz (2017) highlight that capital gains from housing are concentrated among the middle and upper-middle parts of the wealth distribution, thus increases in housing prices decrease wealth inequality in the Euro area, the United States, the United Kingdom and Canada.

Within the broad trends noted, the magnitude of impact that housing has on wealth inequality depends on a series of factors, including the initial distribution of housing wealth, the change in the rate of owner-occupation, regional disparities in house price inflation and the extent and ease of leveraging through mortgages (Balestra & Tonkin, 2018). Colciago et al. (2019) emphasise that increases in housing wealth could raise or possibly lower wealth inequality depending on the context. More specifically, domestic institutions shape wealth inequality and house price growth and studies show that housing wealth inequality outcomes are different, with lower levels of overall wealth inequalities where family land and resources are involved in self-building (southern Europe), the privatisation of state housing is significant (the UK and former socialist economies) and where subsidised ownership remains important (Denmark, Sweden and the Netherlands) (Fuller et al., 2020; Wind et al., 2017).

In contrast to the alleviating effect of homeownership on wealth inequality noted above, house price growth since the 1980s could act as a mechanism of increasing inequality and this role has strengthened in this millennium (Fuller et al., 2020). This is also true in China's housing market. The evidence suggests that China has indeed demonstrated similar, if later but stronger, adverse trends compared to other advanced economies. The expansion of the homeownership rate equalised the distribution of wealth during the era of housing reform from 1995 to 2002 (Q. Zhang et al., 2020). In the post-reform era after 2010, the decline in the homeownership rate led to the concentration of wealth by widening the gap between owners and non-owners (Q. Zhang et al., 2020). Indeed, relative house price inflation's wide variation suggests that it may well have contributed to the rise in wealth inequality (Knight et al., 2020; S. Li & Wan, 2015).

Within any national housing sector decreasing equality in overall wealth distribution consequent to rising home-ownership rates and house prices is also consistent with increasing inequalities between particular groups, most obviously across localities, tenures, and life-cycle groups. The discussion in this section argues that with housing prices increasing ahead of income and the increasing reliance on housing to accumulate wealth, wealth would concentrate more on developed areas that attract more capital, owners (especially multiple property owners), and older age cohorts.

9.2.1 Location

The heavy dependence on housing price appreciation to accumulate wealth particularly underscores the importance of location. After the 1980s, financial deregulation across the OECD countries brought housing finance circuits closer to the national capital market and, further, these previously national markets closer to a more globally integrated financial system (Fernandez & Aalbers, 2016). Despite a more prudential attitude to mortgage markets after the Global Financial Crisis of 2007-2008, mortgage lending has recovered and risen steadily in most countries over the preceding decade (Whitehead & Williams, 2017).

With the local housing market integrating into the national housing market and further the global housing market, interregional divergences may narrow to some degree. However, some price relativities do not re-converge completely and even if they do the absolute price gaps have risen significantly, and faster than incomes. Recently, within urban settings, there is growing attention to price and wealth formation within 'superstar' cities (Glaeser & Gyourko, 2018; Metcalf, 2018). The IMF has produced research on the extent to which the

major ‘world cities’ have been converging with each other in price change patterns and delinking themselves from the rest of their national urban systems (Alter et al., 2018; Katagiri, 2018), although these convergence effects among global cities/metropolitan areas may now moderate, as flows of finance, ideas and human capital are disrupted by COVID-19 and less integrative global politics. As a consequence, the coexistence of booming and struggling property markets within a city, metropolitan area and country become relatively prevalent (Arundel & Hochstenbach, 2020). Additionally, within each city or region, differential price gains for different areas have also been typical, for instance with gentrifying core neighbourhoods witnessing the fastest growth rates and old neighbourhoods without regeneration experiencing stagnation.

Although the differentiation and fragmentation of the housing market have long been highlighted by Forrest et al. (1990), there have been some systematic geographic patterns of house price rises and equity gains in a range of countries. Urban areas have gone through growth in housing capital and generally outstripped rural areas, displaying strong spatial disparities. However, with some interestingly different patterns emerging in the first year of the COVID-19 pandemic, the experience in the UK, Canada, the USA and Australia has led to speculation about shifting patterns of demand as a consequence of the pandemic, with significant increases in demand and housing prices and rents away from the city centre (Gupta et al., 2022). In part, this reflects changing work practices, increases in the incidence of home working and reduced commuting (Gupta et al., 2022).

In a similar vein, there is clear spatial polarization in China, which can be seen in both between-group and within-group inequalities. There is an increasing disparity in growth rates of housing prices between coastal and inland regions (X. He & Huang, 2012; Shih et al., 2014). For households in the eastern part of the country, house prices exhibited stronger dynamics in these parts, while in central and western China, house price appreciation was less pronounced. As identified in Chapter 7, the yearly housing wealth gains are greater in eastern China, followed by middle China and western China.

Apart from an increasing disparity in growth rates of housing prices between coastal and inland regions and different tiers of cities (Fang et al., 2015; Shih et al., 2014), there are discrepancies in capital gains between urban and rural areas. Compared with the urban-rural gap in advanced economies, this difference is much greater in China. Urban households accelerate their wealth accumulation through higher capital gains due to the higher

marketisation of housing in urban areas, while few housing wealth gains can be produced or extracted (except for the occurrence of expropriation of land and houses) in rural areas due to the severe restrictions on the utilisation of land and the transfer of housing in these areas, thereby widening the household wealth gap between urban and rural areas (S. Li & Zhao, 2008; Y. Wang et al., 2020). It has been reported that in 2007 the urban-rural gap in per capita housing wealth contributed roughly 40 to 50 per cent of national inequality in per capita housing wealth (Sato et al., 2013).

When looking at housing wealth inequalities in urban areas and rural areas separately, the big urban-rural gap is reinforced by increases in rural inequality of housing (Sato et al., 2013; Y. Wang et al., 2020). It has been argued that inequality within rural areas is more extensive than inequality within urban areas. Regarding housing wealth inequality in urban areas, it has been argued that the distribution of housing wealth contributed to two-thirds of the overall urban wealth inequality (Gustafson, 2009; S. Li & Zhao, 2008). Capital gains were not equally distributed among all urban households, benefiting economically advanced cities (Q. Zhang et al., 2020). This can also be exemplified by the apparent discrepancy in housing price growth in first-tier cities, second-tier cities and other tier cities (H. Fang et al., 2015). The empirical results in Chapter 7 also suggest that households in first-tier cities experienced the highest growth in housing prices, followed by second-tier cities and other cities. The simple description of the housing price trajectory in Chapter 2 supports this argument, with housing prices in first-tier cities outpacing housing prices in other cities. The convergence of housing prices between first-tier cities and other-tier cities seems to occur slowly.

Like so many housing policy issues, housing wealth patterns and their effects have to be seen in the context of local markets rather than national averages. Some neighbourhoods, global cities and regions experience rapid housing price appreciation, whilst other housing market areas stagnate. Differential levels and rates of house price changes in different areas create spatial inequalities. Further, the spatial disparities are intertwined with inequalities generated by socio-economic characteristics and institutional factors.

9.2.2 Tenure

When housing values rise, owners benefit, and renters lose. Theoretically, Forrest and Murie (1995b) have discussed the wealth inequalities between owners and renters. However, there are significant subtleties and nuances involved in effects when diversities within tenures and life-cycle effects are considered (Forrest et al., 1990). The interaction of tenure and life cycle

will be discussed in the next section. This section investigates the diversities within tenures, namely, homeowners, tenants, marginal homeowners, and multi-property homeowners.

House prices have now risen so far in relation to incomes, primarily for young people and for other later-life first-time homeowners too, that aggregate homeownership rates in most advanced economies have fallen significantly started before 2008 and falls in the rate of homeownership among younger households in some countries began around the 1989/90 crisis (Whitehead & Williams, 2017). For example, over 25 years to 2020, Australia's aggregate home-ownership rate has fallen, from 71.4 to 63 per cent, leading to similar falls in New Zealand (also declining since the mid-1990s), and the UK (76 to 67) and the USA (70 to 66) both falling sharply from 2000 to 2020 (OECD, 2022b). These are significant reductions and they are indicative of sustained stresses in the housing market and they are likely to have reduced the spread of wealth as ownership shares declined. Rising house prices have ultimately reduced, significantly, the share of the population that can share in equity gains.

In China, those who have entered homeownership, have experienced great wealth gains generated from price appreciation. The repayments of mortgages appear to be a small burden (the real value of outstanding debt fell rapidly) when price inflation, low-interest rates, and capital gains are taken into consideration. By contrast, those households that cannot meet the requirement of rising entry deposits are left far behind in terms of wealth holdings.

When tenure interacts with spatial disparity, the increasingly unaffordable property has prevented younger, lower-income, recent immigrant households from acquiring housing equity in the large capital cities (Leishman et al., 2021). It is these cities which have had a higher potential of experiencing higher housing price appreciation, thus increasing the wealth of those who already own, and raising inequalities between those owning property and those who do not (MacKillop, 2013; Rahman, 2010). Besides, as explained in Chapter 7, tenure would also interact with other socio-economic characteristics, such as income, hukou status, migration status, and employment type. In consequence, ownership 'wealth spreading' has stopped and inequality is increasing both between owners and renters and within the home-ownership sector.

More specifically, the heterogeneity in housing wealth gains (found in Chapter 7) embodies the housing wealth inequalities between property-rich households and property-poor households. The heterogeneity in yearly housing wealth gains comes from what and where

housing is purchased, which is determined by household economic characteristics, social characteristics, parental characteristics, as well as institutional arrangements. The widely recognised argument by researchers concerning the housing market in China is that although market mechanisms have replaced the original socialist redistribution mechanisms to become the major drivers of housing inequality, some of the original socialist institutional arrangements continue to play a role in housing wealth inequality (C. Li & Fan, 2020). For one thing, these institutional settings influence housing wealth inequality through the transfer of parents' characteristics, in this case, hukou status of parents and employment type of parents (C. Cui et al., 2020). For another, these institutional arrangements also directly influence the size of housing wealth gains (hukou status and the nature of the work unit). The results in this section suggest that market mechanisms and socialist institutional arrangements not only impact the access to homeownership but would influence the size of gains that households could benefit from homeownership, creating wealth inequalities.

The length of life-cycle time spent in homeownership is critical for wealth accumulation, as (verified in Chapter 6) the housing wealth gains are positively associated with the period of staying in homeownership. Therefore, if households delay entry too long they will miss the opportunity for accruing wealth through homeownership, which would aggravate wealth inequality. In some extreme cases, young households rationed into renting would never enter homeownership as prices ran faster than their wages.

Government policies promoting homeownership again extrapolate pre-1990 experiences and assume that the switch into ownership is uni-directional whereas there is a growing proportion of homeowners who will move in and out of the sector as their circumstances change. Increasing attention has been paid to a segment of the special population, namely the marginal homeowners. Tenants are, by definition, excluded from homeownership-based welfare but so are financially stressed/marginal' homeowners (Köppe, 2017). According to CHFS, 4.18% of homeowners in the 2013 survey did not cling to that status in the 2017 survey, although some of these losses can be attributable to factors other than financial stress. Those falling off the homeownership ladder represent a new asset-poor grouping, due to missing out on capital gains and asset accumulation associated with homeownership (Wood et al., 2010). Both financial costs and non-pecuniary costs such as housing instability, reduced homeownership, financial distress, moving to worse neighbourhoods and elevated divorce can be imposed on this type of cohort when a foreclosure occurs (Diamond et al., 2020).

At the other end of this spectrum, market evolution encourages households to own second, third and more properties when rising house prices drive capital returns at rates not available in other sectors. One purpose of buying additional properties is to rent them out. The role of rental investors is also important and is seen as a further driver of inequality. The 'buy-to-let' activities in countries such as the United Kingdom, provide insignificant rental income for these investors (Soaita et al., 2017). This result shows that buy-to-let investment becomes profitable, even for small-scale and inefficiently financed landlords. The lettings supplied, in the short-term, reduce excess demand but the returns earned attract investment, push up prices and further ration the ownership options of the young. These arguments and outcomes are reinforced where non-local and international capital observes persistent price and rent inflation in particular cities. In China, about 22% of homeowners own more than two properties. Correspondingly, the vacancy rate in 2017 is 21.4%, increasing from 18.4% in 2011 (Gan, 2018). Among all the vacant rooms, long-term vacancy contributes the largest share, with a ratio of 8.1% (Gan, 2018). Unlike the 'buy-to-let' in the United Kingdom, in China, their business model relies on equity uplifts (and longer-term sales) rather than rental incomes versus costs (with long-run replacement).

9.2.3 Intergenerational differences and transfers

The aforementioned outcomes reflect different impacts of housing tenure but they interplay with age and life-cycle effects, as incomes, assets and household relationships all have well-defined and interrelated life cycle patterns. According to life-cycle theory, demographic changes in society play a vital role in determining the level of wealth inequality. The life-cycle effect likely accounts for between 80% and 87% of wealth inequality, becoming the dominant driver (Sarlo, 2017). Those in the bottom wealth quintile are more likely to be young and have not yet had an opportunity to accumulate any wealth, who would be in the top wealth quintile by the time they retire.

Nevertheless, the common trend in advanced economies is that younger people appear unable to make the same wealth gains as their predecessors. Further, wealth and housing wealth owned by older generations accounts for a large and increasingly large share of total wealth. For example, in the UK, almost half of the homeowners' housing wealth is concentrated in the hand of the over-65s in 2019, rising from 40 per cent in 2009 (Evans, 2019). In China, although this proportion is much lower than that in the UK, the increasing trend is similar but stronger and changes more quickly. According to CHFS, the share of

housing wealth owned by over-65s increased from 18.41% in 2013 to 26.59% in 2017. Given the high rate of homeownership among old generations and the increasing difficulty in getting into homeownership among young generations, the intergenerational difference in wealth holdings (housing wealth holdings) between old generations and young generations is expected to expand in the foreseeable future in China.

This millennial generation is slower to enter homeownership than their old counterparts at that age. The increased longevity for senior homeowners, who had initiated home-ownership careers in very different economic circumstances, has masked falls in age-specific homeownership rates for young adults under 40. Ownership rates for younger age cohorts have been falling in some advanced economies, although the observed lower rate of homeownership among young generations across advanced economies can be partly attributable to the delayed leaving home, family formation, parenthood, and longer periods of staying in education (Fisher & Gervais, 2011) and partly due to the hollowing out of the middle classes and the polarisation of labour markets, eroding income and job stability across a large middle-class sector of the population and younger generations (Arundel & Doling, 2017).

For instance, in 2004, 48% of 25–34-year-olds in Scotland owned their homes in Scotland and that share has fallen sharply to 32% by 2017 (Bell & D'Arcy, 2018). According to Census data in Canada, persons younger than 65 were less likely to own their homes in 2016 than in 2006, and the reduced probability was greatest for younger adults aged 20-34 years old (Statistics Canada, 2017). More specifically, 50.2% of millennials lived in their own home at the age of 30, compared with 55.5% of boomers in 1981. A report shows that in China the average age of entering homeownership changed from 30 to 34 from 2013 to 2016. This trend continues in the year 2021 and the report suggests that the average first-term purchase age is 36.9 in first-tier cities (Beike Research Institute, 2022). Although the rate of homeownership among young generations is much higher in China than in the above-mentioned countries, the up-to-date data (from 2015 to 2017) in CHFS suggest that this rate has also decreased for the age group below 25 (66.93% to 56.32%), between 25 to 30 (77.13% to 73.11%) and between 30 to 35 (88.19% to 86.9%).

Rising house prices often spill over into rising rents that, in turn, are also likely to reduce the savings and non-housing wealth of younger renters. An emerging research concern is regarding the 'excess rents' faced by younger households who face growing challenges in

accumulating the savings required to access ownership and make entry deposits (Leishman et al., 2021). These have potentially significant effects on the savings behaviours of rental households, the life cycle point at which they acquire housing assets and commit to regular 'mortgage' savings. These effects may shift the life-cycle structure of household savings and wealth not just at ownership entry points but later in the life-cycle when households retire (Soaita et al., 2019). The sustained shock of high rents and deferred entry to homeownership will have a significant effect on overall wealth, and not just housing wealth in later years. The papers of Grossmann et al. (2018), Lennartz et al. (2016) and especially Kindermann and Kohls (2018) all emphasise the need to refocus on this topic area.

This intergenerational difference further exerts an impact on intergenerational mobility and the intergenerational transmission of advantages, inducing intra-generational inequality between different socio-economic backgrounds. With housing prices beyond the affordability of younger households, the odds of entering homeownership increasingly rely on intergenerational transfers, in the forms of inheritance and *inter vivos*. A variety of aims of parental gifts have been identified, for instance, to support access to education, rental costs, and clear debt, but higher value transfers are given in particular to assist entry into homeownership, and even landlordism (Searle, 2018). The evidence of parents (and grandparents) helping earlier access to housing ownership by relaxing the deposit or down payment constraint for first-time homebuyers can be found in the U.S. (H. Lee et al., 2020), the United Kingdom (Karagiannaki, 2017), and the Netherlands (Helderman & Mulder, 2007). Support from parents can also be a determinant for structuring what housing is purchased (Spilerman & Wolff, 2012) and where to buy it (van Ham et al., 2014).

In China, it has been argued that parental financial support triples adult children's odds of homeownership (Z. Yu, 2020). As shown in Chapter 2, about one in three homeowners have their parents' financial support in down payments, 5.26% have their parents partly or fully pay off the debts, and about one in ten homeowners have their parents pay for their houses in full. Among the homeowners who have multiple properties, although fewer homeowners get financial assistance from their parents in down payment, however, more share of home buyers has their parents pay off the debts (13.05% or one in eight homeowners) or pay for their flats in full (13.05%). The finance for children's landlordism also exists in the context of China.

The ability to make intergenerational transfers, however, is not equally distributed. The possibility of receiving gifts or bequests and the value of that capital transfer is considerably higher for households in the top income quintile compared with those in the bottom quintile (OECD, 2022a). Parental homeownership and socio-economic characteristics display a strong relationship with an individual's future wealth and an adult child's homeownership, implying low levels of intergenerational mobility (Eyles et al., 2021). Wealthier recipients receive higher gifts than their poorer counterparts, allowing for an even earlier entry into the housing market for the former (Barrett et al., 2015). This also appears to act as a trigger to 'wealth-effects' over the life course (Hills et al., 2013); wealth received early in life self-accumulates, e.g., via house price growth or more general higher returns on capital than labour (Piketty, 2018). This further exacerbates the gap between those who own property and those who do not among similar age groups, and it can reasonably be expected that this will become more pronounced in the future.

The housing trajectory and social class standing of young adults are stratified by parental/grandparental transfers and transmission of socioeconomic status. Patterns of inequality are imprinted from one generation to the next generation. It is noteworthy here that although both housing advantages among high-income households and the middle-classes and housing disadvantages among low-income households and the working classes can be passed on to their children, by comparison, the effects of intergenerational transmission of socioeconomic status in China are limited albeit with its greater significance, at least at the early stage of young adults' housing career (C. Cui et al., 2020).

For young adults who do not receive intergenerational transfers, permanently continuing in the private rental market or significantly delaying obtaining homeownership become the two most popular options (Sissons & Houston, 2019). These groups might be increasingly confined to low-income communities with limited access to public amenities and with inadequate employment opportunities that lower lifetime incomes (Maclennan et al., 2019). Consequently, those young adults lose the opportunity to augment as much wealth through homeownership as their counterparts. In this case, inequality is reproduced and reinforced over generations through housing wealth.

9.3 Housing wealth and housing strategies

The heavy reliance on homeownership to accrue wealth and the great financial return from housing not only impacts welfare after retirement but also household behaviours before retirement, to ensure their benefits after retirement and guarantee the homeownership of a high-value asset. As Smith & Searle (2010) and Soaita et al. (2019) argue, there are three common strategies deployed by households to benefit from homeownership: 'passive' strategies, 'active' strategies, and 'pro-active' strategies. What strategies will be employed by households are impacted by the housing wealth accumulation patterns, as we identified above. In periods of low house price inflation (before the 1970s and nowadays in some countries experiencing low housing price growth such as Germany), 'passive' strategies dominated. With house prices outstripping income and experiencing long-term increases since the 1980s, 'active' and 'pro-active' are frequently used by some households, making a startling comparison to households who are stuck in 'passive' strategies. It is noteworthy here that the dominance of strategies is not only influenced by households' socio-economic characteristics, but also by the accessibility of financial instruments and the institutional contexts.

In China, combining the results in Chapters 6, 7, and 8, the wealth advantage of homeowners in overall wealth and the insignificant effect of homeownership on financial wealth and business wealth may indicate that passive strategies (age in place, the precautionary saving motive, and the bequest motive) and active strategies (trading up) in HABW are frequently employed to maintain the accumulation of housing wealth, while homeowners are resistant to deploy the pro-active strategies, which restricts the role that homeownership plays in accruing financial wealth and business wealth. As Disney et al. (1995) and Soaita et al. (2019) argue, the slow consumption of housing stock mirrors a desire to bequest the house, or a precautionary motive for holding a housing asset against sudden risks. Compared with Disney et al. (1995) and Soaita et al. (2019), this section additionally stresses the importance of the intention to trade up. Furthermore, the interplays of passive strategies, active strategies and pro-active strategies may further influence housing tenure status and housing wealth/mortgage careers.

Households in China tend to maintain the housing values and prevent their houses from being influenced by other factors which could jeopardise the housing values, for instance, home equity withdrawal. At the final stage of their life, they could age in place and bequeath

these housing assets to their descendants. If they must sell their houses, this is most possibly caused by their willingness to trade up, followed by investment, education and/or medical care.

The results of CHCS will be used to support these arguments. To avoid the bias caused by temporary migrants, I still drop households who did not stay in the place for more than 6 months. Three parts of the questions in this survey are related to these arguments: (1) plan to sell the house or purchase a house; (2) the main purpose of purchasing houses; (3) the experience of selling the house. The questions regarding the first part include: "Do you plan to sell the house in the future?" "Why do you want to sell the house?" "Do you plan to purchase a house in 1 to 2 years?" "What is the main reason for you to purchase a house in 1 to 2 years?" To acquire the information on the second part, households are asked the following questions: "What was the main purpose of purchasing the first house?" "If you have more than one house, why did you purchase the second house?" "And the third house, if you have?" The third part covers the following questions: "Have you ever sold an owned house in the past five years?" "Why did you sell this house?"

Figure 9-1 and Figure 9-2 are used to present the answers to the first two questions in the first part: "Do you plan to sell the house in the future?" and "Why do you want to sell the house?". As Figure 9-1 shows, 77.36% of all these homeowners do not have a plan to sell the house in the future if the current situation holds constant. Unsurprisingly, the plan to sell the house varies by the number of houses that the household owns. The selling willingness is stronger for multiple-property homeowners, with 33.43% of this group planning to sell the house in the future, while this proportion drops to 18.96% for homeowners with only one property. In terms of the reasons to sell the house in Figure 9-2, 63.31% of these households intend to improve their standard of living, 21.40% of the households want to sell their spare houses, and 7.64% of households are planning to meet their investment needs. The results in these two figures imply that it could be reasonably anticipated that most of these households would prefer to keep their homeownership of the houses they purchased and passively enjoy the price appreciation gains. If they plan to sell this house, the reason would be more likely to be improving the standard of living, in this case, trading up.

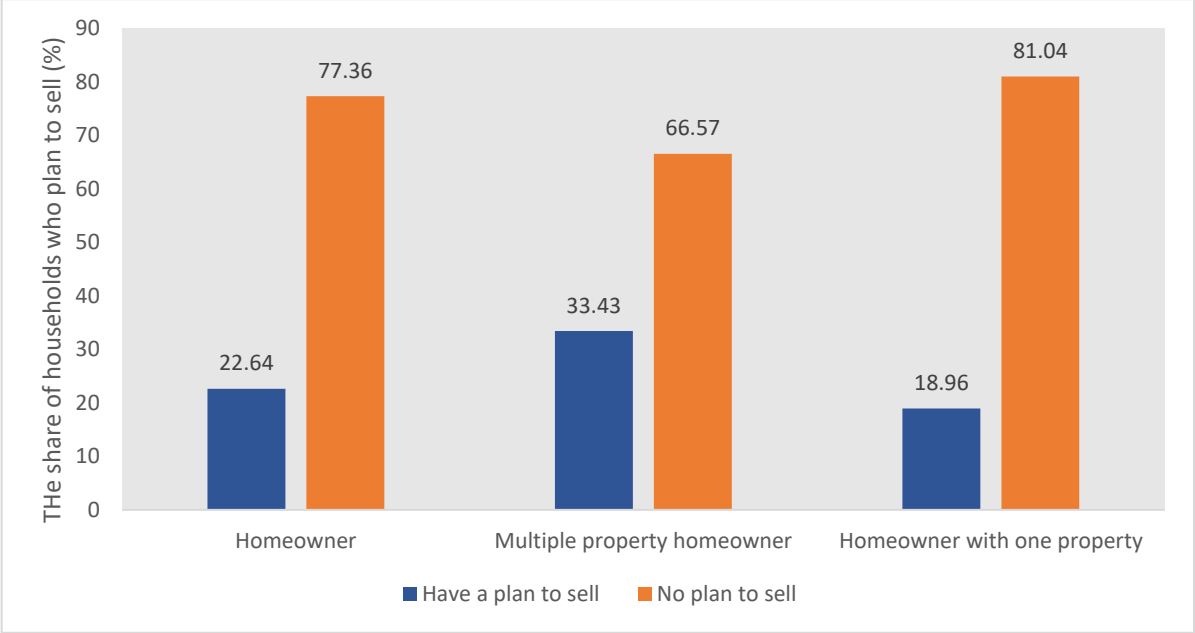

Figure 9-1. Plan to sell the house in the future

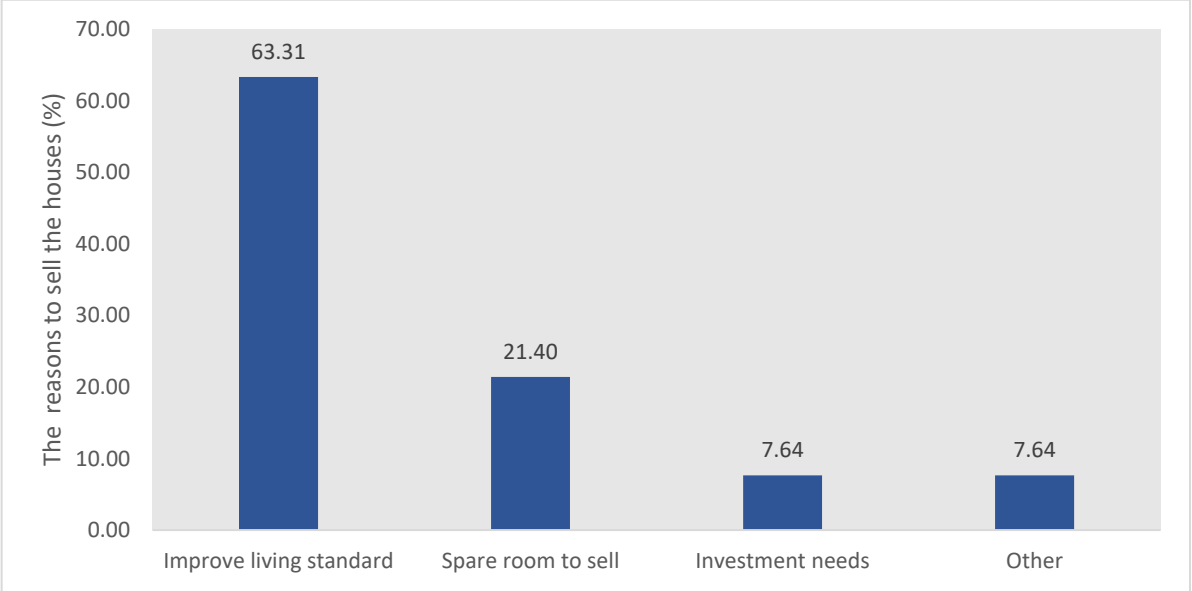

Figure 9-2. The main reason for the plan to sell the house

The results for the questions “Do you plan to purchase a house in 1 to 2 years?” and “What is the main reason for you to purchase a house in 1 to 2 years?” are presented in Figure 9-3 and Figure 9-4. More than half of the homeowners responded that they would not purchase another house in the following one or two years. Consistent with expectations, the proportion of tenants who would highly likely purchase a house is much higher than that of homeowners. In general, households who recently want to purchase a house account for a small share of the total households.

When asked the main reason to purchase a new house, about 50% of homeowners want to improve their standard of living. About 24.78% of homeowners want to purchase a house for families. For tenants, the proportion of households for the reason of improving the standard of living is almost equivalent to the proportion of households who are first-time homebuyers, accounting for about 40% of the whole tenant households. Very few households intend to purchase a house for the reason of appreciation or investment (about 20% for homeowners and less than 10% for tenants).

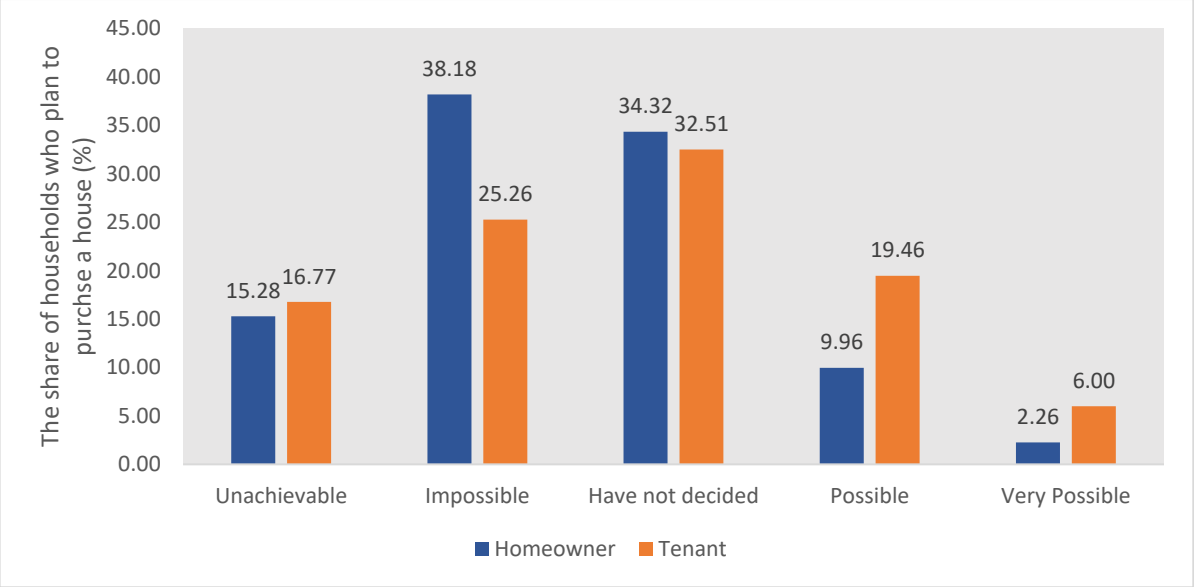

Figure 9-3. Plan to purchase a house in 1 to 2 years

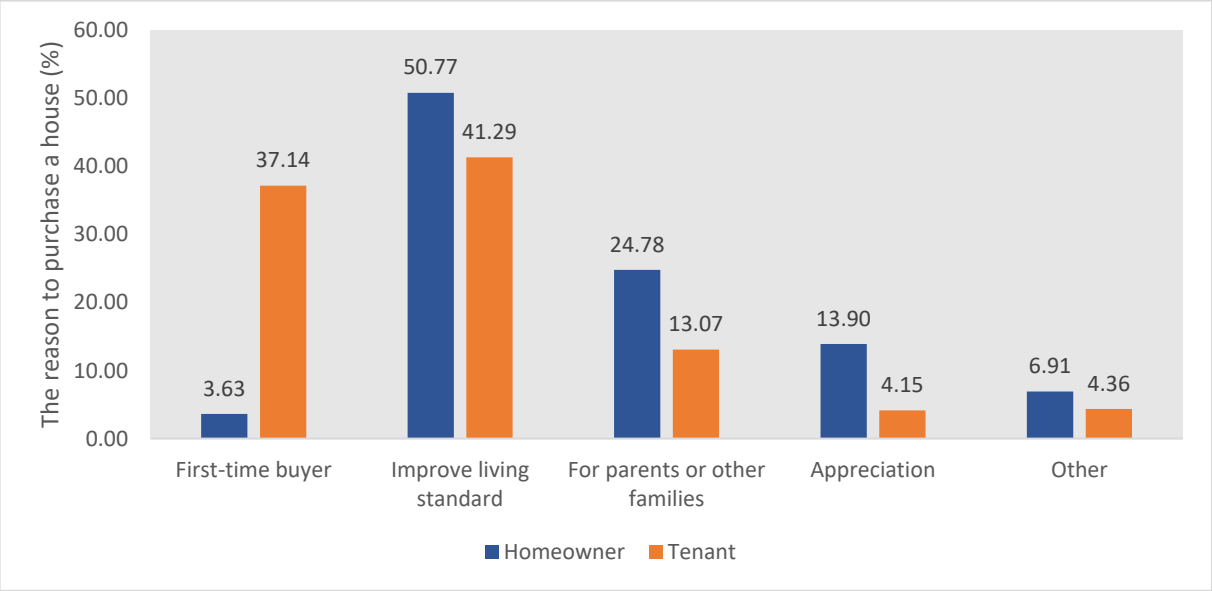

Figure 9-4. The main reason to purchase the new house in 1 to 2 years

The results for the second part “what was the main reason for your family to purchase the houses?” are reported in Figure 9-5. The proportion for the reasons of self-residence or

families living decreased with the increase in the houses owned. Nonetheless, no matter how many houses they buy, the purpose to purchase for families living still dominates. The more houses the households purchase, the more likely they purchase a house for the purpose of appreciation or investment. The reason for appreciation for the first house only accounts for 1.69%, while this proportion increases to 13.76% for the second house and 25.83% for the third house.

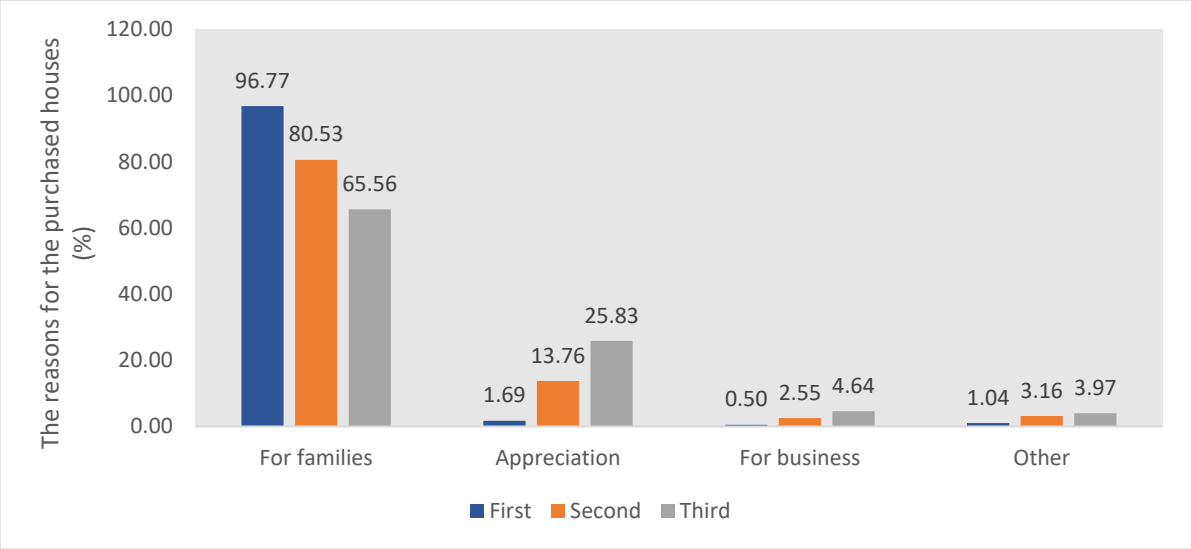

Figure 9-5. The main reason for purchasing the first second and third house

Next, I turn to consider the real selling experience. The following Figure 9-6 and Figure 9-7 show the results of the third part: "Have you ever sold an owned house in the past five years?" "Why did you sell this house?". Of all the present homeowners, about 13.38% had ever sold the house they lived in the past five years and about 86.62% had never sold their houses. Concerning the reasons for selling, about 60% of these households wanted to purchase a new house. Of these households, about 86.32% traded up their house (Figure 9-*8*). Following this reason were to invest in the financial market (4.97%), repay their debts (3.42%), support children's education (2.95%), and for medical care (0.62%).

In general, the real selling experience appears to be consistent with households' planning of selling a house. It is reasonable to assume that passive strategies are the predominant approach deployed by Chinese homeowners. Most households would not sell the houses they owned except for the reason of trading up. Comparing the reasons for planning to sell with the reasons for an actual sale, the precautionary motives seem to disappear in people's plans while accounting for an important role when households sell their houses. Another noteworthy point is the appearance of investment needs in both cases, albeit a small share.

This result indicates that pro-active strategies are rarely used by Chinese homeowners, while this possibility increases as the number of houses owned rises.

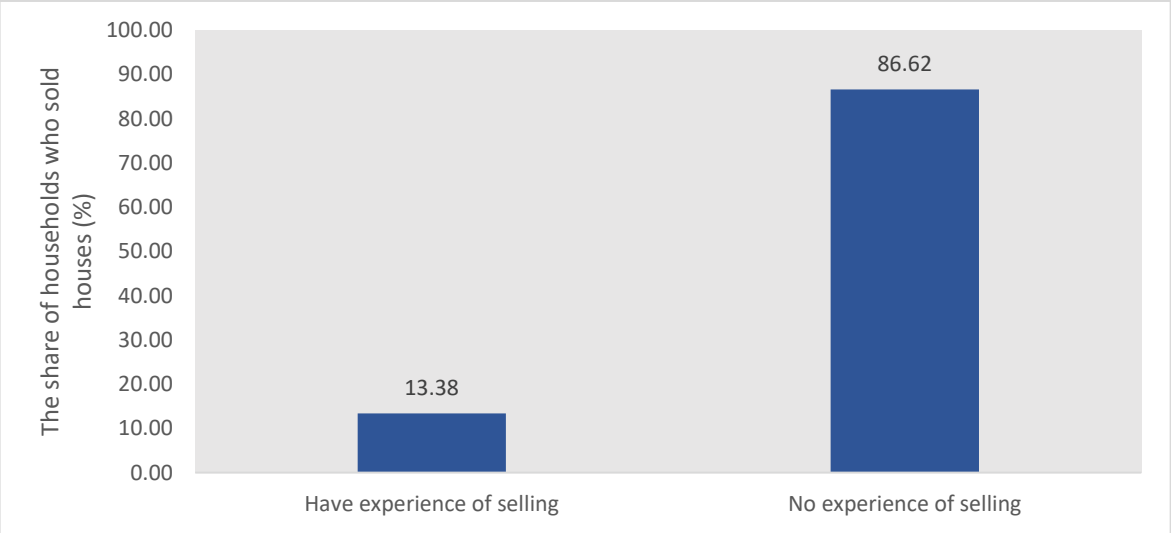

Figure 9-6. Selling experience in the past five years

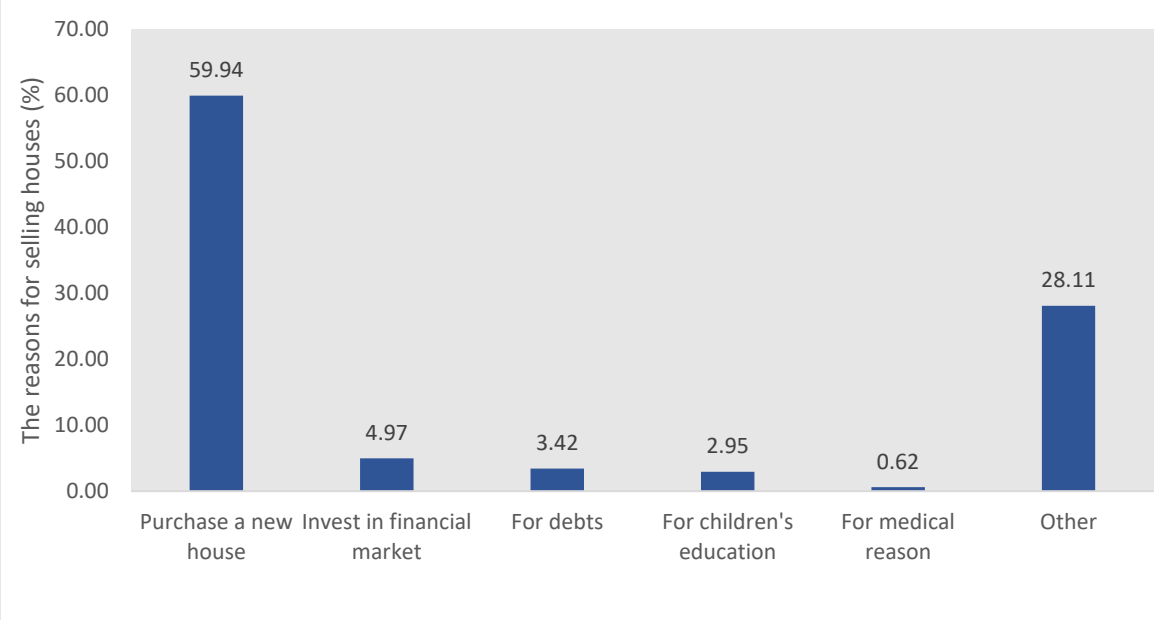

Figure 9-7. The reason for selling the houses

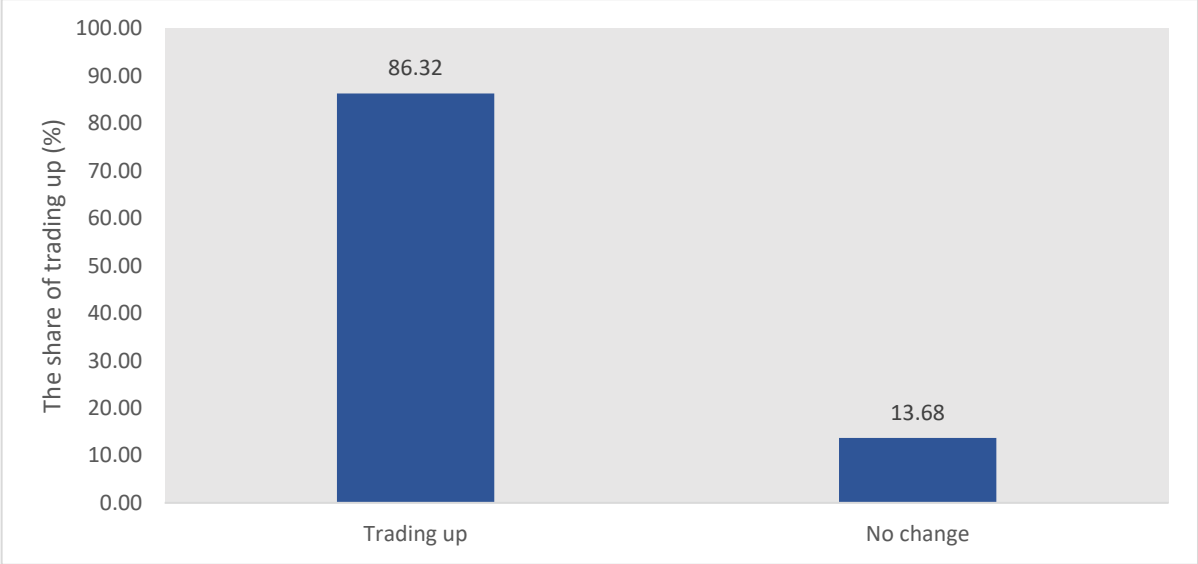

Figure 9-8. Trading up for selling a house

I am especially interested in active strategies. I interact the questions "Do you plan to sell the house in the future?" with "Have you ever sold an owned house in the past five years?" to explore the path dependency of selling experience. The results are presented in Table 9-1. Of the households that have ever sold their houses in the last five years, 36.76% are planning to sell the houses in the future. Of the households that have not sold their houses in the last five years, 22.14% are planning to sell the houses in the future. The difference of 14.62%, seems to suggest there may be path dependency existing in the selling plan.

Table 9-1. The interaction of prior experience and plan

	Have a plan to sell	No plan to sell
Have experience of selling (%)	36.76	63.24
No experience of selling (%)	22.14	77.86

Nevertheless, no causal link between the prior experience and the plan could be extrapolated from Table 9-1. To possibly examine the causal relationship, I use the Logit model and data from CHCS (same as the sample in Chapter 7) to estimate the effect of previous experience on a future selling plan.

$$Log\frac{P(Future\ selling_i = 1)}{P(Future\ selling_i = 0)} = \alpha + \beta Sold\ house_i + W_i'\delta + \gamma_c + \lambda_t + \varepsilon_i \quad (9.1)$$

where $Sold\ house$ equals one if household i have ever sold houses in the past 5 years and zero otherwise. $Future\ selling$ indicates whether the household plan to sell the properties they owned in future. Other variables take the same definitions as in Equation (7.2), Chapter 7.

The results are presented in Table 9-2. Column (1) shows the effect of having selling experience on having a plan to sell, without control variables, followed by the estimation of a marginal effect. The marginal effect indicates that, without controlling for other observables, homeowners who had ever sold houses in the past 5 years on average are 6.7 percentage points more likely to sell their houses in the future than the households who had not sold houses in the past 5 years, and the difference is statistically significant at the 1 per cent level. In column (2), I control for related variables such as region, city level, age, age squared, hukou status, gender and marital status. The marginal effect decreases to 6.3 percentage points, which is still significant at the 1 per cent level. Considering the average percentage point of households who have a plan to sell the houses is 22.64% (as shown in Figure 9-1), the percentage points of households who want to sell the houses in the future for households who have previous selling experience would be 28.94%. This estimated result using the Logit model after controlling for pertinent variables is smaller but similar to the result shown in Table 9-1 (36.76%).

Table 9-2. The effect of prior selling on a future selling plan

	(1)		(2)	
	Coef.	Marginal effect	Coef.	Marginal effect
Sold house	0.413***	0.067***	0.398***	0.063***
	(0.10)	(0.02)	(0.10)	(0.02)
Constant	-1.492***		-1.350*	
	(0.18)		(0.81)	
Observations	4,440		4,440	
Controls	No		Yes	
City FE	Yes		Yes	
Year FE	Yes		Yes	
Pseudo R^2	0.0291		0.0537	

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Although I cannot fully rule out the possibility that the positive relationship between previous experience and selling plan is driven by unobservable household characteristics, such as risk preference, it is still reasonable to draw a simple conclusion that the "housing

ladder" approach is a path-dependency behaviour. Active strategies are frequently used by some kinds of people. It supports the theoretical basis of ASB, which emphasises the impact of homeownership on long-term behaviours. Although this thesis argues the insignificant role of home tenure in financial wealth accumulation as well as business wealth accumulation, it indeed finds evidence of the use of active strategies to climb the housing ladder. In this sense, homeownership could change housing trajectories, at least for some households.

Due to the one-way upward housing prices in China, the passive strategies enable homeowners to benefit from homeownership, at least before 2022. The passive approach, as mentioned by Doling and Elsinga's (2013) and Rowlingson et al.'s (2017) in Soaita et al.'s (2019) report, is also being taken as a priority by households when other savings and tenure alternatives poorly behave. Overall, most households in China take passive strategies after entering homeownership to maintain their housing values in the future. These strategies include precautionary motives and bequeathing. The passive strategies employed by households underscore the dominant role of houses as homes.

At the other end of this spectrum, some households do devise active strategies of asset management and asset building to receive more gains, which indicates the increasingly important role of houses as an investment, as highlighted by Ronald et al. (2017). It is also this price trend in the housing market that makes trading up feasible and profitable, which provides a good opportunity for households to use active strategies. The frequent use of active strategies also imposes upward pressure on housing price increases and undermines the financial health and stability of those individuals in later life and retirement. It is these two strategies that provide homeowners with opportunities to accumulate housing wealth. This division in China has also been discussed by Forrest (2018).

The inability of homeowners to deploy pro-active strategies is restrained by the imperfect equity released market and complexity of rules. Re-mortgage products or equity released products are rarely used by older generations in China since they are tightly constrained by regulations, which also partly explains why the accumulation of financial wealth and business wealth is rarely generated via entering homeownership.

The housing strategies deployed by households are linked to the effectiveness of HABW policy. With a large share of total wealth concentrated on housing, there are increasing studies that question the effectiveness of HABW policy (Lersch & Dewilde, 2018; Soaita et

al., 2019). One of the reasons comes from the easiness of this homeownership welfare being influenced, through increasingly long lives after retirement from work, by sudden incidents such as long-term sickness, unemployment and relationship dissolution before retirement (André et al., 2019; Hubers et al., 2018; Soaita & Searle, 2016). On the other hand, the ageing, recession, housing price volatility and neoliberal policy reforms also pose threat to the HABW (Izuhara, 2016). For instance, it is more troublesome for divorced homeowners to re-enter homeownership in later life (Dewilde & Stier, 2014). Additionally, the heavy reliance on housing wealth to meet family welfare needs and mitigate social risks undermines households' capability to face the challenges of sudden needs considering the time needed to sell the house. This means social welfare policies are still highly required to provide these benefits for households. Therefore, the sustainability and effectiveness of homeownership as a welfare strategy have been questioned (Izuhara, 2016).

Another reason can be attributable to, again, the increasing difficulty for some households to get access to homeownership. With a rising number of households remaining in the rental market, the effectiveness of welfare generated by homeownership may largely shrink. The resulting falling rates of homeownership among younger cohorts are likely to decrease the ability of those households to use housing equity to support consumption and care as they age. It may further result in some households increasingly becoming restricted to low-income areas marked by poor access to public amenities and limited to inadequate employment opportunities that reduce lifetime incomes, influence the use and formation of human capital, and impact the efficiency of resource reallocation, deteriorating economic productivity. Furthermore, similar to the situation in Australia, the UK, Canada and New Zealand, key policy structures (not least taxation) were put in place when low house price inflation meant that 'passive' strategies dominated, and they may not be best designed to deal with 'active' and 'pro-active' households and times (MacLennan, Long, & Leishman, 2021).

9.4 Conclusion

Homeowners are found to be wealthier than tenants. This phenomenon is quite evident when housing prices start to increase ahead of income. Notwithstanding, the accumulative aspect of homeownership could exert an effect on the accumulation and distribution of wealth and generate consequences for households in the long term.

This chapter seeks to investigate the link between housing and wealth inequality and housing strategies against the background of rising housing prices rising ahead of income. The rising housing prices since 2009 in China and especially since 2015 when housing prices began to outpace income generate huge prosperity for households. Although housing prices fell in 2022 due to COVID-19 and the deleveraging campaign, disposable income fell much more.

The rising housing prices help households accumulate housing wealth through capital gains, whilst it could also act as a possible mechanism of increasing wealth inequality by preventing young households and low- and middle-income households from attaining homeownership and typically achieving it at a later age, especially in highly developed metropolitan areas. Coastal regions, first-tier cities, and urban areas experienced higher housing capital gains than inland regions, other tiers, and rural areas. Existing homeowners take capital gains and leverage them to expand their purchasing power and trade up to larger and/or more expensive dwellings. Inequalities are also, in effect, handed down to younger generations through differential prospects of being helped into homeownership (and subsequent rental investment ownership) through financial assistance from family members.

The change in housing wealth accumulation patterns also influences what housing strategies are employed by households to secure the benefits of homeownership. With house prices growing ahead of income and experiencing long-term increases in housing prices, passive strategy and the more speculative strategy, active strategy are the dominant strategies deployed by Chinese households. The proposals simultaneously involve encouraging individuals to chase a fast-moving, escalating level of housing prices, while undermining the financial health and stability of those individuals in later life and retirement. These phenomena may further result in some households increasingly becoming restricted to low-income areas marked by poor access to public amenities and limited to inadequate employment opportunities that reduce lifetime incomes, influence the use and formation of human capital, and impact the efficiency of resource reallocation, deteriorating economic productivity. This chapter, therefore, implies the need for changes in housing policies when market outcomes may be overwhelming the intended distributional measures of housing policies. Housing policies in current times are inherited from the ‘saving’ era, which may not be best designed to deal with housing outcomes in times when the function of spreading wealth holdings is threatened, wealth inequality accelerates, and speculative behaviours arise.

This chapter has some limitations. Firstly, it does not empirically investigate the wealth inequality trajectory and the housing outcomes that influence wealth inequality in China. Secondly, what socio-economic and demographic characteristics impact the choice of housing strategies is also understudied in this chapter. Future research is required to fill in these voids. For future research, a model connecting wealth inequality at local levels, housing tenure, spatial characteristics and home-buyer resources such as inter-family transfers that help first-time buyers meet their mortgage credit constraints is required. Meanwhile, the second limitation requires a model tracking households' history of climbing the housing ladder with long time series incorporating households' socio-economic characteristics and detailed house price data at the neighbourhood, or at least city levels.

Chapter 10 Conclusion

10.1 Introduction

In a world of homeownership, housing is argued to be linked to socio-economic, demographic, and political consequences at the micro-level and the whole economy at the metro- and macro-level, although the causal link has been rigorously criticised. Among these consequences, the effect of homeownership on wealth accumulation draws much attention from the public, policymakers, and academics. Nevertheless, evidence on effects shows some inconclusive results and the mechanisms for the accumulative aspects of homeownership are ambiguous. And there is a possibility that the effects of wealth accumulation through homeownership may also be associated with increases in wealth inequality and cultivate speculative behaviours and activities by households.

Concerning these considerations, this thesis aims to contribute to existing knowledge on the impact of homeownership on wealth accumulation, using China as a case study. Specifically, this research examines the relationship between homeownership and wealth and its components by teasing out diverse mechanisms derived from different theoretical perspectives, and this relationship's effects on wealth inequality and housing strategies in the presence of rising housing prices in urban China. Building on the evidence provided in existing studies, this thesis adopts a quantitative approach and employs large-scale longitudinal data and cross-sectional data to investigate homeownership and wealth outcomes across separate but mutually reinforcing analyses.

This chapter is the final and concluding chapter of this thesis. It starts with a summary of key findings of the empirical analyses that have been carried out in Chapters 6 through 9 together and then reflects on their overall contribution to knowledge in the area of homeownership and its concomitant impacts. Following that, the policy implications for time after COVID-19 are presented. This chapter ends with a reflection on the limitations of this thesis and the potential direction of future research.

10.2 Summary of major findings

This current thesis focused on examining the effects of homeownership on wealth accumulation and the consequent effects on wealth inequality and housing strategies in China. The main findings can be summarised as follows:

Chapter 6 established that a transition from renting to owner-occupation is positively associated with wealth gains, with a series of robustness checks supporting this result. The heterogeneous analyses demonstrated that the response of wealth gains to homeownership varies across household economic, social, and parental characteristics, and different geographies. Owner-occupiers in eastern China gained more wealth than others, and this intensifies the aggregate impact of owner-occupation on wealth. Conversely, owner-occupiers with low income and agricultural hukou, those whose parents worked as a farmer or self-employed, and those whose parents had agricultural hukou, gained less wealth than others, which attenuates the effects of the owner-occupation on wealth gains. However, employer type and migration status turn out to play a negligible role in wealth gains, which contrasts with prior research.

Chapter 7 first argued that the housing wealth accumulation pattern is moving away from a savings and repayments approach to the accumulation of housing wealth via housing price appreciation. The contribution of housing price appreciation to housing equity rises with the increases of the time stayed in homeownership and maximised share being around 80 per cent. In the former era households mainly passively accepted the housing gains arising, whereas now borrowing, leveraging and moving strategies are definitive of the 'speculative' era.

Second, through employing data from CHFS and CHCS, Chapter 7 found that housing wealth in China is mainly accumulated through housing price appreciation and mortgage repayments (fixed commitments), with housing price appreciation dominating. The favourable status of homeowners over renters in wealth holdings arises from housing price appreciation rather than from fixed commitments or changed saving behaviour. It further argued that housing wealth gains vary by housing characteristics: the holding period, retaining the homeownership, the timing of purchase, the location of housing, and the source of houses, mortgage status, which are of importance in accruing housing wealth.

Third, the heterogeneous effect suggested households' characteristics matter for housing equity increases. Each additional year since first purchase is associated with more housing wealth gains for high-income households, household head who worked in the public sector and with non-agricultural hukou, households whose parents work as employees and self-employers than for low-income households, households whose head works in non-public sectors, households with agricultural hukou, households whose parents were peasants. No significant difference between native households and migrant households is found in this chapter.

Using data from the CHFS and controlling for sufficient covariates, time-constant household characteristics and time trends to make a comparison between comparable owners and tenants and drawing on a series of robustness checks, Chapter 8 found that the transition into homeownership does not help homeowners to accumulate more non-housing wealth (assets), financial wealth (assets) and business wealth (assets). Therefore, the favourable status of homeowners in wealth holdings over tenants does not come from homeownership accumulating more non-housing wealth. The current study suggested that selection rather than causation drives the higher non-housing wealth holdings among homeowners compared to tenants found in earlier studies. With time-constant characteristics being controlled for, non-housing wealth holdings no longer respond to the transition into homeownership.

Drawing upon studies on the effects of housing consumption and investment, this chapter also explored the possible mechanisms from which the insignificant effect of owner-occupation on non-housing wealth could be explained, by examining the existence of collateral effect, wealth effect, and crowding-out effect. Nuances and differences exist among different types of non-housing wealth. This chapter suggested that the collateral effect does play a role in the relationship between homeownership and business wealth holdings, while this effect is indiscernible in the link between homeownership and financial wealth holdings. In terms of the wealth effect, significant results are found in both the financial wealth holdings (except for low-risk financial wealth) and business wealth holdings, although it turns out that the wealth effect cannot be attributed to the changes in risk preference, awareness of financial information or financial knowledge. Regarding the crowding-out effect, the investment in housing assets significantly reduces the holdings of financial wealth, while the evidence of the crowding-out effect cannot be found for high-risk financial wealth and business wealth holdings. Combining these effects, the impact of homeownership on non-housing wealth holdings may be ambiguous in different contexts.

Another possible reason for the insignificant results could arise from the short observation period in this survey. It is possible that this insignificant relationship between owner-occupation and non-housing wealth may change to be statistically significant in the medium or long term.

Chapter 9 emphasised that increasing housing prices, as a result, make homeownership inaccessible to young, low- and middle-income households, especially in metropolitan areas, generating a wealth gap among homeowners in different locations, between homeowners and tenants, and between old generations and young generations. Homeownership has transformed from spreading wealth and reducing wealth inequalities to a possible mechanism of increasing wealth inequalities by concentrating more wealth on developed areas which attract more capital, homeowners and multiple-property owners, and older generations. The change in housing wealth accumulation patterns also influences what housing strategies are employed by households to secure the benefits of homeownership. There is more awareness of homeownership gains and people pursuing housing careers in this sense is related to maximising financial gains. With house prices growing ahead of income and experiencing long-term increases in housing prices, passive strategy and the more speculative strategy, active strategy are the dominant strategies deployed by Chinese households.

Individuals chasing a fast-moving, escalating level of housing prices may undermine the financial health and stability of those individuals in later life and retirement. These phenomena may further result in some households increasingly becoming restricted to low-income areas marked by poor access to public amenities and limited to inadequate employment opportunities that reduce lifetime incomes, influence the use and formation of human capital, and impact the efficiency of resource reallocation, deteriorating economic productivity.

10.3 Thesis contribution

The findings in this thesis should make an important contribution to existing research knowledge subsumed in the following way.

First, as discussed in detail in Chapter 1 and Chapter 3, most of the extant studies focus on how homeownership contributes to household net worth growth, without considering the effect of homeownership on non-housing wealth. Alongside Lersch and Dewilde (2018) and

Kaas et al. (2019), this paper, through conducting a large-scale and quantitative investigation into the effect of homeownership on different components of total household wealth, begins to remedy this absence of empirical analysis in existing studies. The results in Chapters 6 through 8 suggest that the favourable status of homeowners in wealth holdings over renters (Chapter 6) principally comes from the accumulation of housing wealth but not the holdings of non-housing wealth (Chapter 8). When controlling for relative socio-economic characteristics and time-constant variables, homeowners do not own more non-housing wealth than tenants. The phenomenon that homeowners own more non-housing wealth than tenants then arises as a result of selection effects. Tenants do not compensate for their disadvantage in housing capital gains with more holdings of non-housing wealth. The findings in this thesis highly support the results of studies such as Turner and Luea (2009), which argue that homeowners' accumulation of housing wealth is not matched by tenants' accumulation of non-housing wealth over time. The positive association between homeownership and non-housing wealth found in Di et al. (2007) and Grinstein-Weiss et al. (2013) cannot be supported in this thesis.

Second, the transmission mechanisms whereby the relationship between homeownership and wealth accumulation could be established have been examined in this thesis, filling in the gap in the literature. To the best of my knowledge, this comprehensiveness cannot be found in prior studies. More specifically, this thesis examined six mechanisms: housing price appreciation, fixed commitments, changed saving behaviour, collateral effect, wealth effect, and crowding-out effect. In the context of China, both housing price appreciation and fixed commitments (mortgage repayments) contribute to housing equity increases, with housing price appreciation dominating. However, there is a trade-off between enforced saving and active saving, which has been absent in Lersch and Dewilde (2018) due to the availability of data. Therefore, no significant results can be found for the support of changed saving behaviour. The favourable status of homeowners cannot be attributable to fixed commitments or changed saving behaviour. Drawing upon literature on the impacts of housing on consumption and investment, the thesis also comprehensively explored the possible mechanisms (collateral channel, wealth channel, and crowding-out channel), which explains the insignificant effect between homeownership and non-housing wealth, although this insignificance could also be attributable to the short research period in this thesis. There is a coexistence of collateral effect, wealth effect and crowding-out effect.

Third, this thesis also expands the literature on the impacts of homeownership on wealth accumulation by combining the results found in Chapters 6 to 8 with the background of rising housing prices and drawing on these results in the context of China. Although the links between homeownership and wealth inequality and housing strategies have been comprehensively discussed in prior literature in the western contexts (e.g., Forrest & Murie, 1995b; Soaita et al., 2019), the accumulation of wealth through homeownership has rarely been connected to wealth inequality and housing strategies employed by households in the presence of rising housing prices rising fast than income in China. These wide impacts of wealth accumulation patterns have been investigated in this thesis, albeit still at the initial stage of research and relying on future studies to fully explore these impacts. A conjunction of spatial disparity, tenure inequality and intergenerational difference and transfers explains the possible correlation between homeownership and wealth inequality against the backdrop of rising housing prices increasing ahead of income. A comparison between passive strategy, active strategy and pro-active strategy has been made to discuss the deployment of housing strategies by Chinese households.

Fourth, this thesis also enriches the current debate on the impact of homeownership on wealth by adding China's unique institutional context. The heterogeneous analyses through interacting homeownership with households' characteristics such as hukou status, internal rural-urban migration, and job types, the robustness checks via city levels and housing types, associated with the investigation on the effect of parental characteristics shed some light on how unique institutional context would influence the response of wealth gains to homeownership, thus exploring the factors that could reinforce wealth inequality generated by homeownership. These identification efforts allow us to draw careful conclusions based on the estimates and to compare and reconcile research results found in different institutional contexts.

10.4 Policy implications

The findings of this thesis hold several implications for contemporary housing policy in China. Importantly, the empirical investigation provides consistent evidence that homeownership helps wealth accumulation mainly through housing price appreciation in China, at least before 2022, with no significant effect on saving behaviour and non-housing wealth accumulation. Tenants do not compensate for their lack of housing wealth by accruing more non-housing wealth. The results in this thesis also show that the response of

wealth gains to homeownership varies by housing characteristics and households' socio-economic characteristics. It also argues that the accumulative aspect of homeownership through housing price could increase wealth inequality through its impact on spatial inequality, tenure inequality, and intergenerational inequality. Furthermore, this thesis highlights that under existing conditions, speculative strategies have been deployed by households, while housing policies inherited from 'savings' era may not be best designed for the 'speculative' era. The findings imply that conjunction of reforms on housing, land, and tax is required.

Firstly, there is a clear need to increase the level of the total wealth of tenants. Policymakers should be concerned with the potential lack of resources for tenants that may pose threat to tenants' later life experiences, given the longer stay in the rental market and the delay in getting access to homeownership combined with the trend towards delaying family formation at present. This indicates that there is some room for policymakers to consider improving the wealth level of tenants through the accumulation of non-housing wealth.

For one thing, the increase in the savings of tenants would be beneficial. Lersch and Dewilde (2018) argue that facilitating regular saving, namely, conscious saving, for those not entering homeownership may be one instrument to reduce inequalities between homeowners and tenants. This thesis reinforces this recommendation by examining the trade-off between principal repayments and conscious saving among homeowners. Therefore, policies that facilitate regular savings for tenants could narrow the wealth gap caused by the accumulation of housing wealth between homeowners and tenants. The government in China has started to address the issues by providing supply-side subsidies and incentives, such as encouragement for the private rental market (J. Chen et al., 2022), based on tenants' housing needs. An emerging phenomenon in some advanced economies, such as the UK and Australia, is an increasing provision of rental housing by non-profit suppliers, with rising rents offset by greater access to income-related subsidies (Scanlon et al., 2014; Whitehead, 2015, 2017). These policies could help increase tenants' residual savings. The key thing lies behind is reforms in the housing markets providing housing corresponding to tenants' socio-economic situation and meeting tenants' housing needs. Furthermore, as a remedy policy for life experience, the support for the 'same rights for tenants and owner-occupiers' in terms of education, public services, and social services should be encouraged. The protection of tenants' rights (quality-based rental control and using rights) should be strengthened.

For another thing, the second way to compensate for tenants' lack of housing wealth is to possibly increase the holdings of financial assets of tenants, which relies on increasing the availability of secure financial instruments and the propagation of financial knowledge, based on tenants' risk affordability.

Secondly, the concern about wealth inequality would further challenge policymakers. This thesis highlights the need for changes in housing policies when market outcomes may be overwhelming the intended distributional measures of housing policies as well as land policies. In terms of tenure inequality, promoting access to owner-occupation through changes in the regulation and control of mortgage markets and reductions in affordability and job and income insecurity among younger households and low-income households would be helpful (Whitehead & Williams, 2017). Pawson et al. (2022) also report a combination of demand-side policies and supply-side policies being used in the global context.

In the context of China, one is to increase the coverage rates of HPFs among private sectors, which have been disproportionately occupied by individuals and households in the rental sector. Besides this, relaxing the limitations on the use of HPFs in other places could also be helpful. The second one is to decrease transaction costs for homeowners, especially taxation for first-time homebuyers and households at the low end of wealth distribution. A number of countries do apply transaction tax exemptions or concessions or first-time subsidies for first-time buyers, such as Australia, Canada, Italy, and the United Kingdom (OECD, 2022a; Pawson et al., 2022). The third one is, possibly, to encourage the diverse supply of housing and promote the more efficient use of existing housing stock (including housing in urban villages). One example has been made through the encouragement of intermediate tenures (Clarke, 2010; Monk & Whitehead, 2010). Clarke (2010) and Monk and Whitehead (2010) emphasised the use of shared-ownership housing. However, the experience in Australia, China, Norway, the UK and the USA suggests that homeowners' exit affordability is weak when subsidised homeowners have to share their capital gain with the government (Cheung & Wong, 2019). The ability of households to climb the housing ladder or get out of shared ownership may be highly subject to fluctuations in the housing market, household's changing income levels and propensity to move away to cheaper locations. Therefore, the future sustainability of shared ownership is reliant upon households being confident that they will be able to give up the ownership if they wish, finding buyers for their part.

Concerning spatial inequality between urban and rural China, it would be helpful through land reform in Chinese rural areas, to increase the possibility of rural households benefiting from land transactions and housing transactions. Specifically, a system to support the transaction profits shared by rural households and local governments should be promoted. At present, the residual principle of land rents has been solely enjoyed by local governments. The successful reform of this system would rely on and be enhanced by increasing the transparency of land auctions.

Thirdly, a key issue that relates to the housing wealth accumulation patterns and housing strategies that are employed by households, is the functioning of the housing policies that are designed to cope with the rising housing prices. With house prices rising ahead of income and experiencing long-term increases, homeowners receive great gains through housing price appreciation. Homeowners have moved on from 'passive' accumulation of unearned house price gains to more 'active' and 'pro-active' strategies and leveraging behaviours (such as trade-up, rent-to-buy). Key policy structures in Australia, the UK, Canada, and New Zealand, were put in place when low house price inflation meant that 'passive' strategies dominated, and they may not be best designed to deal with speculative strategies, namely 'active' and 'pro-active' strategies.

Recently, Lunde and Whitehead (2021) provide an overview of housing taxation across European countries by distinguishing tax systems for private landlords, social landlords, owner-occupation, and tenants. A detailed comparison and assessment of housing taxes across OECD countries can also be found in a more recent OECD (2022a) report. They argue that the tax systems in most countries are quite complicated and favour owner-occupation. The efficiency, effectiveness and equity of housing taxation have the potential to improve the functioning of housing markets, improve fairness and equity and help raise more revenue better. New policies that are credible, feasible and have the support of the large numbers of losers to restrain speculative behaviours are required.

This is also true in China. In China's context, holding multiple properties without renting out and just waiting for opportunities to sell out is not rare (Gan, 2018; Y. Huang et al., 2020a). The tax system in China favours the holding of housing and trading-up activities, as it continues to rely heavily on transaction taxes, mortgage interests could be deducted, tax on the capital gains of the only house can be exempted and expanding property tax to other cities has been suspended. These types of support measures have the possibility to fuel house

price increases (Andrews et al., 2011; OECD, 2021). It has been found and widely argued that the effectiveness, revenue and fairness could be impaired by levying recurrent property taxes on outdated property values, relying heavily on transactions taxes, exempting capital gains on principal residence, and deducting mortgage interest (OECD, 2022a). Housing policies in current times in China are inherited from the 'savings' era, which may not be perfect enough to deal with housing outcomes in times when the function of spreading wealth holdings is threatened, wealth inequality accelerates, and speculative behaviours arise.

Arguably, governments have failed to reform the institutional arrangements and fiscal settings for housing development, especially the taxation of housing. A wide range of taxes on immovable property has been levied. The increase in the discussion on the possibility of strengthening the role of recurrent taxes on immovable property based on updated property values (since increases in housing values have not been reflected in property tax), lowering housing transaction taxes (especially for first-time homebuyers and individuals and households below a certain income group), and capping certain tax incentives (mainly capital gains, since capping the value of the deduction on mortgage interest already exists) to strengthen progressivity may be meaningful (OECD, 2022a).

Additionally, with the residential sector being linked to the emissions of energy-related CO_2, the tax system plays an important role in reducing emissions. An encouragement for the supply of green buildings and the techniques for reducing the costs of green buildings through tax incentives (such as tax rebates, grants and low-interest loans) could be very beneficial. Especially, the tax system in China should improve the targeting of tax incentives for energy-efficient housing renovations to ensure relief reaches low-income households. The reform in taxes, nonetheless, is challenging. For instance, in 2022, the plan of the expansion of property tax was interrupted by the potential of a bust in the housing market caused by COVID-19 and the deleverage activities. This reflects a lack of strong empirical evidence of the effectiveness of policies and a trade-off between the sustainability of policies and pressure arising from reality and macroeconomic development.

10.5 Limitations and future research

Although this thesis has made several contributions, the study does have some key limitations. First, the empirical results in this thesis may rely on the period of research. Since the COVID-19, the growth rate of newly built house prices decreased stably and after May

2022, the average new home prices dropped compared to the same time in last year. The results from the Bank of International Settlements show that this year-on-year declines are a global phenomenon during the same time, in both advanced economies and emerging market economies. Average new home prices in China's 70 major cities dropped by 1.6 percent year-on-year in November 2022. This was the seventh month of decrease in a row in new home prices which remained the steepest pace in the sequence and the fastest fall since August 2015, amid the deleveraging campaign and COVID-19 lockdowns. China's home prices fell at a faster pace in December 2022, according to a survey conducted by China Index Academy, reflecting persistently weak demand. Besides the year-on-year declines, in some cities, the month-on-month house prices also reduced too.

In this case, the results of the positive effects of homeownership on wealth accumulation may be impacted or reversed in some cases. More specifically, adding the years after COVID-19 and deleverage campaign will significantly lower the wealth benefits of homeownership, especially in cities like Tianjin. If we only focus on data in recent years, especially since 2021, we may find the transferring into homeownership may be negatively related to household's wealth and renting households with similar socio-economic characteristics may accumulate more wealth. This is why wealth accumulation through homeownership is highly dependent on economic growth and market situation. This is also why wealth accumulation through homeownership could be risky and poses threats to the asset-based welfare policies in advanced economies, which has experienced housing booms and busts already. In this situation, the most negatively influenced households would be those who became homeowners just before the COVID-19 and the deleveraging campaign. They will certainly experience wealth loss since they did not have the accumulation of wealth through capital gains before that time.

Secondly, this thesis does not engage with the long-term effect of homeownership so it cannot be easily extrapolated for the long-term impacts. Compared with a long-term observation period of survey data in developed economies, such as Panel Study of Income Dynamics (1968-) in the USA, British Household Panel Survey (1991-2008) in Britain, and Socio-Economic Panel Study (1992-2012) in Germany, the time span of the dataset is relatively short for the models established in this thesis, which could be mostly attributed to the transition that has been taking place in the Chinese housing market only officially started in 1998 and data before 1998 were not applicable. The short observation period of the research has at least three obvious shortcomings. Firstly, it is widely acknowledged that the

impacts would be different or even contradictory in magnitude in short-term observation and long-term observation. Due to a lack of data, this thesis fails to capture the long-term effects of homeownership, which constitutes one of the limitations. The results typically track wealth accumulation during a relatively short span and hence are not necessarily generalisable. In addition, possibly, any behavioural changes invariably require time. In the short term, transition into homeownership may not necessarily induce any potential 'positive' behavioural changes. Nonetheless, there is a chance that behavioural changes could happen in the middle or long run. This becomes one of the shortcomings of this chapter. Secondly, differences preceding the entry to homeownership between those homeowners and tenants are not fully traced. It has been widely recognised that some factors at the household level may be jointly associated with related housing characteristics and wealth accumulation. However, due to the short periods, it is impossible to trace these differences. The third shortcoming is directly related to the cycle of the housing market. Compared with the housing markets which underwent ups and downturns in other countries, the housing market in China was characterised by relatively one-way upward. This feature helps to promote housing accumulation; however, it also generates a lack of fluctuation in the housing market in China when it has been proved that market conditions influence the wealth gains from homeownership (Wainer & Zabel, 2020).

Thirdly, although this thesis interrogated six possible mechanisms, there is still one mechanism that has not been explored, namely, the favourable tax system. In the chapter reviewing literature (Chapter 3), the effect of a tax system on contributing to favouring owning over renting has been discussed. The reason that this mechanism has been absent in this thesis is that it cannot be examined through housing wealth accumulation in Chapter 7 or through the accumulation of non-housing wealth in Chapter 8. Furthermore, it is not easy to capture the effect of this complex system, when it involves various types of taxes that relate to the housing market. The favourable tax system is directly linked to the user cost of housing capital, influencing housing prices and rents and thus the returns of owning (Ozanne, 2012). Therefore, it would influence wealth accumulation. For instance, the owner-occupier in the UK who traded up benefited from tax relief and the tax relief broadly increased in value with income and size of loan (Forrest & Murie, 1995a, p.63), although mortgage interest deduction has been abolished in 2000 in the UK. The way housing is taxed and subsidised is critical in wealth accumulation and further wealth distribution.

Fourthly, some key information in the household level dataset was missing, limiting the degree of information in the models, such as saving propensity before getting into homeownership and city information in CHFS. It has been proved that saving propensity is a pivotal variable that influences home tenure choice and the accumulation of financial investment (Vestman, 2019). Due to the data inaccessibility of the information on city location, this thesis cannot solve the endogeneity problem by using instrumental variables such as house purchasing price (J. Zhao & Li, 2017), residential land supply allocation and the interaction of house supply elasticity and the provincial housing price index (Z. He et al., 2019), which follow the work of Saiz (2010), Mian and Sufi (2014) and Chetty et al. (2017) in solving the endogenous issue of housing price or housing equity increases. On the other hand, the city-by-year effect cannot be controlled for to eliminate unobservable region characteristics.

Lastly, while a DID approach and a variety of robustness checks have been used to disentangle the causal relationship or treatment effect and mitigate selection bias as it controls for time-invariant unobservable household characteristics correlated with wealth and homeownership, the quantitative results could still be subject to problems of endogeneity, including those arising from omitted variable bias caused by other time-varying household-specific characteristics and measurement errors. Especially, time-variant unobservables cannot be controlled for in DID procedure so there might still be some residual selection bias (Cerqua & Pellegrini, 2019). Furthermore, as Wainer and Zabel (2020) mentioned, using a dummy variable to capture the difference between homeowners and tenants may miss variation across households.

The current study also leaves some questions unanswered that require future research. First, as mentioned in Chapter 4, the analysis of Chapter 9 is a bit different from the analyses in Chapters 6 to 8. At the initial stage of research, Chapter 9 relied more on literature analysis and simple survey data to explore wealth inequalities and housing strategies, without robust and serious econometric models being established to verify these effects. More specifically, further studies on how housing, and what factors influence wealth inequalities are suggested.

Regarding households' housing strategies, more rigorous studies are required to provide answers to what factors impact a household's housing trajectory. For instance, as homeownership has expanded, and with the experience of rapid house price inflation, there is more awareness of homeownership gains. People pursuing housing careers in this sense

are related to maximising financial gains, while innovations in the financial market and agency services have made movement and trading-up easier. Also, there is a necessity to explore people's view of housing and trace the changes of attitude: a saving/investment, feeling of security, use as collateral, leaving to children, better dwellings (involve a reference to a package of attributes including value and saleability). The same importance should also be attached to the investigation of the factors that promote the changes in attitude. Since there is significant evidence about attitudes that must mould housing decisions.

Secondly, as mentioned above, a focus on the effects of the tax system on facilitating the accumulative aspect of homeownership is required in future research. The tax system not only influences the demand for housing, especially the speculative demand for housing, but it also exerts an effect on the returns of homeownership. In the future, the tax system should be studied in detail. More specifically, what kinds of taxes influence households to favour housing and benefit from homeownership, how much households could benefit from these kinds of taxes, and how these benefits would vary across groups are especially interesting.

Thirdly, a very interesting topic related to housing wealth accumulation is the decumulation of housing wealth. On the opposite side of wealth, the decumulation of housing wealth intrinsically depends on the accumulation of housing wealth. Therefore, the examination of how households in their later life deal with their housing equity could mirror the wider impacts of the accumulation of wealth through homeownership, especially in terms of the verification of housing asset-based welfare and the impacts of wealth inequality.

The function of life-cycle savings and wealth aspects of housing ownership, by owner-occupiers and landlords, have long drawn policy attention to how stocks of housing assets held by households can act as own sourced 'welfare' in periods of retirement from work. Homeownership has been historically supported by states through various subsidies to promote this welfare. The subsidised provision of a long-term own asset safety net through early life-cycle entry to homeownership was assumed to alleviate the need for governments financial support from state welfare provision in later life. The local governments in China are faced with an ageing problem, which poses great challenges to fiscal arrangements at the local level. In the context of the high rate of homeownership in China and the high rate of households who have multiple properties, exploiting the possibility of using housing assets to relieve the financial stress caused by the ageing problem would generate great theoretical and practical values. Since welfare is closely associated with housing wealth, when housing

wealth is considered a safety net and backup for uncertain issues, there should be distinct results regarding the effectiveness of individualised strategies in providing for family welfare needs and mitigating social risks, which has been largely ignored in extant studies and the current study. Therefore, the ways how older generations decumulate their housing assets, what factors influence households' decision to draw on the wealth accumulation in housing, and what available options they have to make better use of their assets deserve attention from researchers.

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Appendix

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Table A3.1 Key related references

Authors	Location	Year	Models	Independent Variable	Dependent Variables	Coefficients
Di et al. (2007)	USA	2001	General regression	Years of homeownership	1) Log of net worth; 2) Non-housing wealth	1) 0.8*** 2) 0.3**
Turner and Luea (2009)	USA	1994, 1999, 2001	General regression	Years of homeownership	Total net wealth	Each additional year of homeownership increases total net wealth by $13.7 thousand
Herbert et al. (2013)	USA	1999-2009	Fixed effects	Years of homeownership	Total net wealth	Each year is associated with $9,473***
Lersch and Dewilde (2018)	UK and Germany	UK: 1991-2008; Germany: 1992-2012	Hybrid panel regression	Tenure	Log of financial wealth	1) UK: 0.10 2) Germany: -0.41***
Kaas et al. (2019)	15 Euro area countries	2009/2010	Instrumental variable	Tenure	1) Log of total net wealth; 2) Financial wealth; net real wealth; business wealth	1) -1.779***; 2) -6.692***; -7.907***; -0.554
Wind and Dewilde (2019)	10 Eurozone countries	2010/11	Country-fixed effects	Tenure	1) Net worth; 2) Financial wealth	1) Mortgaged ownership: 3.123***; outright ownership: 4.789*** 2) Mortgaged ownership: -0.67; outright ownership: 2.073***
Wainer and Zabel (2020)	USA	1984-2013	Fixed effects	Years of homeownership	Real wealth	1) 1984 sample: each year is associated with $6.79*** thousand and $16.41*** thousand on average for the low- and higher-income groups 2) 1999 sample: -3.34 and 9.48***, respectively
Sun et al. (2022)	China	2013-2019	Fixed effects	Tenure	Risky assets	-0.017**

Source: collected by the author.

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Table A5.1 Duration of homeownership for CHFS sample

Duration	Number of households	Per cent (%)
0	205	31.35
2	175	26.76
4	274	41.90
Total	654	100

Table A5.2 Timing of getting into homeownership for CHFS sample

	Homeowner	Renter	Per cent (%)
2013	0	654	0
2015	336	318	51.38
2017	387	267	59.17

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Table A6.1 Placebo test for the relationship between homeownership and wealth/log wealth

	Wealth (1)	Log wealth (2)
Treat_homeownership	13.415	0.277
	(22.22)	(0.18)
Time	-14.407	-0.163
	(20.35)	(0.19)
Treat_homeownership*Time	4.014	0.000
	(32.55)	(0.26)
Constant	-156.025	0.712
	(209.33)	(1.43)
Observations	636	636
R-squared	0.279	0.370
Controls	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

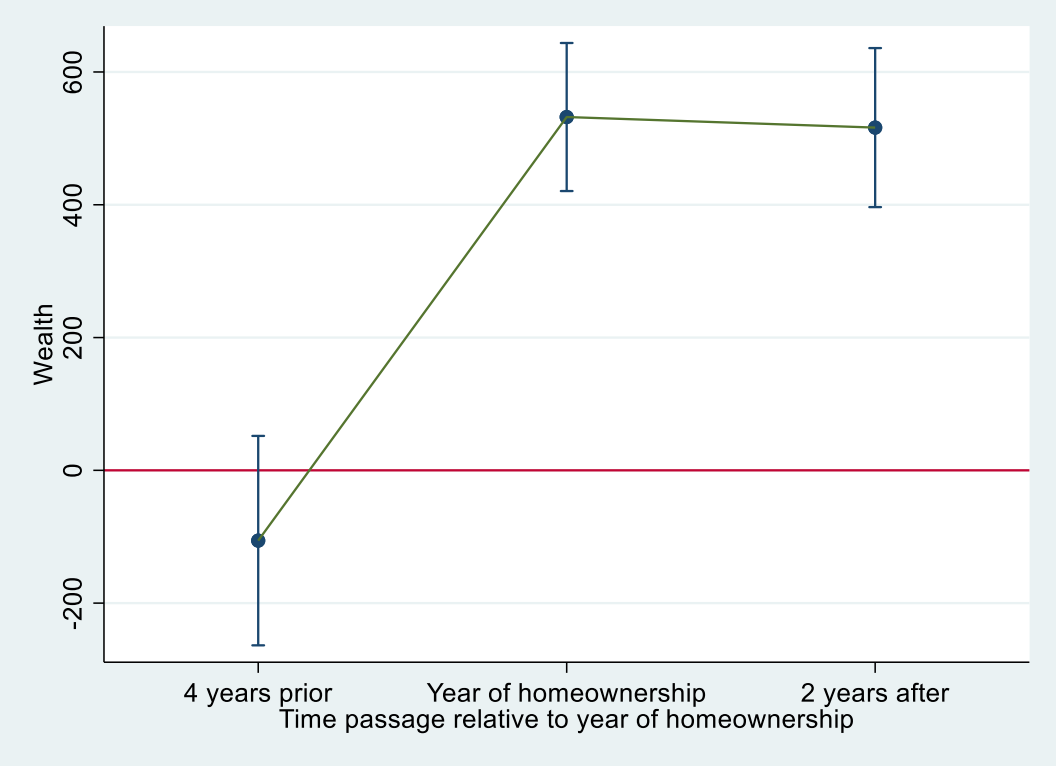

Figure A6.1 Parallel trend test for homeowners using the level value of wealth

Figure A6.2 Parallel trend test for homeowners using logarithm value of wealth

Table A6.2 Heterogeneity of homeownership across household economic characteristics

	Wealth (1)	Log wealth (2)	Wealth (3)	Log wealth (4)
Homeownership	534.500***	1.598***	428.721***	1.676***
	(56.77)	(0.13)	(55.56)	(0.14)
Homeownership*lowincome	-283.680***	0.215		
	(57.52)	(0.23)		
Homeownership*workunit			98.248	-0.067
			(76.27)	(0.16)
Workunit			-95.072**	0.043
			(39.55)	(0.12)
Constant	1,181.399	6.496**	933.311	6.667***
	(946.51)	(2.53)	(964.46)	(2.53)
Observations	1,962	1,962	1,962	1,962
Within R-squared	0.206	0.204	0.200	0.204
Controls	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table A6.3 Heterogeneity of homeownership across household social characteristics

	Wealth	Log wealth	Wealth	Log wealth	Wealth	Log wealth	Wealth	Log wealth
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Homeownership	205.456**	1.131***	228.084	0.825***	580.666***	1.836***	612.050***	1.919***
	(95.33)	(0.20)	(182.82)	(0.28)	(59.09)	(0.14)	(65.24)	(0.14)
Homeownership*native_city	320.511***	0.661***						
	(103.59)	(0.21)						
Native_city	-123.649	0.076						
	(126.20)	(0.41)						
Homeownership*native_province			259.779	0.932***				
			(188.73)	(0.29)				
Native_province			385.030	-0.236				
			(272.86)	(0.59)				
Homeownership*hukou_unify					-366.017***	-0.547***		
					(75.51)	(0.18)		
Hukou_unify					76.598	-0.005		
					(75.42)	(0.22)		
Homeownership*hukou_transfer							-383.913***	-0.665***
							(80.97)	(0.17)
Hukou_transfer							115.361**	0.241
							(54.76)	(0.17)
Constant	682.832	5.558**	1,181.490	6.635***	-68.607	4.701*	-617.356	3.459
	(996.19)	(2.50)	(951.27)	(2.50)	(931.66)	(2.53)	(964.15)	(2.53)
Observations	1,962	1,962	1,962	1,962	1,962	1,962	1,962	1,962
Within R-squared	0.208	0.210	0.202	0.212	0.214	0.210	0.216	0.213
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table A6.4 Heterogeneity of homeownership across parental characteristics

	Wealth (1)	Log wealth (2)	Wealth (3)	Log wealth (4)
Homeownership	692.715***	1.915***	622.347***	1.901***
	(75.56)	(0.15)	(69.45)	(0.14)
Homeownership *hukou_parent	-471.556***	-0.526***		
	(87.70)	(0.17)		
Homeownership *employmenttype_parent2			29.069	-0.196
			(185.81)	(0.37)
Homeownership *employmenttype_parent3			-386.989***	-0.566***
			(80.58)	(0.18)
Constant	-527.167	4.650*	328.180	5.317**
	(941.49)	(2.50)	(936.66)	(2.49)
Observations	1,962	1,962	1,962	1,962
Within R-squared	0.225	0.210	0.217	0.210
Controls	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table A6.5 Heterogeneity of homeownership across geographic characteristics

	Wealth (1)	Log wealth (2)
Homeownership	211.185***	1.704***
	(60.95)	(0.22)
Homeownership*region_east	431.641***	-0.122
	(85.19)	(0.24)
Homeownership*region_middle	162.152**	0.020
	(81.21)	(0.24)
Constant	-36.157	6.892***
	(970.80)	(2.56)
Observations	1,962	1,962
Within R-squared	0.213	0.204
Controls	Yes	Yes
Household FE	Yes	Yes
Year FE	Yes	Yes
City FE	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

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Table A7.1 Housing wealth and region: homeownership

	Eastern China		Middle China		Western China	
	Asset	Wealth	Asset	Wealth	Asset	Wealth
	(1)	(2)	(3)	(4)	(5)	(6)
Years since purchase	219.986***	197.691***	79.012***	73.027***	52.252***	44.025***
	(31.74)	(27.57)	(10.84)	(10.50)	(11.52)	(10.40)
Constant	1,006.133	1,512.902	-1,320.274	-988.951	1,109.874	1,664.822
	(2,040.31)	(1,857.73)	(849.25)	(858.17)	(1,134.32)	(1,070.89)
Observations	870	870	645	645	447	447
Within R-squared	0.293	0.240	0.198	0.170	0.227	0.207
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table A7.2 Housing wealth and timing of purchase: homeownership

	Homeowner15	Homeowner15_1	Homeowners15_2	Homeowner17
	(1)	(2)	(3)	(4)
Years since purchase	109.356***	130.643***	26.292	257.797***
	(11.52)	(12.57)	(21.06)	(29.58)
Constant	1,310.279	1,670.287*	955.926	533.663
	(883.77)	(922.23)	(748.56)	(793.79)
Observations	1,623	1,437	801	954
Within R-squared	0.169	0.240	0.0992	0.361
Controls	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

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Table A8.1 Collateral effect: debts and homeownership

	Debt_other		Debt_finance	Debt_business	
	(1)	(2)	(3)	(4)	(5)
	Fix	Poisson	Fix	Fix	Poisson
Homeownership	6.412	0.492*	-0.432	8.373**	1.641**
	(4.72)	(0.29)	(0.36)	(3.75)	(0.72)
Constant	10.736		3.824	-0.133	
	(95.14)		(7.66)	(74.10)	
Observations	1,962	930	1,962	1,962	210
Controls	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes	Yes
Within R-squared/ Wald chi2	0.0409	103.9	0.0231	0.0471	2945

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

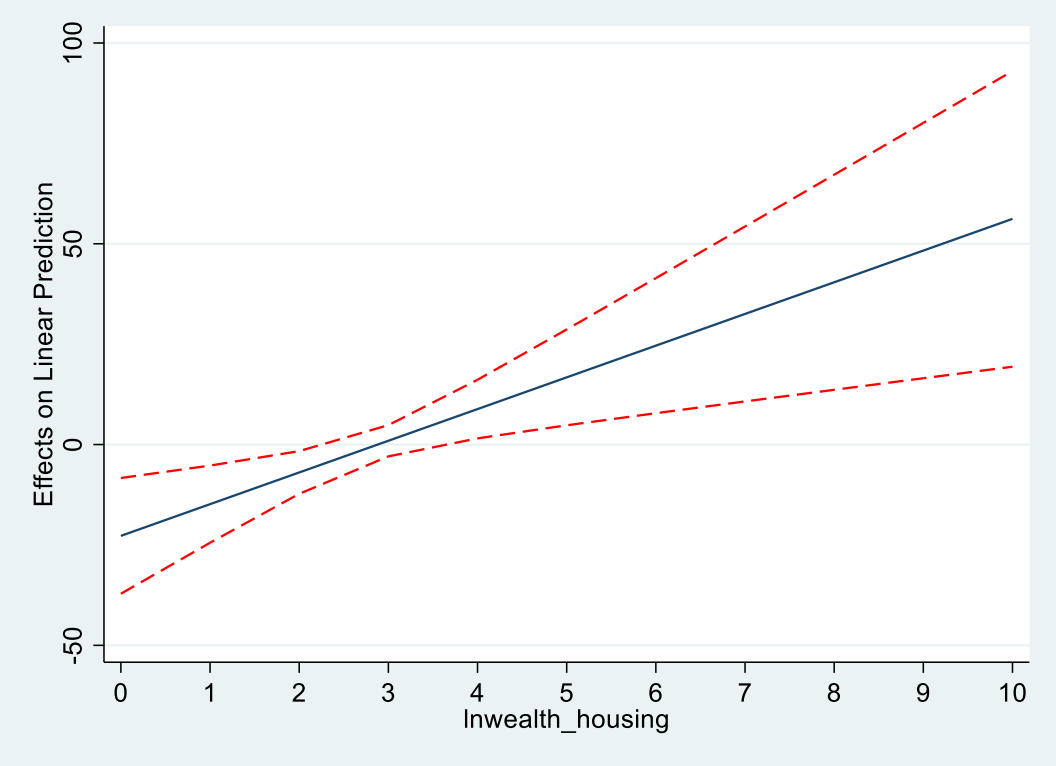

Figure A8.1 Average marginal effects of log housing wealth with 95% Cis on total financial wealth

Table A8.2 Risk preference, financial attention, financial knowledge: homeownership

	Risk preference (1)	Financial attention (2)	Financial knowledge (3)
Homeownership	-0.058	-0.038	0.035
	(0.04)	(0.07)	(0.06)
Constant	1.014	5.606***	0.508
	(0.88)	(1.43)	(1.25)
Observations	1,962	1,962	1,962
Within R-squared	0.0337	0.0636	0.0163
Controls	Yes	Yes	Yes
Household FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
City FE	Yes	Yes	Yes

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

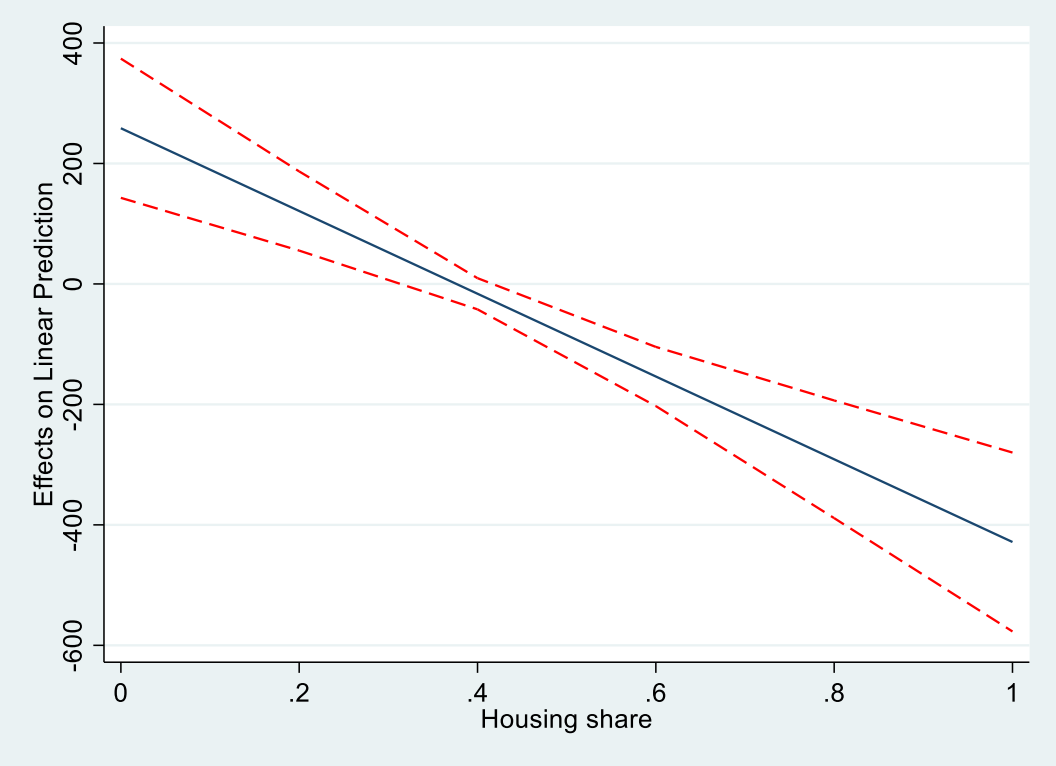

Figure A8.2 Average marginal effects of housing share with 95% Cis on total financial wealth