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The Effect of Housing Wealth on Household Portfolio Choice

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This study uses data from the 2013 China Household Finance Survey (CHFS) to investigate the effect of housing tenure decisions on households' portfolio choices. We find that property value has a significantly positive impact on the extent to which households hold risky financial assets. Furthermore, this impact is mitigated in households that do not have full property rights over their homes, and housing characteristics that increase transaction costs reduce the proportion of households with risky financial asset holdings. These results indicate the presence of a wealth effect on households' portfolio choices.

Key Words: Housing portfolio choices; Housing wealth effect; Financial market participation.

JEL Classification Numbers: G50, G51.

1. INTRODUCTION

Owning a home, often the largest asset in a household, can have important consequences for the household's portfolio choices (Campbell, 2006). Originally, scholars considered homeownership as a stimulus for investing in risky assets, since it often resulted in wealth accumulation through the joint effects of price appreciation and mortgage amortization. This "wealth effect" enables and encourages households to invest the remainder of their portfolio in assets that are less safe (Cohn et al., 1975; Friend & Blume, 1975; Tobin, 1982). Later studies, however, presented evidence for the "crowding-out" effect of homeownership on holding risky financial assets, since a vast portion of a household's wealth is automatically locked into the illiquid asset of housing. The latter effect has been well documented

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empirically and for developed economies, in particular, it appears to dominate the wealth effect (Brueckner, 1997; Chetty & Szeidl, 2007; Cocco, 2004; Flavin & Yamashita, 2002; Grossman & Laroque, 1990; Kullmann & Siegel, 2005; Pelletier & Tunc, 2015; Vestman, 2012).

Now that homeownership rates are on the rise, even in developing economies, we need to understand which of these two homeownership effects is dominant in these new markets. To find the answer, we utilize a novel dataset provided by the 2013 China Household Finance Survey (CHFS) to examine the effect of housing on household portfolio choices. There are three reasons that data from China may be different from data accessed from developed countries and useful in examining the wealth effect. First, China has experienced a long period of rising home prices since 1998 due to urbanization and marketization, particularly over the past 10 years, following the 2007-2009 global financial crisis. According to the China Statistical Yearbook, home prices in China have soared almost 20% to 30% in the so-called first-tier cities such as Beijing, Shanghai, and Guangzhou. By comparison, during the same period, home prices in the United States (U.S.) increased by only 3%, according to the S&P/Case-Shiller home-price index. The rapid increase in China's home prices indicates higher property values and, thus, improved total wealth for households, thereby strengthening the wealth effect. Second, rising home prices imply low home-price risks in China. Given that the recent year-by-year rise in the country's home prices have produced rapid wealth growth for homeowners, the wealth effect must be particularly strong there, making it easier to document. These first two reasons suggest that the wealth effect may dominate the crowding-out effect. Third, because of the nature of housing policies that are distinct to China, certain characteristics of housing there help delineate the wealth effect. For example, there are different levels of ownership rights due to various government policies. Some households have complete property rights and are free to sell their homes, so the wealth effect is valid for them. However, there are households with incomplete property rights, and the wealth effect is weakened or even non-existent in such cases. We can clearly identify the wealth effect by comparing these two kinds of households.

Using the CHFS dataset, our empirical study began by examining the effect of homeownership on household portfolio choices. We found that it significantly increases households' investments in risky assets, even when controlling for the differences in outstanding debt (from both banks and private loans). After including property value as an independent variable, we found that homeownership was no longer significant in influencing households' participation in risky financial markets. Instead, property values significantly increased households' propensity in holding risky assets. This suggests that the wealth effect is driving the positive relationship between

homeownership and the investment appetite for risky assets, and that the wealth effect dominates in China.

To further explore this Chinese wealth effect, we investigated the impact of certain individual homeownership characteristics. In this paper, we studied and discussed three characteristics of homeownership in this paper. First, we discuss the homeowner's property rights. Typically, the state owns the land on which large houses are built and is leased under 'land use rights' for up to 70 years. The law protects large property homes, and owners can use, finance, sell, or transfer them freely according to the market prices. However, all this is different for small property homes in China. These are owned collectively, cannot be financed easily, and land use rights have no clear leasehold time period and can, therefore, be terminated at any time. Hence, small property homes cannot be sold easily in the real estate market and are not protected by law. We have included these aspects in our analysis and divided our sample of households into sub-samples of homes with or without full property rights over their main houses. Notwithstanding all this, we found that property value significantly increases the willingness to hold risky assets in the sub-sample of households with complete property rights, but its effect is negligible in the sub-sample of households with incomplete property rights. This suggests that the wealth effect exists only when houses can be easily sold; thus, property value is part of the household's "true" wealth.

The second characteristic of homeownership that we considered was the number of houses owned by a household. Keeping the total property value constant, owning several houses implies that the housing portfolio maintains a higher level of liquidity. When a household owns multiple homes, it has flexibility or the option to trade a small part of the total property value and pay a lower transaction cost. Consistent with this liquidity hypothesis, we found that the proportion of risky assets held increases with the number of houses owned, after controlling for total property value. The third and final homeownership characteristic we considered was house size. The rates of contract taxes increase with house size in China, implying that sales of larger homes include higher taxes and thus greater transaction costs. Hence, the wealth effect must be stronger in households with smaller houses. We also found that a household's willingness to hold risky assets decreases as house size increases, after controlling for total property value, thus supporting this hypothesis.

In sum, the empirical results of this paper indicate that homeownership increases household investment in risky financial assets substantially through the wealth effect and this impact dominates in China. Furthermore, the wealth effect is stronger in instances where housing wealth is more liquid. Section 2 presents a review of the relevant literature. Section

3 describes the model setting and data collected. Section 4 presents the results and discussions, and Section 5 concludes this report.

2. LITERATURE REVIEW

Scholars have long debated the impact of housing tenures on a household's portfolio choices. Some studies report that there is a wealth effect that encourages homeowners to seek risky financial investments. One reason for this is that people can tolerate higher risk if they have greater wealth, and housing is generally a household's most important financial asset. Therefore, appreciation in housing prices increases wealth and promotes investment in risky assets (Tobin, 1982). In addition, in countries with highly developed credit systems, housing can be used as collateral, and this improves households' potential to hold additional financial assets (Cardak & Wilkins, 2009). Some studies demonstrate that mortgage balances, relative to financial net worth, have a positive effect on the share of stock individuals own in the U.S. (Heaton & Lucas, 2000; Yao & Zhang, 2005) and Australia (Cardak & Wilkins, 2009).

The arguments in favour of positive effect of housing on households' portfolios emphasize that, in any given period, when appreciation in real home prices accelerates, homeownership has an independent effect on the ability of households to accumulate wealth (Turner & Luea, 2009). Thus, wealth improvement from housing capital gains enables households to be less risk averse and engage in riskier investments in equity products (Cardak & Wilkins, 2009; Chetty & Szeidl, 2015). Even though households show only a 'book gain' under such appreciation, the perceived wealth may stimulate them to invest in riskier portfolios, creating a wealth effect on their decisions in the financial market (Campbell & Cocco, 2007; Fougere & Poulhes, 2014; Shum & Faig, 2006; Wachter & Yogo, 2010). Conversely, from the perspective of the household's consumption role, the negative effects of homeownership on household portfolios are also widely reported, with housing-occupied investors prone to reducing their overall investments (Chetty & Szeidl, 2007; Flavin & Yamashita, 2002; Grossman & Laroque, 1990).

Owning a house introduces asset price risk, and a higher house-to-wealth ratio not only exposes owners to liquidity risks but also leads to home price risk, and committed expenditure risk (Campbell & Cocco, 2003; Cocco, 2004; Fratantoni, 2001; Grossman & Laroque, 1990). As the major component of a household's wealth, housing is indivisible and relatively illiquid. The issues of whether the house can be sold in the real estate market and the attendant uncertainty in terms of an increase in the owners' level of wealth imply a 'liquidity risk'. High-equity homeowners have a less diversified portfolio and are thus exposed to higher risk (Meyer & Wieand, 1996).

Therefore, the impact of portfolio constraints imposed by the consumption demand for housing on investors' optimal holdings of financial assets, called the 'housing constraint', generates a 'crowding-out effect' (Flavin & Yamashita, 2002). Henderson and Ioannides (1983) and Brueckner (1997) showed that households may rationally overinvest in real estate given the principle that housing investment is at least always equal to housing consumption. This inefficiency is the result of a rational balancing of consumption benefits and portfolio distortion associated with housing investment. Yamashita (2003) found that households with a higher house-to-wealth ratio hold a lower proportion of stocks. Benjamin et al. (2004) analysed the phenomenon of a relatively small holding of financial assets and large holding of housing wealth and found that high concentration of household wealth in housing is due to the household's higher marginal propensity to consume from housing rather than from financial assets.

Households also face committed expenditure risk (Fratantoni, 2001) in their housing assets, which is assumed by committing to fixed nominal payments over a long horizon while subject to uncertain labour income. Previous studies, such as Bertaut and Haliassos (1997), Gollier and Pratt (1996), Viceira (1997), and Heaton and Lucas (2000) found that the degree of uncertainty in labour income did not induce sufficient temperance to explain stockholding decisions. On the other hand, Elmendorf and Kimball (1991) found that income insurance from the tax system leads to higher risky asset holding. This indicates that the committed expenditure risk associated with homeownership and the additional temperance associated with this risk adequately explains this puzzle. Moreover, homeownership crowds out stock market participation. Yamashita (2003) found that non-homeowners have substantially higher investments in stocks. Among homeowners, there was a weak pattern of homeowners with a house-to-net worth value lower than 1 having a slightly higher proportion of financial assets invested in stocks than those with a value greater than 1. Hu (2005) showed that renters have a higher share of their financial wealth in risky assets than homeowners, mainly because homeowners can gain returns on their housing investment and, hence, do not need to rely heavily on risky financial investments; renters need to invest more in risky financial investments since they are the only instruments through which they can accumulate wealth.

Meanwhile, high housing values can impede investment in risky financial assets, and this is the crowding-out effect. This can be attributed to the fact that housing ownership carries home price risk. Homeowners bear the risk of housing price volatility and, as a result, tend to hold safer financial portfolios (Flavin & Nakagawa, 2008; Fratantoni, 1998). This effect is stronger in investors with low financial net worth (Cocco, 2004). The other reason is that housing also carries related committed expenditure risks. Homeowners, whose housing expenditures (e.g. mortgage payments)

are fixed, will have a lower effective post-mortgage-payment income if their income plummets, which thereby induces additional temperance toward investments in the financial market (Fratantoni, 2001).

The housing market is an important manifestation of home values, as it also affects home buyers' wealth levels. At the local level, home prices can be volatile. As a result, agents do not know with certainty what the future sales price of their homes will be. This is called 'home price risk', and it crowds out stockholdings in many developed countries. Using U.S. data, Hochguertel and Van Soest (2001) reported that higher house prices reduce the probability of holding financial assets. Cocco (2004), meanwhile, found that younger and poorer investors have limited financial wealth to invest in stocks due to their investment in housing and such households also have a relatively low stock market participation rate compared to standard models with no housing. Saarimaa (2008) proposed that owner-occupied housing has an adverse effect on household stockholding in Finland, whereas Arrondel and Savignac found that housing wealth crowds out stock market participation in France.

Most studies show that the crowding-out effect is pronounced in developed countries (Cocco, 1999 and 2004; Cocco et al., 2005; Flavin & Yamashita, 2002; Fratantoni, 1998; Grossman & Laroque, 1990; Yamashita, 2003). According to Cocco (2004), the major reason for the crowding-out effect in the U.S. relates to the existence or absence of home price risk: wealthy investors who do not face such a risk have a lower average investment in real estate. When there is housing price risk, wealthy investors encounter higher current home prices than when there is no home price risk. Meanwhile, households that bought their first house or upgraded to a larger house when home prices were relatively low benefit under such conditions. Therefore, investors who are fortunate enough to step onto the housing ladder or switch to larger houses at low prices are more likely to have higher financial net assets and invest more wealth in housing.

An exception to this argument can be found in the recent work of Chetty and Szeidl (2017), who reconciled the two effects by reporting that higher mortgage values decrease households' willingness to hold risky assets when their home equity values are controlled. This indicates that although the crowding-out effect exists, when higher home equity values are controlled, households' investment in risky assets increases, namely the wealth effect also exists.

Other related literature does not directly investigate the impact of owning houses on investment portfolio decisions. Instead, it examines the effects of housing characteristics. One such characteristic is housing prices. Corradin et al. (2013) found that during periods of high growth in house prices, households possess a great amount of wealth and are willing to relocate; therefore, there is a larger decline in their share of risky stocks. Fis-

cher and Stamos (2013) further investigated different household behaviours in both the good and bad states of the housing market cycle. They found that a decrease occurs in homeownership rates, housing investments, and leverage ratios when the housing market is in a bad state. Therefore, as a result of the substitution effect, stock ratios and consumption ratios immediately increase within a short time.

The other characteristic is liquidity. Housing is an asset that lacks mobility: homeowners often have difficulty in finding a counterparty to trade (Ang et al., 2014; Schwartz & Tebaldi, 2006), and this illiquidity can impact households' portfolio choices considerably. Henderson and Ioannides (1983) showed that when the investment constraint is binding, the homeowner's optimal portfolio is inefficient. Following Henderson and Ioannides' (1983) ground-breaking research, several studies, including Campbell and Cocco (2003), Campbell and Cochrance (1999), Campbell and Viceira (2002), Chetty and Szeidl (2017), Flötotto (2006), Viceira (1997), and Yamashita (2002, 2003), showed the effects of liquidity restrictions on households' asset allocation. In particular, Viceira (1997), Campbell and Cocco (2003), Campbell and Cochrance (1999), Campbell and Viceira (2002), and Flötotto (2006) established an inter-temporal optimal investment model of households and individuals in relation to liquidity restrictions and found that households reduce investments in risky financial assets as a result of them. Flavin and Yamashita (2002) used the mean value variance method to study the impact of the portfolio constraints imposed by the consumption demand for housing on investors' optimal holdings of financial assets. They found that liquidity restrictions caused by overinvestment in the real estate market reduce households' need for risky financial assets.

In contrast to the previous literature reviewed, this paper focuses on empirically identifying the wealth effect, and the results indicate that this effect is pronounced in China. This approach closely relates to the work of Chetty et al. (2017). We followed that study in insulating the wealth effect from committed payment risk by controlling for the outstanding debt associated with buying a house. However, the major difference between our paper and that of Chetty et al. (2017), is the main contribution of this study, as we explicitly examine the various aspects that may impact the wealth effect and identify the wealth effect as the driving force underlying the positive relationship between risky asset investment and housing ownership. This study also demonstrates that the wealth effect is only significant when housing is sufficiently liquid; otherwise, it is undermined. This reconciles the literature on the wealth effect with that on liquidity constraints.

3. DATA DESCRIPTION AND MODEL SETTING

3.1. Data

The data used in this study is based on the 2013 CHFS. This survey collects nationwide, micro-level information from Chinese households; data were collected from 1,048 villages (neighbourhood communities) in 262 counties (cities and districts) and 29 provinces (autonomous regions and municipalities directly under the central government) across the country. The survey gathers detailed information on the demographics of families and their household assets, liabilities, and income status. As the previous studies, we also controlled for the Provinces of China in this study.

In terms of assets, the data include detailed information on various financial assets held by households, including risk-free and risky financial assets. Risk-free financial assets include cash, deposits, and cheques. Risky financial assets include bonds, funds, financial management products, stocks, warrants, futures, financial derivatives, foreign currency investments, and gold. In terms of housing details, CHFS provides data on the number of housing units owned by each family, the time of purchase, purchase prices, price limits, and the type of property rights owned by the family. Such details provide a solid foundation for the study of housing-related wealth in terms of financial market participation and holding of financial assets.

Note that China has many regulations for selling houses in rural areas, so house prices in such areas are much different from the market prices of urban houses. Additionally, rural households seldom invest in financial assets, as they lack access to information and due to high transaction costs. Therefore, we removed all rural samples from our study and preserved only urban samples.

3.2. Variables and Descriptive Statistics

This paper investigates the effects of housing on households' asset portfolio choices. We used two dependent variables to measure households' inclination toward risky financial assets. Dummyrisky, which is a dummy variable, indicates if the household holds a positive amount of risky financial assets (1 if Yes and 0 if No). This variable also measures the propensity of a household to invest in risky financial assets. The other, Proprisky, is the proportion of risky financial assets in a household's total financial assets. According to this paper, risky financial assets include stocks, funds, financial derivatives, foreign exchange, and gold. Total financial assets also include cash, bonds, demand deposits, time deposits, and other risk-free assets alongside these risky financial assets.

The key independent variables are housing characteristics that include Homeownership (whether the household owns houses), House_wealth (total market value of all the houses the household owns), House_number (number of houses the household owns), and for households owning at least one

home, House_size (size of the house in which the family lives in currently), and Property (if the household has full property rights over the house in which the family lives). We used Homeownership and House_wealth to calculate the baseline regressions. House_number, House_size, and Property are investment characteristics of housing that affect the extent to which a house can be sold and the attendant transaction costs.

In addition to the key independent variables, there are many control variables that can affect the holding of risky financial assets. At the household level, you have Financial_assets (total value of the household's financial assets), Debt (i.e. if the household has loans from banks or has borrowed privately to buy the house: 1 if Yes and 0 if No), and Family_size (number of people in the family). The characteristics of the family's head of household have also been considered, and these include Ln(Income), Age, Gender (1 for male and 0 for female), Marital_status (1 for married and 0 for unmarried), Education (years of education), and Risk_attitude (1 if highly risk-oriented & 5 if highly risk averse). These variables are commonly seen in the literature, and we controlled all of them as relevant to the particular model.

Table 1 reports the summary statistics of the cross-sectional analysis sample, both the full sample and the sub-sample of households that either owned or did not own houses. The statistics of the full sample show that the average values of households' properties and financial assets are about 77,600 yuan and 26,100 yuan, respectively, confirming that housing is indeed a household's most important financial asset. Further, we observe from the statistics of the sub-samples that households that own houses are more likely to hold risky financial assets and the share of such risky assets in their total financial assets is also higher than for other households. Thus, in this sample, it is highly possible that homeownership increases households' investment in risky financial assets.

3.3. Empirical Strategy

Using the following linear specification, we estimated the impact of housing characteristics on 1) households' propensity to invest in risky financial assets, and 2) the share of risky assets in the household's total financial assets.

$$\text{Dummyrisky}_i = \alpha_0 + \alpha_1 \text{Housing characteristics}_i + X_i\beta + \varepsilon_i \text{ and} \quad (1)$$

$$\text{Proprisky}_i = \alpha_0 + \alpha_1 \text{Housing characteristics}_i + X_i\beta + \varepsilon_i. \quad (2)$$

where the dependent variable is either Dummyrisky or Proprisky, in Equations (1) and (2), respectively. Dummyrisky indicates if a household par-

TABLE 1.

Summary Statistics

Variables	Description	Full Sample	Homeownership= 1	Homeownership = 0
Dependent Variables				
Dummyrisky	= 1 if the household holds a positive amount of risky financial assets; = 0 otherwise	0.2065 (0.4048) 9929	0.2183 (0.4131) 8404	0.1410 (0.3481) 1525
Proprisky	Share of risky financial assets in total financial assets	0.1074 (0.2532) 9929	0.1137 (0.2591) 8404	0.0726 (0.2145) 1525
Variables related to Housing				
Homeownership	= 1 if the household has at least one house; = 0 otherwise	0.8464 (0.3606) 9929	1 (0) 8404	0 (0) 1525
House_wealth	Sum of market values for all the houses owned by the household (in millions of yuan)	0.0776 (0.1049) 9794	0.0919 (0.1082) 8269	0 (0) 1525
House_numberA	2 = more than one house owned, 1 = only one house owned, and 0 = no houses owned	1.0156 (0.5681) 9925	1.2000 (0.4000) 8400	0 (0) 1525
House_number	Number of houses a family owns	1.0519 (0.6878) 9925	1.2429 (0.5670) 8400	0 0 (1525)
House_size	Size of the house in which the household currently lives if the household owns at least one house (in square meters)	100.5933 (81.3895) 8360	100.5933 (81.3895) 8360	
House_sizeA	= 1 if the household's house is 90 square meters or bigger; = 0 otherwise.	0.4474 (0.4973) 8360	0.4474 (0.4973) 8360	
Property	For households owning at least one house, Property = 1 if the household has full property rights over the house in which it currently lives; = 0 otherwise.	0.8509 (0.3562) 8316	0.8509 (0.3562) 8316	

ticipated in the risky financial markets; Proprisky represents its share of risky financial assets to total financial assets.

For Regression (1), we used a probit model because Dummyrisky is a dummy variable; that is, carrying a value of 1 if a household participates in the risky financial markets and 0 otherwise. For Regression (2), a tobit model was employed since this proportion is left truncated at 0.

TABLE 1—*Continued*

Variables	Description	Full Sample	Homeownership= 1	Homeownership = 0
Independent Variables				
Financial_assets	Total value of all financial assets (in millions of yuan)	0.0261 (0.1500) 9929	0.0286 (0.1611) 8404	0.0118 (0.0565) 1525
Total_assets	Sum of risk-less financial assets and risky financial assets (in millions of yuan)	0.0780 (0.2335) 9929	0.0844 (0.2483) 8404	0.0427 (0.1169) 1525
Debt	= 1 if the household borrowed money (through bank loans or private lenders) to buy houses; = 0 otherwise	0.0301 (0.1709) 9929	0.0356 (0.1852) 8404	0 (0) 1525
Age	Age of the head of household	52.8951 (15.1220) 9929	52.1245 (14.8176) 8404	50.6308 (16.6488) 1525
Ln(Income)	Ln (1+Income of the family's head of household) (in thousands of yuan)	3.6243 (0.8376) 3713	3.6676 (0.8248) 3197	3.3562 (0.8666) 516
Education	Education level of head of household: 1 = Illiterate; 2 = Primary school; 3 = Middle school; 4 = High school; 5 = Technical secondary school; 6 = Secondary vocational technical school; 7 = Undergraduate school; 8 = Master's degree; 9 = PhD degree	4.3750 (1.8046) 9929	4.4259 (1.8073) 8404	4.0944 (1.7644) 1525
Marital_status	= 1 if the head of household is married; = 0 otherwise	0.8320 (0.3739) 9929	0.8578 (0.3493) 8404	0.6898 (0.4627) 1525
Risk_attitude	= 1 if the head of household is highly risk-oriented; = 5 if the head of household is highly risk-averse	3.9760 (1.2176) 9859	3.9656 (1.2141) 8348	4.0331 (1.2359) 1511
Family_size	Number of people within the household	2.9315 (1.2458) 9929	3.0119 (1.2472) 8404	2.4885 (1.1407) 1525
Gender	Male = 1; Female = 0	0.6491 (0.4773) 9929	0.6584 (0.4742) 8404	0.5974 (0.4905) 1525

According to Cocco (2004), tobit models are primarily used to examine the share of stocks in each given pool of financial assets. We have adopted them for the purposes of our research, examining risky financial market par-

ticipation and households' share of risky financial assets in total financial assets. Compared to previous studies, we have also expanded the definition of risky financial assets to include stocks, bonds, all bank financial products, securities financing, aggregate assets, trusts, and derivatives. This paper is more comprehensive in its investigation of risky financial assets than previous research. Another important aspect is that it is remarkably different from Cocco (2004). To test for the wealth effect, we controlled for both homeownership and house wealth at the same time in our empirical study. In doing so, we found evidence for the existence of the wealth effect in the Chinese real estate market.

The key independent variables in these equations are housing characteristics such as the two types of housing property rights, number of houses owned, and house size. The variable X_i is a vector of other control variables; it includes all types of background risks for households such as age, income, risk appetite, education level, gender, debt, and total financial assets. The coefficients α_0 and α_i are the regression coefficients, and ε_i captures other sources of heterogeneity in portfolios.

4. EMPIRICAL RESULTS

4.1. Does Homeownership Affect Households' Financial Allocation?

According to previous studies (Chetty & Szeidl, 2007; Cocco, 2004 and 2005; Flavin & Yamashita, 2002; Fratantoni, 1998, 2002; Grossman & Laroque, 1990; Yamashita, 2003; Yao & Zhang, 2005), housing has a crowding-out effect on households and it inhibits their participation in financial markets. In our study, however, we found that owning at least one house increased the residents' tendency to participate in risky financial markets and hold risky financial assets.

Hypothesis 1: Housing ownership increases households' participation in risky financial markets and share of risky financial assets.

As in previous literature, we first investigated the effects of homeownership on investment portfolio decisions. Table 2 reports the results of this baseline regression. Columns (1) and (2) show that homeownership significantly increases households' propensity to hold risky financial assets (at 5% confidence level) and their proportion of risky assets (at 1% confidence level), after controlling for other variables, respectively. This positive relationship between housing and risky financial investment suggests that the wealth effect may dominate in China, in contrast to the findings of most previous studies for other developed countries (Cocco, 2004; Flavin & Nakagawa, 2008; Fratantoni, 1998), which reported that the crowding-out effect dominates.

TABLE 2.

Impact of homeownership

Variables	(1) Dummyrisky	(2) Proprisky
Homeownership	0.047**	0.138***
	(2.17)	(2.98)
Total_assets		0.373***
		(3.31)
Ln(Income)	0.075***	0.089***
	(7.15)	(3.94)
Age	0.006***	0.012***
	(8.10)	(6.97)
Education	0.043***	0.089***
	(8.81)	(8.10)
Family_size	−0.006	−0.029*
	(−0.90)	(−1.93)
Marital_status	0.068***	0.138***
	(2.86)	(2.70)
Gender	−0.054***	−0.132***
	(−3.48)	(−3.99)
Risk_attitude	−0.052***	−0.115***
	(−9.23)	(−9.23)
Debt	−0.061**	−0.080
	(−2.00)	(−1.20)
Province	Yes	Yes
Observations	3,072	3,072
R-squared	0.1363	0.1363

This table presents the effects of homeownership on households' portfolio choices. We used the full sample in the models to determine these empirical findings. Robust standard errors are given in parentheses. Significances at the 1%, 5%, and 10% levels are indicated by ***, **, and *, respectively.

It should also be noted that other factors exert significant influence on risky financial investment. First, income influences homeowners' possession of risky financial assets and the proportion of risky financial assets within their overall financial assets. This may imply that a family's long-term income, rather than its temporary income, plays an important role in the investment decision-making process. Second, higher levels of educational attainment significantly increase the probability of a homeowner holding risky financial assets, which may be because higher education en-

courages financial education to attract students to join the financial market (Vissing-Jorgensen, 2002). Third, homeowners' attitudes towards risk has a tremendous influence on their willingness to invest in risky financial assets. If the homeowner is risk-oriented, the probability of the family investing in risky assets increases considerably; if the homeowner is risk-averse, the household's proportion of risky assets decreases. This finding is similar to those of previous studies (Guiso & Paiella, 2008; Guiso & Paiella, 2008; Hong et al., 2004). Fourth, if the homeowner is male, this has a negative influence on the household's willingness to invest in risky financial assets, which may be because males are usually the main income providers in Chinese families. Males experience enormous economic pressure, so households have negative motivation to invest in risky financial assets.

4.2. Does Property Value Affect Households' Financial Allocation?

According to Cohn et al. (1975), a large wealth effect from housing asset appreciation causes households to participate in risky financial markets and hold riskier financial assets. Earlier studies show that as wealth increases, households are motivated to invest more of it in riskier assets. In this study, we further examine the channels through which this occurs in order to confirm the existence of the wealth effect.

Hypothesis 2: Demonstrably, the wealth effect exists in the Chinese real estate market, as influenced by housing wealth.

According to the empirical results presented in Table 2, homeownership has a significant, positive impact on households' investment in risky financial assets. In order to examine this effect more deeply and more particularly, and to determine if a wealth effect exists, we added the total value of properties held by a household as an independent variable (House_wealth) in the regression. The regression results are reported in Table 3.

As can be observed from Column (2) in the table, after adding the variable House_wealth, the previously significant variable Homeownership is also significant. Instead, property value (House_wealth) increases the propensity for investing in risky financial assets and the overall share of those investments considerably. In Column (4), the coefficient of Homeownership decreases to 0.098 from 0.138 in Table 2. Moreover, the significance level also reduces from 1% to 5%. In addition, property value has a significant impact on the overall proportion of risky financial assets households hold, whether we control for homeownership or not. This suggests that property value indeed drives the positive relationship between homeownership and holding of risky assets.

There is an alternative hypothesis for the wealth effect that may also explain the positive relationship between homeownership and investment in risky financial assets. Households that do not own a home may be sav-

TABLE 3.

Effect of property value

Variables	(1) Dummyrisky	(2) Dummyrisky	(3) Proprisky	(4) Proprisky
House_wealth	0.389***	0.380***	0.515***	0.418***
	(5.31)	(4.94)	(3.45)	(2.63)
Homeownership		0.008		0.098**
		(0.38)		(2.00)
Total_assets			0.345***	0.352***
			(2.70)	(2.78)
Ln(Income)	0.060***	0.060***	0.080***	0.078***
	(5.66)	(5.64)	(3.38)	(3.30)
Age	0.006***	0.006***	0.012***	0.012***
	(7.36)	(7.29)	(6.75)	(6.55)
Education	0.039***	0.039***	0.086***	0.085***
	(7.99)	(7.97)	(7.61)	(7.55)
Family_size	−0.010	−0.010	−0.030*	−0.032**
	(−1.33)	(−1.36)	(−1.93)	(−2.07)
Marital_status	0.067***	0.066***	0.150***	0.141***
	(2.86)	(2.81)	(2.92)	(2.73)
Gender	−0.056***	−0.056***	−0.140***	−0.140***
	(−3.58)	(−3.58)	(−4.19)	(−4.21)
Risk_attitude	−0.051***	−0.051***	−0.116***	−0.116***
	(−9.06)	(−9.07)	(−9.29)	(−9.31)
Debt	-0.064**	−0.065**	−0.084	−0.093
	(−2.09)	(−2.12)	(−1.26)	(−1.39)
Province	Yes	Yes	Yes	Yes
Observations	3,661	3,661	3,661	3,661
R-squared	0.1405	0.1405	0.1371	0.1379

This table presents the effects of homeownership and house wealth on households' portfolio choices. We used the full sample in our models to determine these empirical findings. Marginal effects and z-statistics are reported. Robust standard errors are given in parentheses. Significances at the 1%, 5%, and 10% levels are indicated by ***, **, and *, respectively.

ing money towards buying one, so they are inclined towards avoiding large risks and, instead, investing in safe assets. The findings presented in Table 3 above seem inconsistent with this alternative hypothesis, however. This is because under this hypothesis, ownership of a home is important to households, so the property value should not affect the significance of that homeownership. Yet, the results in Table 3 clearly indicate that property values certainly impact household investment choices. Thus, Table 3

results also help to identify the wealth effect by distinguishing it from the alternative hypothesis.

4.3. Effect of Homeownership Characteristics on Housing

In order to further identify the wealth effect in terms of housing, we investigate how various homeownership characteristics affect households' portfolio choices. Property value can be considered as part of a household's wealth only when the house can be sold in exchange for liquid assets (e.g. cash). If a house cannot be sold, or if the sale has a high transaction cost, its property value is reduced or discounted entirely. Accordingly, we discuss some characteristics of housing that affect transaction costs and/or difficulty in selling a house. Specifically, we examine three characteristics: property right, number of houses owned, and house size.

4.3.1. Impact of home property rights

In China, home property rights can sometimes be incomplete; that is, the homeowner is restricted from selling the house for various reasons. For example, some residents may enjoy a large subsidy when buying a home, which is provided by the enterprise or the institution for which they work, but they must sign a contract agreeing to not sell the house until after they have worked for the sponsor for a given number of years; thus, although they do own the house, they do not have full selling authority over it.

Hypothesis 3: Only in cases of complete home property rights, property value has a significant and positive effect on investment in risky assets.

The data from the 2013 CHFS provide information on whether a household has full property rights over the main house, which is the house that the household lives in and also contributes most to the property value. As a result, we can divide homeowners into two groups, those with complete property rights over the main house and those with incomplete property rights, and investigate the effects of property value within each group.

The regression results are reported in Table 4. The sample of households that own houses and live in one of them is used.[1] We divide this sample into two sub-samples according to the property rights of the main house, and present the effect of property rights constraints on households' portfolio choice. Columns (1) and (2) demonstrate that for households with full

[1]The 2013 CHFS contains information on the type of property rights a household has over the house in which they were living at the time of the survey. It is possible that this house is not owned by the household. Hence, to avoid the influence of rented houses, only households that had one or more houses and lived in one of them were included in the sample. This did not eliminate too many observations because most of the households live in the house they own. We then divided this sub-sample further into two sub-samples of those with complete and incomplete property rights.

property rights over their main houses, property value (House_wealth) has a significant and positive effect on risky asset investment. In Columns (3) and (4), we can see that for households with incomplete property rights over their houses, property value has no significant impact on their investment in risky financial assets.

TABLE 4.

Effect of housing property rights

	Complete property rights		Incomplete property rights	
	(1)	(2)	(3)	(4)
Variables	Dummyrisky	Proprisky	Dummyrisky	Proprisky
House_wealth	0.493***	0.637***	0.329	0.174
	(5.11)	(3.46)	(1.58)	(0.37)
Total_assets		0.253*		0.798***
		(1.88)		(3.52)
Ln(Income)	0.057***	0.068**	0.052	0.018
	(4.12)	(2.32)	(1.51)	(0.24)
Age	0.006***	0.012***	−0.001	−0.006
	(5.94)	(5.61)	(−0.20)	(−0.95)
Education	0.038***	0.076***	0.036**	0.070**
	(5.92)	(5.53)	(2.47)	(2.14)
Family_size	−0.009	−0.032*	−0.033	−0.063
	(−0.99)	(−1.66)	(−1.15)	(−1.01)
Marital_status	0.061*	0.126*	0.039	0.099
	(1.76)	(1.71)	(0.46)	(0.58)
Gender	−0.055***	−0.125***	0.007	0.043
	(−2.73)	(−3.04)	(0.13)	(0.41)
Risk_attitude	−0.058***	−0.125***	0.001	−0.028
	(−8.14)	(−8.13)	(0.07)	(−0.65)
Debt	−0.079**	−0.117	0.068	0.230
	(−2.14)	(−1.50)	(0.60)	(1.16)
Province	Yes	Yes	Yes	Yes
Observations	2,343	2,343	358	397
R-squared	0.1441	0.1330	0.1315	0.2087

This table presents the effect of property rights constraints on households' portfolio choices. We used a sub-sample of households that own at least one house and live in one of them. Within this sub-sample, Columns (1) and (2) report the regression results for households that had complete property rights over the main house they lived in (Property = 1), and Columns (3) and (4) report regression results for households that had incomplete property rights over the main house they live in (Property = 0). Marginal effects and z-statistics are reported. Robust standard errors are given in parentheses. Significances at the 1%, 5%, and 10% levels are indicated by ***, **, and *, respectively.

These empirical results indicate that the sale ability of houses is highly important in determining the extent to which housing has an impact on households' financial asset holdings; if homeowners are constrained in selling their houses, homeownership has no impact. This finding is consistent with the hypothesis that housing affects households' portfolio choices through the wealth effect. Property value increases a household's wealth only when the house can be traded as a liquid asset. If households cannot sell their houses, then the property value of such houses cannot be counted as part of household wealth and the wealth effect no longer exists.

4.3.2. Impact of the number of houses owned

Another factor that may impact the wealth effect as it applies to homeownership is the number of houses owned. In this study, we found that, given the same total property value, a household that owns more houses than another household has greater flexibility in turning its housing wealth into liquid assets; it does not have to sell all of the houses it owns when it needs liquidity, as long as this is not too great, which thereby saves on transaction costs. This implies that the wealth effect is stronger in households having multiple houses.

In addition, households that own multiple houses are more likely to seize opportunities for increasing their wealth from home price increases than single-house owners. When home prices temporarily increase during a given period, households that own a single house can hardly sell their only home. However, those with multiple houses can sell several houses without affecting their living situation. This is another reason that the wealth effect is stronger in households with multiple houses.

Hypothesis 4: Owning multiple houses significantly increases both homeowners' propensity for investing in risky assets and their share of risky financial assets.

Consequently, it can be predicted that, after controlling for total property value, households that own multiple houses tend to invest more in risky financial assets than those who do not. We tested this hypothesis by investigating the effects of multiple owned houses on homeowners' investment in risky assets in the sub-sample of households that are houseowners. The regression results are reported in Table 5. In this table, the variable House_number is the actual number of owned houses, and House_numberA indicates whether the household has multiple houses.[2] We can see that

[2]Here House_numberA =0 if the household has no house, House_numberA=1 if the household has one house, and House_numberA=2 if the household has multiple houses.

owning multiple houses significantly increases both homeowners' propensity for investing in risky assets and the share of risky assets owned (both at the 5% confidence level), which supports our hypothesis.

TABLE 5.

Effect of number of houses owned

	(1)	(2)	(3)	(4)
Variables	Dummyrisky	Proprisky	Dummyrisky	Proprisky
House_number	0.048***	0.083***		
	(3.14)	(2.77)		
House_numberA			0.069***	0.140***
			(3.63)	(3.53)
Total_assets		0.314***		0.322***
		(2.59)		(2.71)
House_wealth	0.303***	0.298	0.319***	0.295
	(3.13)	(1.54)	(3.50)	(1.58)
Ln(Income)	0.058***	0.070***	0.057***	0.067***
	(4.88)	(2.77)	(4.79)	(2.67)
Age	0.006***	0.011***	0.005***	0.011***
	(6.26)	(5.78)	(6.18)	(5.68)
Education	0.038***	0.079***	0.037***	0.078***
	(6.91)	(6.57)	(6.82)	(6.48)
Family_size	−0.016**	−0.043**	−0.016**	−0.043***
	(−2.02)	(−2.57)	(−2.03)	(−2.60)
Marital_status	0.063**	0.131**	0.062**	0.130**
	(2.35)	(2.29)	(2.31)	(2.26)
Gender	−0.059***	−0.137***	−0.059***	−0.136***
	(−3.41)	(−3.84)	(−3.41)	(−3.82)
Risk_attitude	−0.051***	−0.114***	−0.051***	−0.113***
	(−8.12)	(−8.45)	(−8.09)	(−8.43)
Debt	−0.062**	−0.087	−0.062*	−0.083
	(−1.98)	(−1.29)	(−1.95)	(−1.24)
Province	Yes	Yes	Yes	Yes
Observations	3,147	3,147	3,147	3,147
R-squared	0.1365	0.1306	0.1374	0.1319

This table presents the effect of number of houses owned on households' portfolio choices. We used the sub-sample of households that own houses for regression to obtain the empirical results. Marginal effects and z-statistics are reported. Robust standard errors are given in parentheses. Significances at the 1%, 5%, and 10% levels are indicated by ***, **, and *, respectively.

We define this variable in this way because the sample did not contain many households with more than 2 two houses.

4.3.3. Effect of the house size

According to Cocco (2004), the minimum house size restriction plays a key role in preventing households from participating in equity markets and in reducing stockholding. In this study, we also found that house sizes that are large increase the burden of expenses related to home sales for households and reduce their tendency to participate in risky financial markets and hold risky financial assets.

Hypothesis 5: A Larger house size reduces households' propensity for investing in risky assets, as well as their share of risky financial assets.

A large house size increases the transaction costs associated with selling it (Cocco, 2004). In addition, China's contract tax rate also depends on the house size. Homeowners must pay more in taxes for houses that are 90 square meters or bigger. Hence, we can predict that the wealth effect decreases in accordance with increasing house size. We ran regressions to test this hypothesis using the sub-sample of households that only own a single house and live in it.[3] The results are presented in Table 6. In Columns (1) and (2), the independent variable House_size is the actual size of a house, and we can see that after controlling for total property value, the house size significantly decreases the household' holding of risky assets. In Columns (3) and (4), the independent variable House_sizeA is a dummy variable that is equal to 1 if the household's house is 90 square meters or bigger and 0 otherwise. The results for this variable also show that house size significantly reduces both households' propensity for investing in risky assets and overall share held.

Based on the above analysis, we summarize that any characteristic of housing that prevents households from easily selling their houses or incurs higher transaction costs will reduce their willingness to hold risky assets. These results provide evidence that housing affects households' portfolio choices through the wealth effect.

5. CONCLUSION

Using data on China's households from the 2013 CHFS, this paper has characterized the causal effect of housing and tenure decisions on households' asset allocation decision-making process. According to prior literature, the crowding-out effect is dominant in developed countries, especially

[3]The 2013 CHFS only contains information on the size of the house in which a household currently lives, similar to the information it gathers related to the number of properties owned. Thus, in our sample we only included households that owned one home and were living in it.

TABLE 6.

Effect of house size

	(1)	(2)	(3)	(4)
Variables	Dummyrisky	Proprisky	Dummyrisky	Proprisky
House_size	−0.000**	−0.001**		
	(−2.21)	(−2.09)		
House_sizeA			−0.058***	−0.091**
			(−3.43)	(−2.56)
Total_assets		0.300**		0.298**
		(2.26)		(2.23)
House_wealth	0.478***	0.645***	0.492***	0.662***
	(5.32)	(3.70)	(5.39)	(3.74)
Ln(Income)	0.059***	0.070**	0.060***	0.072***
	(4.65)	(2.55)	(4.67)	(2.58)
Age	0.006***	0.011***	0.005***	0.011***
	(5.79)	(5.30)	(5.72)	(5.23)
Education	0.038***	0.077***	0.039***	0.080***
	(6.47)	(6.04)	(6.72)	(6.22)
Family_size	−0.009	−0.033*	−0.010	−0.036*
	(−1.03)	(−1.76)	(−1.10)	(−1.90)
Marital_status	0.054*	0.119*	0.062*	0.132*
	(1.71)	(1.73)	(1.94)	(1.91)
Gender	−0.042**	−0.096**	−0.044**	−0.100***
	(−2.29)	(−2.50)	(−2.40)	(−2.60)
Risk_attitude	−0.050***	−0.114***	−0.050***	−0.114***
	(−7.63)	(−7.93)	(−7.63)	(−7.93)
Debt	−0.066*	−0.088	−0.060*	−0.081
	(−1.90)	(−1.20)	(−1.73)	(−1.10)
Province	Yes	Yes	Yes	Yes
Observations	2,758	2,758	2,758	2,758
R-squared	0.1395	0.1329	0.1413	0.1333

This table presents the effect of house size on households' portfolio choices. We used a sub-sample of households that only own a single house and live in it. Marginal effects and z-statistics are reported. Robust standard errors are given in parentheses. Significances at the 1%, 5%, and 10% levels are indicated by ***, **, and *, respectively.

the U.S. Thus, households that own a home reduce their participation in risky financial markets and hold fewer risky financial assets. In this study, we confirmed the existence of a different effect; however, the wealth effect, which is also mentioned in previous studies, has not been examined before.

Does the wealth effect exist in China? The answer is Yes, and for three reasons. First, China has experienced a long period of housing property ap-

preciation. Second, rising home prices indicates rapid growth in wealth for homeowners, reflecting a very strong wealth effect and its existence is thus easier to establish in China. Third, housing policies are different in China compared to other developed countries such as the U.S. The Chinese government pursues a range of policies conveying varying degrees of property rights, so comparisons can be made between households with full rights of sale (i.e. no restrictions on their property rights) and those without. This allows the impact of the wealth effect to be clearly identified, and it was found to be completely valid for households with full property rights and weakened or even non-existent for those with incomplete property rights.

Thus, the findings of this paper have far-researching policy implications. In our study, we found that owner-occupied housing produces a wealth effect in the Chinese housing market and is crucial for ensuring higher investment participation in financial assets. Does this dominance hold only for China or is universally applicable to other developing counties such as India? Overall, does housing have different influences on households' portfolio decisions between developed and developing countries? Governments should be encouraged to introduce rational measures in their countries, specifically in the area of housing such as keeping real estate markets stable, proposing purchase restrictions, and standardizing real estate market transactions. In addition, governments must take measures, tailored to different regions, to ensure that households' home values are maintained within a reasonable range. For instance, enforcing a basic policy that houses are intended for owner occupation, rationally curbing speculative investment, and promoting real estate tax legislation.

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