Households Debts and Financial Market Participation in Korea

가계의 부채와 금융시장참여

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This paper examines household participation in the financial market in response to changes in household debts, disposable income, and real estate. Only less 11 percent of households have participated in the stock market, and less than 0.4 percent have participated in the bond market. However, the participation rate is twice as high in fund markets than in stock markets. Financial debt chiefly results in impingement on financial market participation and is strongly pronounced, especially in fund markets. In contrast, real estate and disposable income tends to boost market participation, offsetting the effect of household debts. In fact, real estate increases household's likelihood of participating in financial markets by 5 percent or more while an increase in disposable income increases by a range of at least 8 percent in liquid markets to 15.3 percent in fund markets, respectively.

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I. Introduction

The recent steep increase in household debts has reached record levels that are about to risk national financial stability simultaneous to an upsurge in government debts. At the end of 2013[1], household debts amounted to nearly ₩1,300 trillion. and by the mid of 2014, government debts exceed ₩500 trillion, which represents roughly fourfold increase over the last decade[2]. Household debt is crucial to asset allocation in the sense that it is capable of leveraging household investment through real estate, especially housing[3]. Mortgage loans take up roughly 70 percent of all household debt[4]. Despite increasing interest in portfolio choice by households and relative importance in household wealth in financial markets, not much about typical household behavior in the financial market has been widely researched. We have a rough figure of aggregate household behavior with respect to asset allocation, but not know little about household behavior in financial markets at the micro level. The anatomy of household behavior is virtually all practical issues among bankers and asset management companies because aggregate analysis can mask the real behavior of households at times by not showing real individual attitudes with respect to investment decision. Therefore, I analyze the effect of household debts in tandem with real estate and disposable income over household shareholdings of financial instruments, using household micro-data. Market participation of households is part and parcel of household shareholdings. It is curious why most households are disinclined to

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1) According to ECOS DB of Bank of Korea, credit extended to households consist of loans to household(₩962.896 trillion), other financial corporations(₩275.71 trillion) and merchandise credit(₩58.46 trillion).

2) Homepage of the National Assembly Budget Office.

3) Similarly, in this present paper, 1481 in 2010 and 1633 households in 2011 consist of 14.81 % and 15.23% of a mortgage loan. The proportions of total mortgage loan in total debts are 71.4 percent and 79.4 percent each year.

4) This percentage comes from the ratio of mortgage percent(47.9%+4%) over debt percent (76.4%) from Table 10 in 2004 Survey of Consumer Finance in Kennickell(2006).

participate in financial markets despite irrefutable evidence of the last market prosperity. There are many theories that attempt to explain this poor market participation, but we have not arrived at a definite conclusion on such a lethargic activity. In part, low market participation stems from borrowing and short-sale constraints(Gakidis, 1998; Haliassos and Michaelides, 2003; Cocco et al., 2005). Even small fixed costs such as the cost of gathering information on interested stocks and leverage fees may also undermine household inclination to participate in the market (Hong, Kubik, and Stein, 2004). Chetty and Szeidl(2009) found evidence that the increases in mortgage debt induce substantial reductions in the share of liquid wealth held in stocks, whereas increases in home equity wealth raise stock ownership. On the other hand, the use of mortgage debt makes households opt for higher stock holdings or increase optimal portfolio(Heaton and Lucas, 2000; Flavin and Yamashita, 2002). Kullman and Siegel(2003) studied the risk exposure of real estate since it can influence the relative share of risky financial assets in household's portfolios. To illustrate, overinvestment in housing can shrink the relative demands for risky financial assets (Flavin and Yamashita, 2002). However, because houses are illiquid, homeowners instantaneously recognize it is not easy to sell them at once to raise capital and that it is costly to engage such a transaction. The illiquidity from these adjustment costs may deter householders from owning a home and thus, from taking financial risk (Grossman and Laroque, 1990; Cocco, 2005; Flavin and Nakagawa, 2008; Fratantoni, 2001; Shore and Sinai, 2005; Yao and Zhang, 2005). In this paper, real estate was found to not only increase the shareholdings of risky assets, but also of safe assets. However, the magnitude of real estate's effect on both is noticeably different. Labor income is also known to play a decisive role in weather households hold financial assets. The level of labor income increases the risky asset holdings, but, conversely, its risk reduces them(Bertaut and Haliassos, 1997; Angerer and Lam, 2009). If households expect a low wage income, they are less likely to participate in stock markets(Gakidis,

1997). Comparably, households with more risky income streams choose to invest in safe investments(Hochguertel, 1997). Although it is known that household debts decrease a household's shares of financial instruments and eventually, limit its financial market participation, it turns out that the absolute effect of household debt does not offset the combined effect of real estate and disposable income. Prior studies overemphasized the effect of household debts on market participation, but, considering the interrelation of household debts and real estate in the Korean financial markets, it is not uncommon that market participation cannot be solely explained by household debts. In this respect, it is of interest to examine the extent of the combined effect of the three interest variables on household decision to participate in the market.

Above all things, household characteristics have an overall rather than an individual effect on the choice of financial instruments(Mankiw and Zeldes, 1991; Hochguertel et al., 1997; Jaganathan and Kocherlakota, 1996; Halliosos and Bertaut, 1995; Viceira, 2001; Attanasio et al., 2002; Ait-Sahalia et al., 2004; Yao and Zhang, 2005; Campbell, 2006; Calvet et al., 2007; Angerer and Lam, 2009; Love, 2009). Sex, marital status, homeownership, employment, and education as socioeconomic elements can constitute underlying risk factors in investment circumstances, which, in turn, cause heterogeneous beliefs concerning market participation. Those household characteristics are controlled for in this research.

The present paper is organized as follows: section 1 presents the distribution of financial instruments according to household characteristics, which includes such as funds, stocks, bonds and derivatives. Section 2 examines the impact of financial variables on the shareholdings of several financial instruments, controlling for household characteristics. Section 3 investigates which household features increase or decrease the likelihood of household market participation, with an emphasis on the combined effect of household debt, disposable income and real estate. it further investigates how household market participation changes in the case of an abrupt

change in certain financial variables. Section 4 summarizes this paper, suggesting implications fir further research and policy.

II. Financial features of households in South Korea

Statistics Korea first started to conduct the Household Financial Survey in 2011 in order to further national financial policy by examining household financial stability, and provides household samples of 10,000 via the electronic data archive, MDSS, through stratified sampling. This archive offers all-purpose household financial data such as total assets, financial assets, financial liabilities, disposable income and household characteristics such as household ID, sex, household size, educational attainment, age, employment status, marital status, occupation, type of residency, and the amount and types of real estate. It also provides specific subcategories of each financial datum. For example, financial assets include bank deposits, funds, stocks, bonds, and derivatives, and information on the type and size of loans. This body of household data supplies information relevant to household's economic activities and facilitates cross-sectional studies on the household shareholdings of financial assets. It also allows for micro-level analysis of household market participation, which highlights features that are distinct from aggregate or macro-level studies.

1. Preliminary features of analysis variables

To lay the groundwork for the analysis of household shareholdings, the sample period of 2010-2011 is chosen. The top panel in Table 1 exhibits the figures of the main financial instruments. Financial wealth includes bank deposits, funds, stocks, bonds, derivatives, capital insurance products, lending money, and rental deposits.

Along with columns 6 and 7 in the top panel, households on average hold ₩64.33 million of financial wealth in 2010 and ₩74.64 million in 2011, which correspond to the portion of 42 or 43 percent relative to total asset, each year. The median financial wealth each year is about half of means and its median weight is slight over the half of average ones. This large discrepancy between mean and median values indicates that a few households hold extreme amounts of financial wealth. In 2000, the maximum financial wealth held by a given household is ₩3,317.6 million, which is 27 times the standard deviation. In 2010, the median household holds ₩20 million in funds and ₩10 millions in stocks, and in 2011, these figures are 21.3 million and ₩15 million, respectively. The weight of fund on average indicates 16 percent and the median is 10 percent both year. On average, stocks have smaller portion of 7 percent in 2010 and 8 percent in 2011. In contrast, in 2011, the mean stock holdings triple those in 2010 ₩163.67 million versus ₩55.8 million. The number of households who hold financial instruments delivers simple information on market participation. For instance, the number of fund holders in 2010 is 2,574 of households, showing roughly one quarter of the sample. On the other hand, the portion of stock householders represents approximately 10.8 percent of the sample, for both years[5]. There are tiny households that hold bonds and derivatives. The bottom panel in Table 1 reports the statistics of household variables used as independent variables in the Tobit regression. This table reports the distribution of financial wealth, funds, stocks, bonds, derivatives, monthly minimum consumption, disposable income, financial debts, and real estate of households in unit of 10,000 Won and the number of household in the 2011-2012 Household Financial Survey conducted in South Korea. The number underneath the statistics is the ratio of each asset relative to total asset. For the 10,000 households in the sample, the median family is three. They earn an average of ₩30.31 million of

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5) Roughly speaking, these proportions are half that of U.S. households who own stocks and mutual funds reported in the 2001 Survey of Consumer Finance, Yao and Zhang(2005), p. 1.

disposable income in 2010 and ₩32.54 million in 2011. Average disposable income is not low but insufficient to accommodate the standard of living for a median family living in and urban area, when one considers consumption prices in South Korea. A household desires at least a monthly mean consumption of ₩1.4 million[6], where consumption is the monthly minimum amounts desirable for households living. On the other hand, average financial debts, which include collateral, credit, credit card loans, payable paid-in money in private union and others, are ₩39.16 million in 2011 and roughly 32 million in 2010. Surprisingly, the mean of financial debt each year exceeds disposable income. Due to the fact that the standard deviation of financial debts is higher than that of disposable income for both years, I conclude that some fractions of households use financial debts immoderately. The following facts support this inference. In 2010, median financial debts are considerably small in comparison to median disposable income, but the financial debt mean is almost equal to the disposable income mean. Real estate includes houses, lands, buildings and etc., and excludes automobile, precious metal, curios and jewelry, intangible assets, etc. Real estate shows enormous value in both years with an average. mean of ₩232.81 million in 2010 and ₩240.82 million in 2011. In addition, real estate takes up a large proportion of total household wealth. Notably, the mortgage loan makes up approximately 70 percent of total debts[7].

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6) Actual monthly household consumption expenditures average ₩2,392,700 in 2011 as reported in 2012 by Statistics Korea.

7) Real estate accounts for over 70 percent of household assets in the Swedish and U.S. data(Calvet et al., 2006).

〈Table 1〉 Descriptive statistics of financial assets and household variables

Financial instrument type	Observation		Median		Mean		Standard Deviation		Min		Max	
	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Financial wealth	9,929	10,470	2,985 (0.26)	3,418 (0.27)	6,43 (0.42)	7,462 (0.43)	12,128 (0.38)	14,682 (0.38)	1	1	331,760	499,040
Funds	2,574	2,728	2000 (0.10)	2130 (0.10)	4,863 (0.16)	5,436 (0.16)	8,644 (018)	9,297 (0.17)	20	2	200,000	150,000
Stocks	1,074	1,137	1,000 (0.04)	1,500 (0.04)	5,580 (0.07)	16,367 (0.08)	10,062 (0.09)	15,268 (0.11)	8	3	150,000	282,000
Bonds	21	37	2,000 (0.04)	3,000 (0.04)	5,851 (0.05)	6,250 (0.11)	10,868 (0.04)	34,504 (0.18)	200	100	50,000	180,000
Derivatives	4	3	3,500 (0.03)	2,000 (0.05)	3,050 (0.03)	1,567 (0.04)	1,464 (0.01)	1,021 (0.04)	1,000	400	4,200	2,300
Number of Household	10,000	10,517	3	3	2.96	2.98	1.31	1.32	1	1	10	10
Monthly consumption	10,000	10,517	120	130	140	130	79	92	6	0	1,000	1,000
Disposable income	10,000	10,517	2,330	2,581	3,031	3,354	3,193	4,226	-25,508	-29,931	78,150	160,807
Financial debts	10,000	10,517	84	200	3,175	3,916	10,055	16,937	0	0	294,200	1,175,050
Real estate	10,000	10,517	9,500	10,000	23,281	24,082	54,787	59,431	0	0	2,635,000	3,620,000

2. Households' income, debts, and real estate by categories of sex and marital status

The Household Financial Survey provides a preliminary piece of information on household economic activities. It instills rough figures concerning asset class distribution by ilk and guides us to delineate characteristics of households' financial asset distribution. Figure 1 shows mean statistics of household-level financial variables by sex, in 2010 (a) and 2011 (b), and by marital status, 2010 (c) and 2011 (d). Specifically, Figures 1(a) and 1(b) show the mean distribution of disposable income, financial debts, and real estate by sex in unit of 10,000 Won, where financial debts include collateral, credit, credit card loans, payable paid-in money in private union and

〈Figure 1〉 Distribution of household-level financial variables by household characteristics: sex and marital status

(a) Sex, 2011
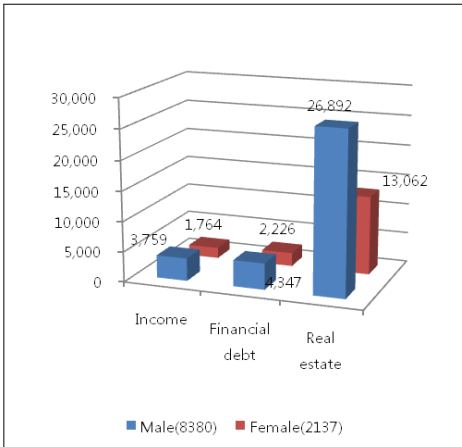
(b) Sex, 2010
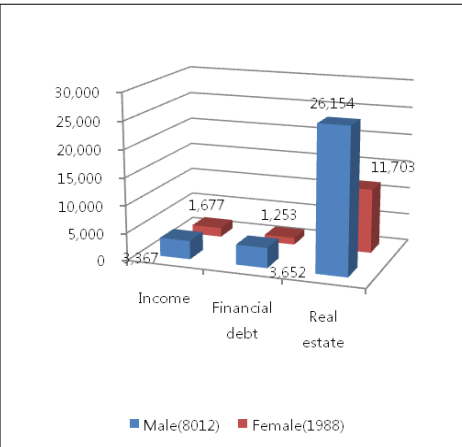
(c) Marital status, 2011
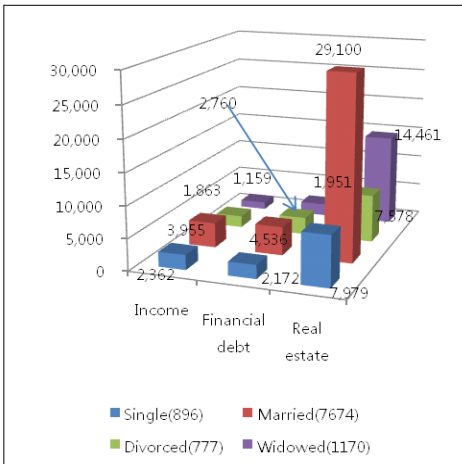
(d) Marital status, 2010
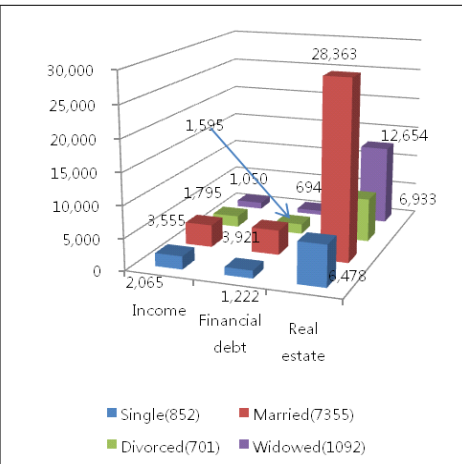
others. The number in parenthesis next to each category denotes the number of households. The number on top of the bar indicates the mean of each financial variable. Male household heads have an average of ₩269 million of real estate in 2011, and ₩261 million in 2010. In contrast, female heads own slightly less than half the value of real estate that male do. Male household heads have an average of ₩33.67

million in disposable income in 2010, which is approximately double that of their female counterparts. On the other hand, Figures 1(c) and 1(d) display the mean bar of these three variables according to marital status. The real estate of married households reaches ₩291 million in 2011 and ₩284 million in 2010. Moreover, the financial debt and disposable income of married households are at the top of each category. Figure 2

〈Figure 2〉 Distribution of household level financial variables by household characteristics: employment and homeownership

(a) Employment, 2011

(b) Employment, 2010
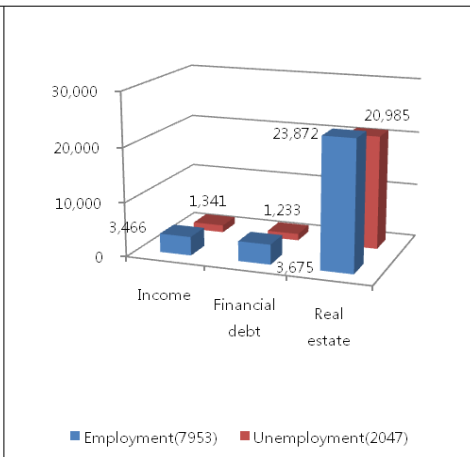
(c) Homeownership, 2011
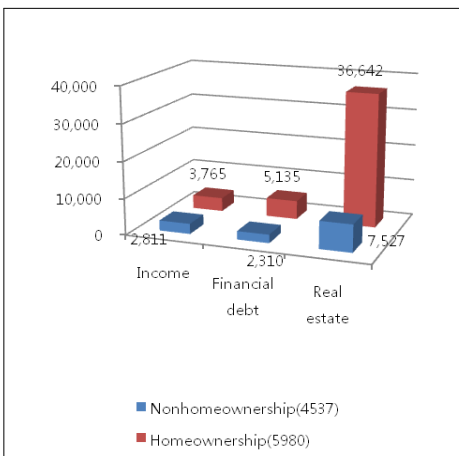
(d) Homeownership, 2010
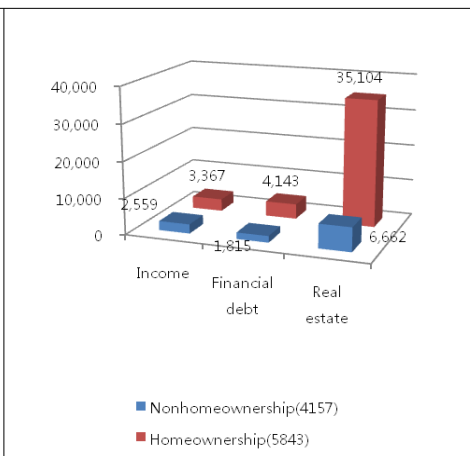
shows mean statistics of household-level financial variables by employment, in 2010 (a) and 2011 (b), and by homeownership, 2010 (c) and 2011 (d) in unit of 10,000 w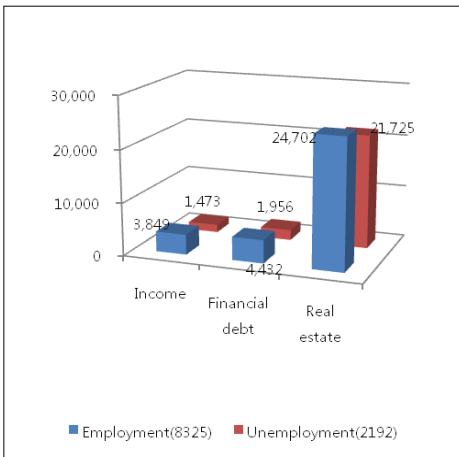on. The number in parenthesis next to each category denotes the number of households. The number on top of the bar indicates the mean of each financial variable. Tabulation by employment status and homeownership depicts unusual features about the three variables. For instance, in Figures 2(a) and 2(b), in 2010 employed households hold an average of ₩36.75 million in financial debts, which is triple that of unemployed households. Even in 2011, the imbalance in debts between these two types of households persists. We also see the same imbalance in disposable income in financial debts. Figures 2(c) and 2(d) speak of real estate by homeownership. There is a marked discrepancy in real estate by the ca-tegory of homeownership: ₩366 million of homeowners versus ₩75 million of non-homeowners in 2011, and ₩351 million versus ₩67 million in 2010. In addition, homeowners have more than double the average financial debts of their opposite households in both years. Homeowners who have large amounts of real estate also hold more financial debts in excess of disposable income than their peer families. Therefore, household debt seems to be primarily made up of the collateral value of real estate.

3. Distribution of financial instruments by household characteristics

Age is one distinguishing indicator that determines the distribution shape of financial vehicles. It is well known that financial asset holdings vary according to age (Jaganathan and Kocherlakota, 1996l; Viceira, 2001). Table 2 shows the number of households who participated in the financial markets, and the central tendencies, median, and mean, of major security classes in unit of 10,000 Won by age group according to 2011 and 2012 Household Financial Survey. The number underneath the statistics is the ratio of each asset relative to total asset. Typically, financial wealth

exhibits a hump-shaped distribution by age. The median of financial wealth sharply increases up until the 40s and then drops down after the 50s. In the meantime, the median portion of financial wealth relative to total asset along with age shows a U-shaped distribution in both years. the weight decreases from teens down to sixties and then turn up to increase. In this tabulation, the average household of anything between the 30s and the 70s holds a great deal of funds and stocks relative to the other age groups during the two sample periods, but, the portions of funds and stocks to total wealth are 14 percent and 7 percent or more respectively, which are not as great as those in the other age groups, though. Most households own fewer bonds and derivatives than funds and stocks. This implies that bond investments are not as attractive as stocks or funds investment. Meanwhile, the means of funds, stocks, and bonds ownership vary with different age groups in both years. For instance, as to stocks, in 2010, the households in the 80s hold just ₩2.3million, whereas those in the 70s, nearly ₩137 million. Peculiarly, the households who hold the greatest average amount of stocks belong to the 70s group. Table 2 also outlines large discrepancies in the average amount of financial instruments by age group and the mean variation among age groups within each financial vehicle. Importantly, from Table 2, I can extract material information on market participation rates by securities type. Stock market participation shows approximately only 3 percent in the sample period, and the rate in fund markets is also low. Interestingly, the participation rate of old households(those from their 70s to over 90s) in fund markets is 5 percent higher than their participation in stock markets for each year in this study. Within the middle age group(those from their 40s to those in their 60s), a nearly comparable difference is found: 16 percent participation in the stock markets versus 12 percent in the fund markets. This is consistent with the findings in Swedish market(Calvet et al, 2007). Table 3 illustrates financial shareholding distribution by marital status according to 2011 and 2012 Household Financial Survey. Marital status is broken down into four

⟨Table 2⟩ Central tendencies of financial wealth, funds, stocks, bonds, and derivatives by age group

Age	Observation					Median					Mean				
	Financial wealth	Funds	Stocks	Bonds	Derivatives	Financial wealth	Funds	Stocks	Bonds	Derivatives	Financial wealth	Funds	Stocks	Bonds	Derivatives
2011															
10	4	0	0	0	0	373 (0.99)					326 (0.99)				
20	483	68	34	0	0	2,500 (0.94)	1,000 (0.14)	850 (0.07)			4,125 (0.75)	1,685 (0.21)	1,612 (0.14)		
30	1,952	431	270	4	0	4,665 (0.49)	1,000 (0.08)	1,000 (0.04)	1,650 (0.06)		7,555 (0.53)	2,514 (0.14)	2,635 (0.07)	1,750 (0.08)	
40	2,619	650	365	12	2	4,704 (0.33)	2,000 (0.07)	1,800 (0.04)	3,000 (0.04)	1,350 (0.02)	9,431 (0.46)	5,051 (0.14)	5,754 (0.09)	3,388 (0.06)	1,350 (0.02)
50	2,327	641	280	11	1	4,276 (0.23)	3,000 (010)	2,000 (0.04)	1,200 (0.03)	2,000 (0.08)	8,902 (0.37)	6,581 (0.15)	6,540 (0.08)	25,130 (0.11)	2,000 (0.08)
60	1,619	521	154	8	0	2,376 (014)	3,000 (0.11)	2,000 (0.03)	9,000 (0.06)		6,393 (0.29)	7,184 (0.16)	4,832 (0.07)	16,438 (0.19)	
70	1,135	350	33	2	0	1,003 (0.14)	3,000 (0.13)	2,000 (0.06)	75,000 (0.23)		4,407 (0.35)	6,002 (0.20)	10,360 (0.09)	75,000 (0.23)	
80	318	62	1	0	0	300 (0.27)	2,000 (0.17)	4,000 (0.24)			1,763 (0.49)	4,219 (0.29)	4,000 (0.24)		
90	13	5	0	0	0	1,150 (0.74)	3,000 (0.39)				4,107 (0.58)	4,800 (0.45)			
2010															
10	7	0	0	0	0	710 (1.00)					1,701 (0.99)				
20	508	77	37	1	0	2,178 (0.93)	800 (0.15)	400 (0.04)	270 (0.04)		4,292 (0.75)	1,515 (0.20)	1,208 (0.07)	270 (0.04)	
30	1,959	466	273	2	0	3,846 (0.53)	1,000 (0.08)	700 (0.04)	2,000 (0.06)		6,690 (0.53)	2,503 (0.14)	1,828 (0.07)	2,000 (0.06)	
40	2,572	660	383	9	1	4,139 (0.31)	2,000 (0.09)	1,500 (0.04)	3,000 (0.04)	3,000 (0.03)	8,151 (0.45)	4,455 (0.14)	3,458 (0.08)	9,767 (0.06)	3,000 (0.03)
50	2,094	575	248	4	0	3,618 (0.20)	3,000 (0.09)	2,000 (0.04)	1,250 (0.03)		7,413 (0.35)	5,754 (0.14)	5,871 (0.08)	1,375 (0.08)	
60	1,506	473	109	5	1	1,869 (0.33)	3,000 (0.12)	2,000 (0.04)	3,000 (0.03)	1,000 (0.02)	5,561 (0.28)	7,240 (0.18)	5,514 (0.06)	3,900 (0.03)	1,000 (0.02)
70	1,022	278	21	0	2	600 (0.10)	2,700 (0.16)	2,000 (0.07)		4,100 (0.03)	3,164 (0.32)	5,057 (0.22)	13,694 (0.09)		4,100 (0.03)
80	252	44	3	0	0	261 (0.29)	2,000 (0.22)	120 (0.02)			1,687 (0.46)	3,446 (0.34)	230 (0.11)		
90	9	1	0	0	0	3,150 (1.00)	3,000 (0.22)				5,736 (0.66)	3,000 (0.22)			

〈Table 3〉 Distribution of financial wealth, funds, stocks, bonds, and derivatives by marital status

Marital Status	Observation					Median					Mean				
	Financial wealth	Funds	Stocks	Bonds	Derivatives	Financial wealth	Funds	Stocks	Bonds	Derivatives	Financial wealth	Funds	Stocks	Bonds	Derivatives
2011															
Single	894	148	83	0	0	2,500 (0.91)	1,500 (0.16)	1,200 (0.10)			4,585 (0.69)	2,773 (0.23)	3,498 (0.14)		
Married	7,639	2,264	991	36	3	4,479 (0.23)	2,500 (0.09)	1,500 (0.04)	2,850 (0.04)	2,000 (0.05)	8,873 (0.37)	5,762 (0.14)	5,220 (0.07)	16,739 (0.11)	1,567 (0.04)
Divorced	775	90	31	0	0	1,900 (0.95)	2,000 (0.21)	2,000 (0.11)			4,009 (0.68)	5,279 (0.25)	3,038 (0.20)		
Widowed	1,162	226	32	1	0	638 (0.31)	2,000 (0.13)	1,000 (0.03)	3,000 (0.06)		2,700 (0.48)	3,981 (0.22)	7,183 (0.09)	3,000 (0.06)	
2010															
Single	849	171	76	2	0	2,040 (0.92)	1,100 (0.16)	500 (0.07)	1,635 (0.05)		4,069 (0.69)	2,719 (0.22)	1,386 (0.11)	1,635 (0.05)	
Married	7,307	2,126	948	19	4	3,822 (0.22)	2,100 (0.09)	1,200 (0.04)	2,000 (0.04)	3,500 (0.03)	7,654 (0.36)	5,239 (0.15)	4,185 (0.07)	5,995 (0.05)	3,050 (0.03)
Divorced	693	66	24	0	0	1,420 (0.96)	1,765 (0.17)	1,000 (0.06)			2,960 (0.70)	2,724 (0.23)	1,745 (0.13)		
Widowed	1,080	211	26	0	0	500 (0.91)	2,000 (0.16)	1,500 (0.10)			2,258 (0.45)	3,483 (0.25)	3,785 (0.06)		

categories. A majority of security owners are married couples. In 2011, married head of households own a mean of ₩57.62 million or 0.14 fraction to total wealth in funds, ₩52.2 million or 0.07 fraction in stocks, and even ₩167.39 million or 0.11 fraction in bonds. note that those fractions are not as large as in the other three groups. Even though single or divorced households have large portion of financial wealth to total assets at the median or mean for any year, median or average statistics of the two households are roughly as half as those of married couple. In contrast, the other three types of households hold roughly half the average amount that married couples do. Over 20 percent, married couple participates in fund markets, but fewer than 10 percent, in stock markets in either year. Exceptionally low market participation rate is prevalent in bond and derivative markets for all four groups.
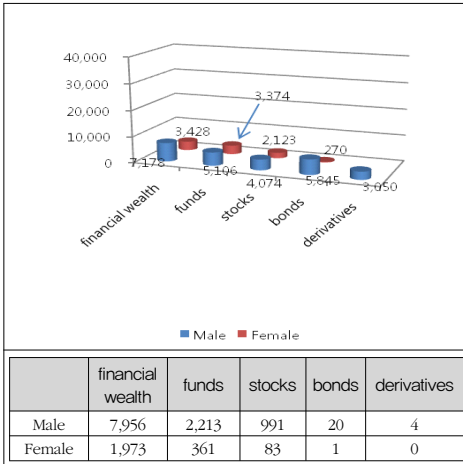
Figure 3 shows mean statistics of financial instruments according to household characteristics such as sex, (a) and (b), employment, (c) and (d), and homeownership, (e) and (f) in 2010 and 2011, respectively. Observations below the figure are indicated in the table. The number on top of or above round bar indicates mean of each financial instrument in unit of 10,000 Won. As might be expected, male household heads on average own more any types of financial instruments than female ones. There are deserving of some features about female investment. Female households are more inclined to participate in fund or stock markets in both years than bond markets. Average female households have approximately ₩38 million of funds, and ₩35 million of stocks, in 2011. Its opposite, average male households, have ₩57 million and ₩52 million, correspondingly. Employment exhibits the unequal distribution of financial vehicles between two groups. Households during work in (c) and (d) in Figure 3 have greater financial wealth than unemployed households. Specifically, working households own approximately 1.6 times financial wealth as out-of-work households do. However, the latter have greater mean and median amounts of stocks as well as funds than the former. This result sounds peculiar because the reverse

evidence has been reported(Viceira, 2001). It could imply unemployed households in this sudden recession seek higher risk-bearing gambling than employed households.
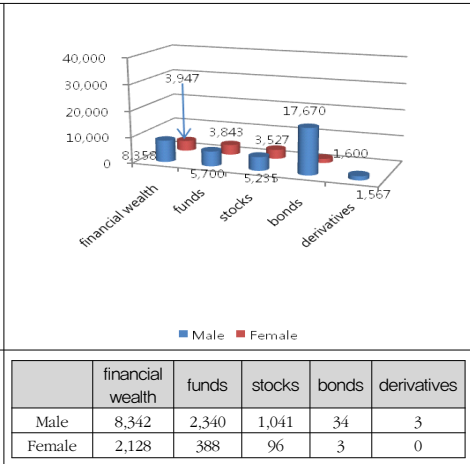
Homeownership unveils a delicate flavor of household investments in recession. Kullman and Siegel(2005) evidenced that non-homeowners prefer investing in the safer assets to risky assets.

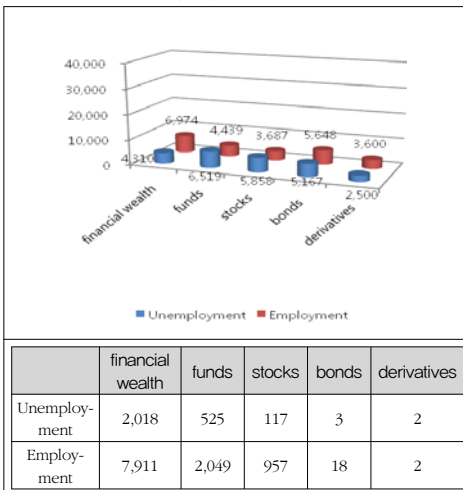〈Figure 3〉 Distribution of financial instruments by household characteristics
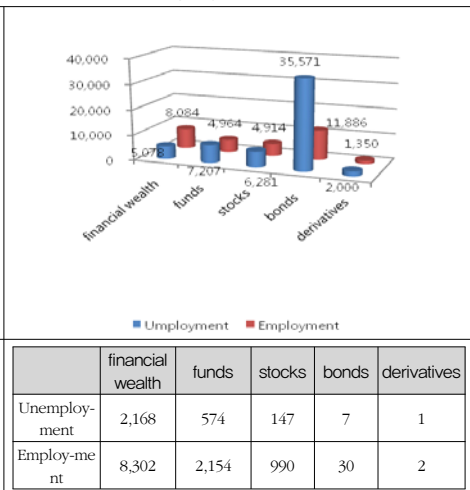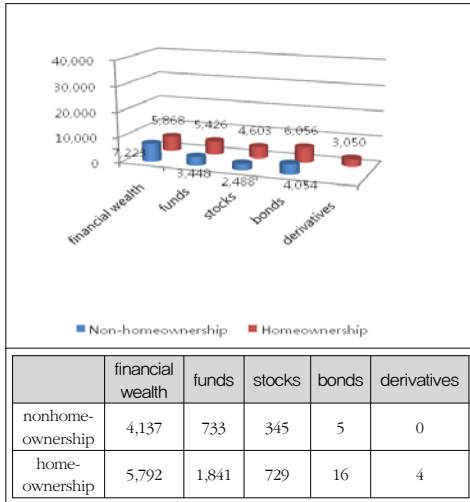
(a) Sex in 2010

	financial wealth	funds	stocks	bonds	derivatives
Male	7,956	2,213	991	20	4
Female	1,973	361	83	1	0

(b) Sex in 2011

	financial wealth	funds	stocks	bonds	derivatives
Male	8,342	2,340	1,041	34	3
Female	2,128	388	96	3	0

(c) Employment in 2010

	financial wealth	funds	stocks	bonds	derivatives
Unemploy-ment	2,018	525	117	3	2
Employ-ment	7,911	2,049	957	18	2

(d) Employment in 2011

	financial wealth	funds	stocks	bonds	derivatives
Unemploy-ment	2,168	574	147	7	1
Employ-me nt	8,302	2,154	990	30	2

(e) Homeownership in 2010

(f) Homeownership in 2011

	financial wealth	funds	stocks	bonds	derivatives
nonhome-ownership	4,137	733	345	5	0
home-ownership	5,792	1,841	729	16	4

	financial wealth	funds	stocks	bonds	derivatives
nonhome-ownership	4,535	770	367	7	0
home-ownership	5,935	1,958	770	30	3
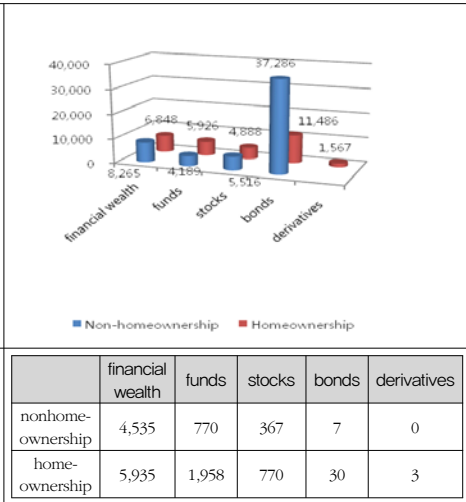
In addition, Hu(2005) shows that risky occupied housing substitutes for stocks. But, in this paper, that is not so all over the place. In 2011 homeowners have approximately ₩60 million of funds, which is larger than ₩42 million of funds held by non-homeowners. Non-homeowners rather have larger mean value of financial wealth, stocks, and bonds than homeowners in the same year.

It is well known that education stimulates investors to be involved in stock markets equipped with financial literacy. Table 4 exhibits linear trend of stockholding by education level. The number underneath the statistics is the ratio of each asset relative to total asset. The following categories are elementary school education, middle school, high school, college with less than 3 years, college with more 4 years and graduate school, respectively. In 2010, households with less than a high school hold approximately ₩2.2 million in stock wealth, and contrast with about ₩5.4 million held by households with a graduate school. Even at the median, by and large, the amount of stockholding shows gradual increases along education levels. The portions of funds are varying alongside education attainment but those of stocks are little yet.

⟨Table 4⟩ Distribution of financial wealth, funds, stocks, bonds, and derivatives by education

2011

Education	Observation					Median					Mean				
	Financial wealth	Funds	Stocks	Bonds	Derivatives	Financial wealth	Funds	Stocks	Bonds	Derivatives	Financial wealth	Funds	Stocks	Bonds	Derivatives
Non education	518	75	3	0	0	250 (0.31)	2,000 (0.16)	500 (0.02)			1,323 (0.49)	2,596 (0.27)	1,533 (0.04)		
Elementary	1,273	299	26	1	0	1,110 (0.17)	2,000 (0.14)	986 (0.03)	130 (0.00)		2,597 (0.38)	3,914 (0.22)	2,012 (0.09)	130 (0.004)	
Middle	1,079	282	46	2	0	2,280 (0.20)	2,000 (0.11)	900 (0.03)	3,000 (0.05)		4,067 (0.39)	3,549 (0.16)	2,809 (0.07)	3,000 (0.05)	
High	3,475	754	287	11	0	3,360 (0.30)	2,150 (0.10)	1,400 (0.05)	1,200 (0.02)		5,897 (0.45)	4,677 (0.15)	3,439 (0.09)	8,504 (0.13)	
College (3 years or less)	981	233	122	2	1	4,272 (0.33)	2,000 (0.09)	1,000 (0.03)	90,500 (0.43)	2,000 (0.08)	7,265 (0.47)	4,036 (0.15)	3,155 (0.07)	90,500 (0.43)	2,000 (0.08)
College (4 years or more)	2,455	831	499	14	2	6,590 (0.29)	2,540 (0.08)	1,800 (0.04)	8,300 (0.05)	1,350 (0.02)	12,188 (0.43)	6,880 (0.14)	6,003 (0.08)	20,051 (0.11)	1,350 (0.02)
Graduate	689	254	154	7	0	9,718 (0.28)	3,000 (0.07)	2,150 (0.04)	2,000 (0.04)		17,712 (0.40)	8,973 (0.14)	8,013 (0.08)	6,314 (0.04)	

2010

Education	Observation					Median					Mean				
	Financial wealth	Funds	Stocks	Bonds	Derivatives	Financial wealth	Funds	Stocks	Bonds	Derivatives	Financial wealth	Funds	Stocks	Bonds	Derivatives
Non education	520	66	4	0	0	217 (0.19)	1,000 (0.2)	1,850 (0.3)			1,117 (0.45)	1,960 (0.29)	2,195 (0.07)		
Elementary	1,212	292	26	0	0	1,009 (0.14)	2,000 (0.14)	900 (0.03)			2,423 (0.35)	3,761 (0.22)	1,466 (0.08)		
Middle	1,020	223	38	1	0	1,775 (0.19)	2,100 (0.11)	1,250 (0.06)	200 (0.00)		3,371 (0.37)	3,839 (0.17)	2,579 (0.09)	200 (0.004)	
High	3,343	745	259	5	1	2,810 (0.30)	2,000 (0.11)	1,000 (0.04)	1,500 (0.04)	1,000 (0.02)	5,129 (0.46)	4,270 (0.16)	3,395 (0.08)	2,100 (0.04)	1,000 (0.02)
College (3 years or less)	888	211	122	1	0	3,831 (0.34)	1,500 (0.09)	1,000 (0.04)	270 (0.04)		6,476 (0.47)	4,098 (0.15)	2,467 (0.06)	270 (0.04)	
College (4 years or more)	2,356	795	490	10	2	5,841 (0.28)	2,100 (0.09)	1,200 (0.04)	3,000 (0.04)	3,600 (0.03)	10,511 (0.42)	5,765 (014)	4,413 (0.07)	4,370 (0.05)	3,600 (0.03)
Graduate	590	242	135	4	1	9,040 (0.25)	3,850 (0.08)	2,000 (0.04)	5,750 (0.04)	4,000 (0.03)	15,685 (0.38)	7,459 (0.13)	5,378 (0.07)	15,625 (0.05)	4,000 (0.03)

III. Assets holdings of households

One research focus of this project looks at investment assets such funds, stocks, bonds, and two additional hypothetical portfolios, one that is made up of bonds and stocks that is, named, liquid assets, and one that is made up of a bundle of bonds, stocks, funds and derivatives that is, named, financial assets. Because these types of assets are believed to be highly liquid and their fair market values can be easily and quickly identified in financial markets. All financial instruments and household characteristics are transformed logarithmically in order to scale down the right-skewedness of the variables of interest. The resulting model is shown below:

$$fin = \alpha_{it} + X\beta_{it} + Z\gamma_i + \varepsilon_{it} \; .$$

where t denotes time(i.e., 2010 or 2011) and denotes i, individual household. ε_i is assumed to follow a normal distribution of zero expectation and σ^2 represents variance. Fin, defined as a set of dependent variables, includes all investment assets mentioned before while X is the set of independent variables that include financial debt, disposable income, minimum required consumption, household size, age, and real estate. Z includes sex, marital status, employment status, homeownership, and educational attainment in order to control for household characteristics. Because a set of fin are censored at zero, a Tobit analysis needs to be performed with the following constraints.

$$fin^* = 0 \;\; if \;\; fin \leq 0,$$
$$fin^* = fin \;\; if \;\; fin > 0$$

By running a Tobit regression on financial wealth, we obtain Table 5. This table reports the impact of household-level determinants on household participation in financial wealth in the 2011-2012 Household Financial Survey in South Korea. The

dependent variable is financial wealth funds, stocks, financial assets, and liquid assets. In the reference household, the household head is a married employed female without official educational attainment, a home, a spouse in the year 2010, which are identical in Tables 6 and 7. Standard errors are reported underneath the coefficients in parentheses. *** , **, and * indicate 1, 5, and 10 percent statistical significance, respectively. Signs of age variables show the typical hump-shaped investment. Household size is the number of households. Household size shows a positive sign on financial wealth suggesting an apportionment of household wealth toward safe assets. Love(2009) finds that the number of children also plays a fundamental role in portfolio choice. The coefficients of the consumption variables, which is defined as the monthly minimum amounts desirable for households living and multiplied by 12 in order to annualize, result in a statistically significant and positive sign on financial wealth, but it is not on any other individual risky assets including the two portfolios at all[9]. Conversely, disposable income has a statistically positive effect on all classes of instruments except for bonds. But, the marginal effects[10] of disposable income show different magnitudes according to types of assets those on liquid assets and stocks are relatively smaller than those on financial assets and funds.

Households with a high disposable income prefer safe assets to risky assets. Households expected to earn uncertain disposable income in the recession are likely to choose safe assets. This result is comparable to the theoretical prediction of Bodie et al.(1992), who hypothesize that it is optimal to hold more stocks when investors earn a certain future labor income, than when retired. Meanwhile Polkovnichenko(2007)

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9) Consumption is a function of income in a context of economy, their multicolinearity in this paper is detected, but, it turns out to be weak.

10) The marginal effect of an explanatory variable, X, is the partial derivative of the prediction with respect to X and the marginal effect measures the expected change in the response variable as a function of the change in X where the other variables held constant. In notation, $\dfrac{\partial E(y|x)}{\partial x} = \beta \, prob(y^* > 0|x)$.

finds that the anticipated demands for stocks are lower than in models based on labor income when stock returns are low correlated with labor income. Additionally, we add an employment dummy variable to check the group effect between the employed and unemployed. This dummy variable reveals a stark contrast on the financial shareholdings of households. That dummy shows a positive sign on financial wealth and funds, and whereas a negative sign on stocks and bonds in Panel B and C. That is, it marginally produces a remarkable increase in financial wealth of 27.2 percent whereas its marginal effects on liquid assets and stocks indicate a drastic reduction of 42.1 percent and 42.5 percent respectively. This evidence seems to contradict the prior findings. What might this change in asset allocation among financial instruments suggest? The plausible hypothesis is that employed households turn financial asset allocation by allotting them to safer assets[11] such as bank deposit or funds out of nagging fear of potential losses especially after the 2008 subprime financial. Labor income might lift the holding position of risky asset a little bit, but, other income sources that includes in disposable income(e.g. entrepreneurial income) would dominate the other marginal edge and so households would be likely to raise the portion of safe assets more among total financial value. Figures 3(c) and 3(d) confirm this interpretation; the average or median amounts of financial wealth held by employed households are larger than those of their counterparts in the sample. In contrast, unemployed households own a greater average number of stocks and bonds than employed households. This implies that unemployed households are more aggressive and risk-taking during this recent recession period at least.

As anticipated, financial debts negatively influence financial wealth as shown in models from 4 to 9 in panel A of Table 5. Its effect still remains in the rest of financial instruments in panel B. This finding is consistent with the results of Chetty and

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11) Recall what kinds of financial instruments each asset incorporates.

Szeidl(2009), who found that because financial debts are primarily comprised of mortgage loans, which depend heavily on housing as a major component of real estate, it is likely to curb financial market participation for young or older households if they earn low income(Constantinides et al., 2002; Cocco, 2005; Polkovinichenko, 2007). Real estate has a positive and statistically significant coefficient in both Panel A and B of Table 5. This is in markedly contrast with the effect of debts, considering its close relation of housing mortgage loans. Housing shows low correlation with stock returns due to the accompanying leverage and limitation on diversification. Hence,

〈Table 5〉 Tobit models in 2011-2012 Financial Household Survey

Panel A: financial wealth

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Intercept	14.192*** (0.176)	14.226*** (0.180)	11.983*** (0.207)	11.989*** (0.207)	12.176*** (0.210)	12.131*** (0.210)	12.438*** (0.210)	12.470*** (0.210)	10.840*** (0.213)
Age	0.148*** (0.007)	0.079*** (0.007)	0.076*** (0.007)	0.080*** (0.007)	0.073*** (0.007)	0.073*** (0.007)	0.073*** (0.007)	0.072*** (0.007)	0.073*** (0.007)
Age square	-0.002*** (6.3E-05)	-0.001*** (6.87E-05)	-0.001*** (6.84E-05)	-0.001*** (6.88E-05)	-0.001*** (6.92E-05)	-0.001*** (6.91E-05)	-0.001*** (6.87E-05)	-0.001*** (6.92E-05)	-0.001*** (6.77E-05)
Household size		0.308*** (0.013)	0.264*** (0.013)	0.280*** (0.013)	0.267*** (0.013)	0.229*** (0.014)	0.125*** (0.015)	0.124*** (0.015)	0.126*** (0.015)
Consumption		0.027*** (0.004)	0.022*** (0.004)	0.024*** (0.004)	0.023*** (0.004)	0.021*** (0.004)	0.020*** (0.004)	0.015*** (0.004)	0.014*** (0.004)
Disposable Income			0.148*** (0.007)	0.146*** (0.007)	0.144*** (0.007)	0.139*** (0.007)	0.134*** (0.007)	0.132 (0.007)	0.130*** (0.007)
Financial debt				-0.011*** (0.002)	-0.012*** (0.002)	-0.012*** (0.002)	-0.013*** (0.002)	-0.014*** (0.002)	-0.014*** (0.002)
Real estate					0.009*** (0.002)	0.007*** (0.002)	0.003*** (0.002)	0.003* (0.002)	0.071*** (0.003)
Sex						0.384*** (0.040)	-0.017*** (0.048)	-0.020 (0.048)	-0.008 (0.047)
Spouse							0.764*** (0.050)	0.759*** (0.050)	0.753*** (0.049)
Employment								0.115** (0.053)	0.141*** (0.051)
Non-home ownership									1.538*** (0.050)
Time	0.233*** (0.030)	0.294*** (0.031)	0.148*** (0.007)	0.285*** (0.031)	0.285*** (0.031)	0.283*** (0.031)	0.287*** (0.030)	0.274*** (0.031)	0.243*** (0.030)
Obs.	20517	20517	20517	20517	20517	20517	20517	20517	20517
Log likelihood	-44536	-44198	-44131	-44115	-44102	-44056	-43941	-43939	-43484

homeowner's choice can be made distinct from non-home owners'. When examining the effect of homeownership on financial shareholdings, we see that non-homeownership has a statistically positively relationship with financial wealth. This is unexpected as it means that homeownership decreases the odd ratio of owning stocks or bonds as compared to non-home ownership.

However, this result makes some sense. As shown in Figures 3(e) and 3(f), the amounts of financial wealth of non-homeowners are greater than those of homeowners, indeed. What's more, the signs of non-home ownership on stocks and bonds are not completely consistent with findings of Yao and Zhang(2005), who find that when investors own a house, the equity proportion in stocks, bonds or home equity is reduced. In the same table, the Sex dummy variable bears a negative sign on financial wealth, whereas it shows a statistically positive sign on liquid assets and stocks. This implies that male households, which refer to households with a spouse, prefer risky assets such as stocks over safe assets. Married household heads, on the other hand, show a distinctive preference in the choice of financial instruments. In Panel B and C, although the Spouse dummy variable has a statistically significant and positive impact across all types of financial vehicles, its marginal effects on stocks and liquid assets is of small magnitude relative to the other instruments. Married heads of household hold slightly more 20% of stocks and liquid assets as compared to all other categories of household. Educational attainment[12] delivers an increasing marginal impact for all the instruments.

Calvet et al.(2007) show that households equipped with financial sophistication by dint of education or wealth tend to invest more efficiently and aggressively. The results in this paper are, in part, consistent with their findings and in align with the previous statistics abstracted from Table 4 that finds that investors with higher education tend to invest more in risky assets.

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12) The education refers to the following categories: up to elementary school education, middle school, high school, college with less than 3 years, college with more 4 years and graduate school.

Panel B: portfolios

	Financial wealth	*Marginal effect*	Financial assets	*Marginal effect*	Liquid assets	*Marginal effect*
Intercept	9.153*** (0.218)		-65.725*** (3.328)		-115.043*** (6.831)	
Age	0.091*** (0.007)	*0.091*	0.573*** (0.107)	*0.197*	1.636*** (0.213)	*0.188*
Age square	-0.001*** (6.88E-05)	*-0.001*	-0.005*** (0.001)	*-0.002*	-0.018*** (0.002)	*-0.002*
Household size	0.117*** (0.015)	*0.117*	-0.122 (0.208)	*-0.042*	0.120 (0.343)	*0.014*
Consumption	0.011*** (0.004)	*0.011*	0.017 (0.058)	*0.006*	-0.022 (0.109)	*-0.003*
Disposable Income	0.114*** (0.007)	*0.114*	1.267*** (0.110)	*0.435*	0.959*** (0.173)	*0.110*
Financial debt	-0.017*** (0.002)	*-0.017*	-0.513*** (0.025)	*-0.176*	-0.138*** (0.040)	*-0.016*
Real estate	0.055*** (0.003)	*0.055*	0.713*** (0.039)	*0.245*	0.690*** (0.060)	*0.079*
Sex	-0.193*** (0.046)	*-0.193*	-0.030 (0.695)	*-0.010*	3.900*** (1.223)	*0.448*
Spouse	0.591*** (0.048)	*0.591*	5.221*** (0.711)	*1.794*	2.223* (1.200)	*0.255*
Employment	0.272*** (0.050)	*0.272*	-0.424 (0.728)	*-0.146*	-3.670*** (1.311)	*-0.421*
Non-homeownership	1.339*** (0.049)	*1.339*	-0.130 (0.653)	*-0.045*	1.073 (0.977)	*0.123*
Elementary	2.320*** (0.095)	*0.578*	4.691*** (1.223)	*1.612*	4.583 (4.041)	*0.526*
Middle	2.094*** (0.082)	*0.960*	6.205*** (1.296)	*2.132*	9.447** (3.991)	*1.085*
High	1.729*** (0.091)	*1.382*	8.145*** (1.243)	*2.799*	17.411*** (3.876)	*1.999*
College 3 years or less	1.382*** (0.078)	*1.729*	13.801*** (1.393)	*4.742*	24.830*** (3.989)	*2.851*
College 4 years or more	0.960*** (0.082)	*2.094*	19.111*** (1.283)	*6.567*	31.753*** (3.912)	*3.646*
Graduate	0.578*** (0.075)	*2.320*	20.729*** (1.417)	*7.123*	32.098*** (4.001)	*3.686*
Time	0.211*** (0.030)	*0.211*	0.280 (0.413)	*0.096*	0.214 (0.653)	*0.025*
Log likelihood	-42915		-36236		-14514	

Panel C: individual risky assets

	Funds	Marginal effect	Stocks	Marginal effect	Bonds	Marginal effect
Intercept	-60.649*** (3.320)		-114.510*** (6.844)		-437.804*** (47.941)	
Age	0.352*** (0.104)	0.098	1.590*** (0.213)	0.179	4.121** (1.925)	0.012
Age square	-0.002** (0.001)	-0.001	-0.017*** (0.002)	-0.002	-0.041** (0.019)	0.000
Household size	-0.085 (0.203)	-0.024	0.110 (0.344)	0.012	1.684 (2.485)	0.005
Consumption	0.013 (0.056)	0.004	0.006 (0.109)	0.001	-0.649 (0.737)	-0.002
Disposable Income	1.229*** (0.116)	0.344	1.006*** (0.176)	0.113	-0.394 (0.894)	-0.001
Financial debt	-0.577*** (0.025)	-0.161	-0.119*** (0.040)	-0.013	-1.007*** (0.297)	-0.003
Real estate	0.562*** (0.039)	0.157	0.673*** (0.060)	0.076	1.290** (0.515)	0.004
Sex	-1.040 (0.677)	-0.291	4.013*** (1.225)	0.452	-4.655 (9.847)	-0.013
Spouse	4.094*** (0.696)	1.145	2.018* (1.199)	0.227	15.055 (11.204)	0.043
Employment	0.206 (0.701)	0.058	-3.769*** (1.311)	-0.425	-0.156 (10.282)	0.000
Non-homeownership	-1.233* (0.645)	-0.345	1.045 (0.979)	0.118	-0.467 (6.595)	-0.001
Elementary	6.819*** (1.154)	1.907	4.522*** (4.023)	0.510	161.251*** (16.202)	0.458
Middle	8.074*** (1.232)	2.259	9.063*** (3.977)	1.021	177.673*** (12.249)	0.505
High	9.329*** (1.185)	2.609	16.889*** (3.860)	1.903	187.043*** (9.440)	0.532
College 3 years or less	12.752*** (1.343)	3.567	24.325*** (3.974)	2.741	186.265*** (10.980)	0.530
College 4 years or more	16.678*** (1.228)	4.665	31.090*** (3.896)	3.504	199.959*** (8.270)	0.568
Graduate	18.054*** (1.365)	5.050	31.372*** (3.986)	3.535	207.799*** (9.178)	0.591
Time	0.182 (0.406)	0.051	0.128 (0.654)	0.014	7.353 (4.914)	0.021
Log likelihood	-29962		-14276		-575	

We conduct additional two tests based on the previous evidence(Flavin and Yamashita, 2002; Kullman and Siegel, 2003; Chetty and Szeidl, 2009). Households can leverage real estate so as to make a loan. Thus, households are able to exploit this loan by investing in financial markets. Another hypothesis is whether household debts play a substitute or complete role in facilitating households towards market participation when they gain income. If financial debts have a positive synergy with disposable income, those will play a supplementary role by driving households towards financial markets. Otherwise, financial debts decrease the participation rate if they curb households investment in financial markets. Table 6 shows the interaction effect of disposable income and real estate with financial debt on several financial instruments. The interaction terms of financial debts and disposable income is statistically significant at the 1 % significance level, and have negative coefficients for all dependent variables except for bonds. Specifically, the diminishing rate by interaction of household debts and income is noticeable in stocks as well as liquid markets. The coefficients are -.224 in stock markets and -.174 in liquid markets. The coefficients in the other markets are minor. In short, the negative signs of these interaction terms support the substitute hypothesis that household debts of which households derive disposable income reduce the participation rate. Next, the interaction terms of financial debts with real estate have negative coefficients on all of instruments. That is, financial debts tied to real estate exert a negative leverage effect on the likelihood of holding all financial vehicles. Even though financial loans made by the collateral value of real estate are prone to decrease investment in financial instruments, these marginal impacts are secondary across a variety of financial vehicles. All coefficients of interaction terms show roughly negative one percent. This result implies households actually can use loans in investing in real assets other than financial assets.

〈Table 6〉 leverage, supplement, and substitution effect of financial debts

Panel A

	Financial wealth		Financial assets		Liquid assets	
Intercept	9.106***	7.863***	-67.029***	-76.822***	-116.184***	-156.842***
	(0.218)	(0.264)	(3.328)	(4.148)	(6.862)	(9.728)
Age	0.090***	0.086***	0.512***	0.486***	1.637***	1.507***
	(0.007)	(0.007)	(0.107)	(0.107)	(0.213)	(0.213)
Age square	-0.001***	-0.001***	-0.004***	-0.004***	-0.018***	-0.016***
	(⟨0.001)	(⟨0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Household size	0.119***	0.113***	0.048	-0.022	0.119	-0.029
	(0.015)	(0.015)	(0.207)	(0.207)	(0.343)	(0.342)
Consumption	0.011***	0.010***	0.028	0.025	-0.018	-0.032
	(0.004)	(0.004)	(0.058)	(0.058)	(0.109)	(0.109)
Disposable Income	0.113***	0.205***	1.195***	2.001***	0.938***	3.829***
	(0.007)	(0.012)	(0.109)	(0.204)	(0.173)	(0.487)
Financial debt	-0.005*	0.094***	-0.234***	0.446**	0.048	2.863***
	(0.003)	(0.013)	(0.049)	(0.209)	(0.083)	(0.459)
Financial debt* Income		-0.007***		-0.056***		-0.174***
		(0.001)		(0.012)		(0.026)
Real estate	0.063***	0.054***	0.859***	0.691***	0.808***	0.660***
	(0.003)	(0.003)	(0.046)	(0.039)	(0.077)	(0.060)
Financial debt* Real estate	-0.001***		-0.019***		-0.012**	
	(⟨0.001)		(0.003)		(0.005)	
Sex	-0.191***	-0.193***	0.375	0.358	3.911***	3.907***
	(0.046)	(0460)	(0.692)	(0.693)	(1.223)	(1.221)
Spouse	0.576***	0.580***	3.797***	4.015***	2.038*	1.827
	(0.048)	(0.048)	(0.708)	(0.707)	(1.201)	(1.197)
Employment	0.275***	0.232***	-0.390	-0.832	-3.634	-4.666***
	(0.050)	(0.050)	(0.728)	(0.731)	(1.312)	(1.316)
Non-homeownership	-1.346	-1.331***	0.409	0.571	-1.075***	-0.893
	(0.049)	(0.049)	(0.652)	(0.652)	(0.977)	(0.975)
Education	YES		YES		YES	
Time	YES		YES		YES	
observation	20517		20517		20517	
Log likelihood	-42904	-42877	-36211	-36222	-14511	-14490

Panel B

	Funds		Stocks		Bonds	
Intercept	-62.260***	-68.188***	-115.529***	-164.612***	-454.572***	-438.149***
	(3.342)	(4.067)	(6.872877)	(10.161)	(49.116)	(49.274)
Age	0.345***	0.337***	1.59***	1.435***	4.173**	4.154**
	(0.104)	(0.105)	(0.212)	(0.213)	(1.938)	(1.927)
Age square	-0.002**	-0.002**	-0.017***	-0.016***	-0.041**	-0.041**
	(0.001)	(0.001)	(0.002)	(0.002)	(0.019)	(0.019)
Household size	-0.047	-0.106	0.110	-0.071	1.676	1.692
	(0.204)	(0.204)	(0.344)	(0.343)	(2.491)	(2.488)
Consumption	0.015	0.012	0.009	-0.005	-0.638	-0.644
	(0.056)	(0.056)	(0.109)	(0.109)	(0.737)	(0.736)
Disposable Income	1.204***	1.726***	0.986***	4.436***	-0.445	-0.861
	(0.117)	(0.199)	(0.176)	(0.522)	(0.895)	(1.415)
Financial debt	-0.282***	0.070	0.050	3.410***	-0.040	-1.652
	(0.048)	(0.211)	(0.083)	(0.488)	(0.890)	(1.625)
Financial debt* Income		-0.038***		-0.204***		0.038
		(0.012)		(0.028)		(0.093)
Real estate	0.724***	0.561***	0.780***	0.637***	1.716**	1.297**
	(0.045)	(0.039)	(0.077)	(0.060)	(0.691)	(0.516)
Financial debt* Real estate	-0.020***		-0.011**		-0.054	
	(0.003)		(0.005)		(0.048)	
Sex	-1.044	-1.063	4.019***	4.050***	-4.541	-4.681
	(0.680)	(0.681)	(1.225)	(1.223)	(9.882)	(9.851)
Spouse	3.793***	4.051***	1.852	1.502	14.723	15.160
	(0.699)	(0.700)	(1.201)	(1.197)	(11.238)	(11.217)
Employment	0.299	-0.010	-3.738***	-4.963***	-0.131	0.070
	(0.705)	(0.708)	(1.311)	(1.318)	(10.290)	(10.307)
Non-home ownership	1.101*	1.258	-1.046	-0.844	0.447	0.425
	(0.648)	(0.649)	(0.979)	(0.977)	(6.595)	(6.594)
Education	YES	YES	YES	YES	YES	YES
Time	YES	YES	YES	YES	YES	YES
observation	20517	20517	20517	20517	20517	20517
Log likelihood	-29971	-29991	-14273	-14247	-575	-575

IV. Low Market Participation of Households

In addition to the Tobit regression, a logistic regression is run to figure out the chances a household would respond in a given way, should an abrupt change take place in household finances. Such changes might include a significant reduction in disposable income due to a job loss, a massive swing of the price in real estate households as seen during the 2008 financial crisis, a steep increase in financial debts as is observed over the last decade[13]. To conduct such analysis, I rely on the two relevant estimates: a point estimate[14] that represents the likelihood of household participation in each type of market in response to a one unit change in an interest variable and an interval estimate that represents the transition of market participation caused by a change of one standard deviation in selected variables. Towards this end, any value greater than zero in a response variable is replaced by one, and it is taken to be zero, otherwise. Observations of all logit models are 10,000 households in 2010 and 10,517 in 2011. The Wald test statistic indicates the global null hypothesis that all coefficients are zeroes.

Table 7 shows that disposable income carries a statistically significant and positive impact on all financial instruments. A one unit change of disposable income induces

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13) Household debt versus Gross Domestic Product in Korea is 8% higher than the average of OECD of 73%, and disposable income versus household debt is 22% higher than the average OECD of 128%, the burden of which has accelerated by an 11.8% increase, to 150.8% in 2010 from 139% in 2007(i.e., right before 2008 global financial crisis). In 2010, Korea Development Institute reported that the adverse effect of household debts that are collateralized with real estate have not been realized yet. Household debt in Korea, Korea Institute of Finance, 2013. 3, p. 7-8.

14) The point estimate of an explanatory variable, X, is the odds ratio of the probability of the treatment category over that of the reference category. $odd\ ratio = \frac{\pi_i}{1-\pi i} = \exp(x_i'\beta)$, where π_i is the probability of occurring *fin* for the other category ,i, over reference category. the interval estimate represents the probability of a dependent variable by change in one standard deviation of an independent variable, which lies in the bracket below point estimate,[ ].

an increase in probability of 0.08 to 0.15, depending on the types of financial instruments. Notably, 8.9 percent in stock markets and 15.3 percent in fund markets. Meanwhile, financial market participation decline if household debts increase. In particular, the participation rate in fund markets declines by approximately five percent, and by less one percent in stock markets. So, these results are patently inconsistent with the theories of Heaton and Lucas(2000), and Flavin and Yamashita(2002) but support the findings of Chatty and Szeidl(2009). Real estate such as housing can be used in furtherance of mortgage loan. So, leverage by dint of housing can make it easier for households to participate in financial markets. Indeed, real estate eventually comes in effect to promote financial market participation by households by inducing at least a positive probability of 0.05 or more as to owning financial instruments. Counterintuitively, the Employment dummy variable, consistently lowers 24 percent of the participation rate in stocks and 23 percent in liquid asset markets. This finding is in stark contrast to the prediction of Watcher and Yogo(2010), who show that unemployment risk lowers the portfolio shares especially for younger households in the lowest wealth level. Cocco et al.(2005) also emphasize that the possibility of zero income due to unemployment increases the portion of cash-on-hand in optimal portfolio share. In this analysis, employed households are likely to avoid risky assets in a recessionary period, whereas unemployed households prefer to skate on the risk of investing in insecure securities. In a sense, unemployed households might endeavor for wealth by trading on financial markets in an effort to replenish equivalent amounts of unrealized income.

Now, I try an additional analysis for a second purpose: to figure out how wildly markets could fluctuate when a sudden swing in interest variables took place. For instance, if one variable was entered into a model at a level much above one standard deviation from mean of a one variable, this might create such a scenario. The number in brackets represents the probability change in each financial instrument if an interest

〈Table 7〉 Logit Models: financial market participation

Panel A

	Financial wealth	Point estimate	Funds	Point estimate	Stocks	Point estimate
Intercept	6.285***		-5.941***		-8.696***	
	(1.855)		(0.331)		(0.575)	
Age	-0.110*	0.896	0.030***	1.03†	0.120	1.127†
	(0.060)		(0.009)		(0.017)	
Age Square	0.0007	1.001	-0.00017*	1	-0.001***	0.999†
	(0.0005)		(0.00009)		(0.0002)	
Household size	0.183	1.201	-0.010	0.991	0.00017	1
	(0.113)		(0.018)		(0.026)	
Consumption	0.045**	1.046	0.00018	1	0.00038	1
	(0.023)		(0.005)		(0.009)	
Disposable Income	0.114***	1.121†	0.142***	1.153†	0.086***	1.089†
	(0.021)	[1.281]	(0.016)	[1.363]	(0.017)	[1.204]
Financial debt	-0.030**	0.971†	-0.051***	0.95†	-0.009***	0.991†
	(0.013)	[0.778]	(0.002)	[0.65]	(0.003)	[0.928]
Real estate	0.096*	1.101	0.049***	1.05†	0.049***	1.05†
	(0.052)	[2.383]	(0.003)	[1.553]	(0.004)	[1.558]
Sex	-0.716**	0.489†	-0.086	0.917	0.305***	1.356†
	(0.334)		(0.062)		(0.098)	
Spouse	0.100	1.105	0.344***	1.41†	0.171*	1.187
	(0.329)		(0.063)		(0.093)	
Employment	0.189	1.208	0.004	1.004	-0.277***	0.758†
	(0.273)		(0.064)		(0.101)	
Non-home ownership	-2.463***	0.085†	0.109*	1.115	-0.071	0.931
	(0.947)		(0.057)		(0.070)	
Elementary	0.047	1.049	0.580***	1.786†	0.504	1.655
	(0.356)		(0.108)		(0.407)	
Middle	0.062	1.064	0.680	1.973†	0.898**	2.455†
	(0.402)		(0.115)		(0.401)	
High	0.459	1.582	0.782***	2.185†	1.536***	4.646†
	(0.406)		(0.111)		(0.390)	
College 3 years or less	0.537	1.711	1.072***	2.92†	2.092***	8.102†
	(0.602)		(0.125)		(0.396)	
College 4 years or more	0.688	1.989	1.407***	4.084†	2.556***	12.886†
	(0.468)		(0.114)		(0.391)	
Graduate	1.235	3.44	1.525***	4.596†	2.561***	12.946†
	(0.811)		(0.126)		(0.395)	
Time	0.777***	2.176†	0.016	1.016	0.004	1.004
	(0.254)		(0.037)		(0.049)	
Holdings	20399		5302		2212	
Wald	132***		1837***		1231***	
Pseudo R^2	0.0073		0.1007		0.0799	

Panel B

	Financial assets	Point estimate	Liquid assets	Point estimate
Intercept	-5.319*** (0.289)		-8.637*** (0.569)	
Age	0.032*** (0.009)	1.032†	0.122*** (0.017)	1.130†
Age Square	-0.0002*** (0.00009)	1	-0.001*** (0.00017)	0.999†
Household size	-0.009 (0.017)	0.991	-0.001 (0.026)	0.999
Consumption	0.001 (0.005)	1.001	-0.002 (0.009)	0.998
Disposable Income	0.113*** (0.012)	1.12† [1.279]	0.078*** (0.016)	1.081† [1.186]
Financial debt	-0.041*** (0.002)	0.96† [0.708]	-0.010*** (0.003)	0.990† [.918]
Real estate	0.054*** (0.003)	1.056† [1.631]	0.050*** (0.004)	1.051† [1.574]
Sex	0.043 (0.059)	1.044	0.290*** (0.097)	1.337†
Spouse	0.348*** (0.059)	1.416†	0.190** (0.093)	1.210†
Employment	-0.029 (0.061)	0.971	-0.266*** (0.1)	0.767†
Non-home ownership	0.051 (0.054)	1.052	-0.073 (0.070)	0.929
Elementary	0.500*** (0.106)	1.648†	0.505 (0.407)	1.657
Middle	0.599*** (0.112)	1.82	0.930** (0.4)	2.534†
High	0.776*** (0.108)	2.173†	1.574*** (0.390)	4.825†
College 3 years or less	1.207*** (0.120)	3.343†	2.126*** (0.395)	8.380†
College 4 years or more	1.621*** (0.112)	5.056†	2.6*** (0.390)	13.464†
Graduate	1.699*** (0.123)	5.47†	2.602*** (0.395)	13.486†
Time	0.038 (0.035)	1.038	0.009 (0.049)	1.009
Holdings	6545		2253	
Wald	2216***		1251***	
Pseudo R^2	0.1229		0.0819	

variable moves by one standard deviation[15]. One standard deviation of change in disposable income causes a significant impact on every financial instrument. It induces 28.1 percent of the probability of participation in financial wealth and 36.3 percent of the probability of participation in fund markets. In addition, it shows a 20.4 percent probability in stock market participation. This hints that income risk as a measure of standard deviation would lead to great movements in financial market participation in either direction. A one standard deviation change in financial debt lowers 35 percent of fund market participation. But, unexpectedly, not much movement in stock markets arises from this corresponding change in financial debt and only incurs a comparatively small 7.2 percent probability of departure from the stock markets. Of course, the forces of the two variables are in the opposite direction. In contrast, a greater than one standard deviation change in household debts induces more than 20 percent change of participations in financial wealth and financial assets markets. This implies that households are likely to adjust the proportion of wealth allocated to safe assets rather than to risky assets in the face of an unexpected rise in financial debts. Household income and real estate induces a 55.3 percent rise in fund market participation and 55.8 percent in stock market participation, respectively. Large oscillations in real estate would give rise to a formidable upswing regardless of all the financial instruments and trigger more than 50 percent of the rate in all the markets. Unexpectedly, stock market participation drops to a lesser extent in response to a surge in financial debts as compared to shifts in household income. The analogous interpretation can be made in liquid markets.

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15) One standard deviation of disposable income, financial debts, and real estate each correspond to 2.1746, 9.0291, and 8.4441 in a natural log scale, respectively.

V. Conclusion

In spite of the high historical performance of stock markets, few households would participate in stock markets to reap capital gains, which is one of the puzzles in stock markets. The Korean market participation rate, in fact, is by far less than a half of that in highly capitalized market. Slightly over ten percent of households in this study own stocks, and very few hold bonds. Instead, they would like to hold safe assets. In the analysis, household debts, in part, contribute to a decrease in asset shareholdings, yet do not sufficiently account for the low observed market participation, as might be expected. Rather, the counter-forces of household income and real estate together appear to dominate the decreasing marginal effect of household debts. Fund market participation is primarily boosted by households' disposable income, whereas to a great extent financial wealth is boosted by real estate. Financial debts tend to constrain stock market participation of households, but marginally have an influence on all sorts of market participations.

Besides household debts, in this study, homeownership and employment status actually make a large contribution to discourage the willingness of household market to participate in financial markets, especially due to the effects of 2008 global financial crisis. One speculative hypothesis drawn from this evidence is that household characteristics are rooted in cultural differences across countries and these cultural differences give rise to a varying degree of an aversion to market participation. If so, it is worth exploring the relationship between market participation and cultural background-related factors in the context of international environments to further investigate low household market participation.

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요 약

이 연구는 가계부채, 가처분 소득, 실물 자산의 변화가 가계의 금융시장 참가에 어떤 영향을 미치는지 분석하였다. 지난 30년간 평균적으로 국내 주식시장은 높은 수익률을 제공해왔다. 그럼에도 불구하고 가계는 주식시장참가에 적극적이지 못했다. 2010년을 기준으로, 국내 가계의 11% 미만의 가계가 주식시장에 참여하고 있으며 채권시장은 그보다 더 낮은 참여율을 보이고 있다(0.4% 이하). 실증적 분석결과를 보면, 가계부채가 가계의 금융시장 참가를 제약하는 주요 요인으로 작용하고 있으며, 특히 펀드시장에서 가계부채의 역할이 두드러지게 나타났다. 그러나 가처분소득과 실물자산의 영향은 가계부채의 시장참여 제약효과보다 커서, 가계의 금융시장참가를 설명하기에 충분하지 않다. 구체적으로, 실물자산은 가계부채의 효과를 상쇄하고도 금융시장 참여를 5% 이상 증가시키고, 펀드시장에서는 15.3%나 높게 가계의 참여를 이끌어내고 있다. 가계부채가 시장참가를 저해하는 충분한 요인이 아니라면 다른 요인에서 찾을 수 있다. 예를 들면, 이 논문에서 주택소유나 고용여부는 가계의 금융시장 참가에 커다란 영향을 미치고 있는데, 이는 인구통계학적 변수의 영향이 중요한 역할을 하고 있다는 사실을 드러낸다.

※ 국문 색인어: 가계금융자산보유, 가계부채, 가처분소득, 실물자산, 시장참여