

Demographic Factors Affecting U.S. Households' Investment in Stocks

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Abstract

Using survey data of U.S. households, we examine the demographic factors associated with stock market participation to seek to explain why some households invest in stocks while others do not. We primarily utilize Probit model estimation robust to heteroskedasticity to evaluate multiple demographic variables that could potentially explain direct stock ownership. Additional tests examine the demographic factors associated with the amounts of direct stock ownership and indirect stock ownership through mutual funds, retirement accounts or other avenues. Our results identify various demographic factors that most likely affect U.S. households' investment in stocks, including age, gender, education level, income, homeownership and business ownership. These results are robust to multiple model variations. These findings may be of interest to financial scholars and policymakers as they seek to better understand stock market participation.

Keywords: U.S. stock ownership, survey of consumer finances, demographic factors, household investment decisions

1. Introduction

This study examines the demographic factors associated with the stock investment decisions of United States (U.S.) households and seeks to explain why some households invest in stocks while others do not. Many studies in the finance literature have researched stock market participation; however, most researchers limit the scope of their studies to only a few explanatory factors such as financial literacy, financial preparedness or even intelligence. Our study builds on prior research by simultaneously exploring many demographic factors that could potentially help us to better understand stock market participation.

Early studies of stock market participation have shown that most individuals' investment portfolios have limited exposure, if any, to equities. Kelly (1995) found that the median stockholder owns a single publicly traded stock, often in the company where he works. Oftentimes, equity exposure is limited to indirect stock ownership through mutual funds or tax-deferred retirement accounts. Later studies have attempted to explain this limited stock market participation by low levels of financial literacy (van Rooij et al., 2011), investors' social interaction (Hong et al., 2004; Kaustia & Knupfer, 2012; Brown et al., 2008; Li, 2009), or financial preparedness (Bhargava & Lown, 2006). Almenberg and Dreber (2012) even attributed a gender gap in financial literacy to help to explain low levels of stock market participation. Additionally, Alan (2006) attributed stock market entry costs as a barrier to participate in the stock market.

Several studies have shown the importance of high stock market participation and its positive impact on the economic development of a country. For example, Levine and Zervos (1998) show that stock market liquidity positively predicts the growth and productivity of a country. Similarly, Arestis, Demetriades and Luintel (2001) conclude that banks and stock markets promote the economic growth of a country.

It is, however, important to note that the presence of a stock market alone is not sufficient to ensure the economic growth of a country. Stock markets need to be efficient and well-functioning in order to make a substantial contribution to economic growth. Stock market efficiency primarily depends on the active and rational participation of investors. Allen and Gale (1994) showed that most investors participate in a limited number of markets and this limited market participation can also affect overall market liquidity, leading to increased

volatility of asset prices.

This study examines the demographic factors that affect individual investors' decisions to participate in stock markets. Results of this study may benefit financial scholars, economists, corporate managers and policy makers alike so that they may focus on the factors that likely increase active stock market participation. Furthermore, an understanding of these factors may help investment banks and financial intermediaries better identify and market to potential investment clients.

This paper is organized as follows: Section 2 provides a literature review with background information on U.S. households' participation in the stock market; Section 3 describes the data used in this study and provides some descriptive statistics; Section 4 details the empirical models utilized and contains a discussion of the results; and Section 5 concludes with practical implications of the results of this study.

2. Literature Review

The U.S. financial environment is characterized by low economic barriers and financial innovation that leads to more financial and investment products (Hicks, 1994). Investors have many choices in investment products and plenty of opportunities to invest in financial markets. Additionally, individual investors in the U.S. enjoy an environment of easily accessible, superior information to the investors of many other countries. The Information Age should encourage U.S. investors to actively invest in stocks and other financial instruments. For example, Bogan (2008) found that there has been a fundamental change in stock market participation and links this change to the advent of the Internet. Participation rates of computer-using households increased substantially compared to those of non-computer-using households.

However, the financial portfolio of the typical household is fairly simple and safe, consisting of a checking account, savings account and tax-deferred retirement account (Bertaut & Starr-McCluer, 2000). Early studies such as Kelly (1995) found that the median stockholder owns a single publicly traded stock, often in the company where he works. Oftentimes, equity exposure is limited to indirect stock ownership through mutual funds or tax-deferred retirement accounts. Christelis, Georgarakos, and Haliassos (2010) suggest that only 15.2% of the households had direct ownership of stocks in 1995. This percentage increased to 19.2% in 1998, 21.3% in 2001 and 20.7% in 2004. Shortly prior to the recent financial crisis of 2008, U.S. households invested more in stocks than their European counterparts (Christelis et al., 2013). However, the observed difference of stock investment for U.S. and European households disappeared after the financial crisis of 2008 (Christelis et al., 2013).

Poterba (2000) notes that most U.S. households have very limited holdings of corporate stocks. Even for those that own corporate stocks, stock investment is usually a small proportion of total investment portfolios. Research on consumer behavior suggests that consumers may have the desire to accumulate liquid assets, such as cash, to finance future consumption emergencies. This preference for liquid assets, coupled with investors' aversion toward risk and uncertainty (Benartzi & Thaler, 1995), may cause investors to shy away from investing in corporate stocks. However, Bhargava and Lown (2006) studied U.S. households' preparedness for financial emergencies and found that a low percentage of households meet the guidelines for adequate emergency funds. More than 50% of households did not meet any of the guidelines. Therefore, there may be alternative explanations that can explain low stock market participation.

Although a considerable amount of research has focused on the savings behavior of U.S. households, less research exists attempting to better understand the stock investment decisions of U.S. households. Much of the extant literature of stock market participation have limited scopes to only a few explanatory factors such as financial literacy, financial preparedness or even intelligence. Below is, in our opinion, a discussion on some of the more prevalent studies.

Levels of financial literacy play a role in stock market participation. Guiso and Jappelli (2005) noted that the probability that investors are aware of stocks, mutual funds and investment accounts is positively correlated with education, household resources, long-term bank relations and proxies for social interaction. Van Rooij et al. (2011) noted that many investors do not know the difference between bonds and stocks, the relationship between bond prices and interest rates, and the basics of diversification – concluding that those with low financial literacy are much less likely to invest in stocks. Finally, Almenberg and Dreber (2012) documented that women typically participate less than men in the stock market, while also scoring lower on financial literacy.

Levels of investors' social interaction also play a role in stock market participation. Hong et al. (2004) found that stock market participation is influenced by social interaction and concluded that social households – those who interact with their neighbors, or attend church – are substantially more likely to invest in the market than

non-social households, controlling for wealth, race, education and risk-tolerance. Kaustia and Knupfer (2012) found that recent stock returns that local peers experience affect an individual's stock market entry decision. Brown et al. (2008) established a causal relation between an individual's decision whether to own stocks and average stock market participation of the individual's community. Finally, Li (2009) documented that household investors' likelihood of entering the stock market within the next five years is about 30% higher if their parents or children had entered the stock market during the previous five years.

Other factors such as levels of investor intelligence or lack of trust in the stock market and political preferences play a role in stock market participation. Grinblatt et al. (2011) found that stock market participation is monotonically related to IQ, controlling for wealth, income, age and other demographic and occupational information. Guiso et al. (2008) studied the effect that a general lack of trust can have on stock market participation, finding lack of trust as an important factor in explaining the limited participation puzzle. Finally, Kaustia and Torstila (2011) studied political preferences and stock market participation, finding that left-wing voters and politicians are less likely to invest in stocks, controlling for income, wealth, education and other relevant factors. Personal values are a factor in important investment decisions, in this case leading to "stock market aversion."

Investors' decisions regarding the investment in equities has important implications for financial markets. For example, stock investment directly affects investors' precautionary savings and retirement contributions (Bertaut & Starr-McCluer, 2000). Additionally, an increase in stock market participation affects overall stock market liquidity, which in turn affects the efficiency of the stock market (Shiller, 1999). An efficient stock market is crucial in promoting an economic climate conducive to growth. Thus, a better understanding of stock investment behavior may have important implications. This study investigates the factors that might affect the stock investment decisions of U.S. households.

3. Data and Descriptive Statistics

The data used in this study is obtained from the Survey of Consumer Finances (SCF) (Note 1). The SCF is a triennial, cross-sectional survey of U.S. families that includes information on families' balance sheets, pensions, income and demographic characteristics (FRS, 2014). This survey is sponsored by the Federal Reserve Board in cooperation with the U.S. Department of the Treasury. The survey is administered by the National Opinion Research Center (NORC) at the University of Chicago, which has collected the survey data since 1992 (FRS, 2014). Survey results were collected from 2001-2013 and used in our analyses.

This study primarily addresses the question of what factors determine whether U.S. households directly invest in individual stocks; however, additional analyses are conducted to see if results change when evaluating the amount of direct stock ownership as well as indirect stock ownership through mutual funds, tax-deferred retirement accounts or other avenues. The primary dependent variable used in this study is *Stocks* (Note 2), which is a binary variable measuring the stock investment behavior of U.S. households. As a part of the survey regarding financial assets, the head of each U.S. household is asked whether he/she owns any publicly traded stock. For the purpose of our study, if the respondent indicates that he/she owns stock, then *Stocks* takes on a value of 1. If the respondent indicates that he/she does not own stock, then *Stocks* takes on a value of 0. Additional dependent variables used in this study are *Stocks_Amt*, which is the natural logarithm of the total value of directly held stocks owned by the household, and *Equity_Exposure*, which is the natural logarithm of the total value of financial assets held by the house that are invested in stock. *Stocks_Amt* measures the amount of direct stock ownership while *Equity_Exposure* measures the amount of indirect stock ownership.

We consider thirteen different demographic variables as potential independent variables from the SCF dataset. Our sample includes 25,875 observations from 2001-2013 with each observation representing one U.S. household. Table 1 provides descriptions of the dependent and independent variables used in this study. The data used in this study is obtained from the Survey of Consumer Finances (SCF). The SCF is a triennial, cross-sectional survey of U.S. families that includes information on families' balance sheets, pensions, income and demographic characteristics. The Federal Reserve Board in cooperation with the U.S. Department of the Treasury sponsors this survey. It is administered by the National Opinion Research Center (NORC) at the University of Chicago.

Age is a continuous variable that indicates the age of household "i." As people grow older, planning for retirement and saving become higher priorities. Therefore, older Americans may invest more in stocks. Thus, we expect *Age* to have a positive coefficient. *Sex* is a binary variable that takes on a value of 1 if the head of household "i" in the sample is male and 0 otherwise. Because men tend to be overconfident while women tend to be more risk averse (Barber & Odean, 2001), it is reasonable to assume that men are more likely to invest in stocks than women. We expect a positive coefficient for the independent variable *Sex*.

Educ is also a continuous variable that indicates the number of years of education completed by the head of household “i.” Stock investment requires, at a minimum, a basic knowledge of stock markets. Furthermore, people with higher levels of education may be in better financial positions to plan their savings and investment decisions and more knowledgeable about trading strategies than people with lower levels of education. Therefore, we expect a positive coefficient of the independent variable *Educ*.

Married is a binary variable that takes on a value of 1 if the head of household “i” is married and 0 otherwise. Married couples may have more savings since both the husband and wife may have income from employment. Saving may also be more of a priority for married couples as children may be a concern. With an increased importance of saving and investing, married households may invest more in stocks compared to unmarried households. Therefore, we expect a positive coefficient on *Married*. *Kids* is the number of children living in household “i.” As the number of children increases in a household, parents may incur higher living expenses on items such as food, clothing, healthcare and education. Higher living expenses may result in lower savings and, consequently, households with more children may have less discretionary money to invest in stocks. Therefore, we expect *Kids* to have a negative coefficient.

Working is a binary variable that takes on a value of 1 if the head of household or the spouse of the head of household “i” is working in some way for pay outside the home and 0 otherwise. If a person is not working, it is reasonable to assume that he/she may not have enough money to save. Without savings, he/she may not be able to invest in securities such as stocks. Therefore, we expect a positive coefficient on *Working*. *Savings* is a binary variable that takes on a value of 1 if household “i” has any amount of savings and 0 otherwise. It is reasonable to assume that households invest more if they have more savings, somewhat analogous to an “income” effect of savings in the economy. However, it is also possible that households consume more if they have more savings, somewhat analogous to a “substitution” effect of savings in the economy. In general, though, it is reasonable to assume that people with any amount of savings are in a better financial position to invest in stocks than people without savings. Therefore, we expect a positive coefficient on *Savings*.

Table 1. Variable descriptions

Variable	Description
<i>Stocks_{i,t}</i>	A binary variable that takes on a value of 1 if household “i” owns any publicly traded stock, and 0 otherwise
<i>Stocks_Amt_{i,t}</i>	The natural logarithm of the total value of directly held stocks owned by the household
<i>Equity_Exposure_{i,t}</i>	The natural logarithm of the total value of financial assets held by the household that are invested in stock
<i>Age_{i,t}</i>	The age of the head of household “i”
<i>Sex_{i,t}</i>	A binary variable that takes on a value of 1 if the head of household “i” is male, and 0 otherwise
<i>Educ_{i,t}</i>	The number of years of education completed by the head of household “i”
<i>Married_{i,t}</i>	A binary variable that takes on a value of 1 if the head of household “i” is married, and 0 otherwise
<i>Kids_{i,t}</i>	The number of children living in household “i”
<i>Working_{i,t}</i>	A binary variable that takes on a value of 1 if the head of household “i” or the spouse of the head of household “i” work for pay, and 0 otherwise
<i>Savings_{i,t}</i>	A binary variable that takes on a value of 1 if household “i” has any amount of savings, and 0 otherwise
<i>Hascheck_{i,t}</i>	A binary variable that takes on a value of 1 if household “i” has a checking account, and 0 otherwise
<i>Bonds_{i,t}</i>	A binary variable that takes on a value of 1 if household “i” has investments in bonds, and 0 otherwise
<i>Home_{i,t}</i>	The natural logarithm of the total value of equity in the primary residence of household “i”
<i>Hasbus_{i,t}</i>	A binary variable that takes on a value of 1 if household “i” owns an actively managed business, and 0 otherwise
<i>Income_{i,t}</i>	The natural logarithm of the total annual wage and salary income of household “i”
<i>Debt_{i,t}</i>	The natural logarithm of the total value of debt held by household “i”

Hascheck is a binary variable that takes on a value of 1 if the head of household “i” has a checking account and 0 otherwise. Most investment brokers and financial agents require their customers to have checking accounts for ease of transactions. In addition, it is reasonable to assume that people who have checking accounts are more informed about finances and securities markets than people who do not have checking accounts. Consequently, we expect these individuals to participate in the stock market more than people without checking accounts. We expect a positive coefficient on *Hascheck*. *Bonds* is a binary variable that takes on a value of 1 if household “i” owns bonds and 0 otherwise. Since bonds and stocks are both financial instruments, it is reasonable to assume that households that invest in bonds are more likely to also invest in stocks. We expect a positive coefficient on *Bonds*.

Home is the natural logarithm of the total value of equity in the primary residence of household “i.” Homeownership is a major financial investment and requires substantial financial planning. It is reasonable to assume that households that own homes are financially more savvy. Furthermore, the amount of home equity that a household has could have a relationship with stock ownership. We expect a positive coefficient on *Home*. *Hasbus* is a binary variable that takes on a value of 1 if household “i” owns an actively managed business and 0 otherwise. Investing in or owning a business is inherently risky. It is reasonable to assume that people who own a business are less opposed to risk than people who do not own a business. Since both ownership of a business and investing in stocks are riskier endeavors, we expect a positive coefficient on *Hasbus*.

Income is the natural logarithm of the total annual wage and salary income of household “i.” The SCF provides salary information (in dollars) for the calendar year preceding each survey. It is reasonable to assume that people who have more income have more discretionary money to save or invest. Therefore, we expect a positive coefficient on *Income*. Finally, *Debt* is the natural logarithm of the total value of debt held by household “i.” If a household has acquired substantial debt, then it may be more financially constrained and unable to save or invest in securities. On the other hand, there is likely a correlation between levels of debt and income, where wealthier households obtain more debt. We are, therefore, uncertain of the sign of the coefficient *Debt* in our study.

Table 2 provides descriptive statistics the sample for both the dependent and independent variables used in this study from 2001-2013. An analysis of Table 2 reveals to us some interesting information. *Stocks* has an average of 0.276, suggesting that on average, 27.6% of U.S. households invest directly in stocks. *Age* has an average of 51.058 indicating that the respondents in the sample, on average, are relatively older ones. The 25th – 75th percentile of *Age* ranges from 39 to 62 years. *Sex* has an average of 0.778, indicating that 77.8% of the sample observations are male.

Table 2. Descriptive statistics of the full sample

Variable	Number of Observations	Mean	Median	25 th Percentile	75 th Percentile
<i>Stocks_{i,t}</i>	25,875	0.276	0	0	1
<i>Stocks_Amt_{i,t}</i>	25,875	3.270	0	0	7.873
<i>Equity_Exposure_{i,t}</i>	25,875	7.002	8.906	0	12.267
<i>Age_{i,t}</i>	25,875	51.058	51	39	62
<i>Sex_{i,t}</i>	25,875	0.778	1	0	1
<i>Educ_{i,t}</i>	25,875	13.910	14	12	16
<i>Married_{i,t}</i>	25,875	0.649	1	0	1
<i>Kids_{i,t}</i>	25,875	0.858	0	0	2
<i>Working_{i,t}</i>	25,875	0.777	1	1	1
<i>Savings_{i,t}</i>	25,875	0.475	0	0	1
<i>Hascheck_{i,t}</i>	25,875	0.843	1	1	1
<i>Bonds_{i,t}</i>	25,875	0.068	0	0	0
<i>Home_{i,t}</i>	25,875	8.166	11.125	0	12.629
<i>Hasbus_{i,t}</i>	25,875	0.279	0	0	1
<i>Income_{i,t}</i>	25,875	11.361	11.133	10.363	12.057
<i>Debt_{i,t}</i>	25,875	8.090	10.273	0	12.067

An average of 13.910 for *Educ* suggests that the heads of household included in the sample, on average, have an education level beyond high school. The 25th-75th percentile ranges from 12-16 years of education. Around 65% of the heads of household are married. *Kids* has an average of 0.858 indicating that the majority of the sample observations may have one child on average. 77.7% of the heads of household or their spouses work outside the home for pay. 47.5% of the observations indicate that they have some level of savings. Similarly, 84.3% of the U.S. households surveyed indicated that they have a checking account. This suggests that roughly 16% of households do not own a checking account.

Bonds has an average of 0.068, indicating that only 6.8% of the U.S. households surveyed invest in bonds. In other words, 93.2% of the households in the sample do not own any bond securities. 66.3% of the U.S. households in the sample indicate that they own a home while 27.9% of households own a business.

Table 3 presents descriptive statistics for the sample observations conditional on whether households own stocks. Roughly 27.6% (or 7,148 U.S. households) indicate that they directly own stocks while 72.4% (or 18,727 U.S. households) do not directly own stocks. We observe some interesting phenomena from Table 3.

Table 3. Descriptive statistics conditional on whether U.S. households own stocks

Variable	<i>Stocks_{i,t} = 1</i>		<i>Stocks_{i,t} = 0</i>	
	(Number of Observations = 7,148)		(Number of Observations = 18,727)	
	Mean	Median	Mean	Median
<i>Stocks_Amt_{i,t}</i>	11.838	11.785	0	0
<i>Equity_Exposure_{i,t}</i>	13.094	13.218	4.676	0
<i>Age_{i,t}</i>	55.641	56	49.308	48
<i>Sex_{i,t}</i>	0.908	1	0.728	1
<i>Educ_{i,t}</i>	15.504	16	13.301	13
<i>Married_{i,t}</i>	0.808	1	0.588	1
<i>Kids_{i,t}</i>	0.801	0	0.879	0
<i>Working_{i,t}</i>	0.803	1	0.768	1
<i>Savings_{i,t}</i>	0.480	0	0.473	0
<i>Hascheck_{i,t}</i>	0.862	1	0.836	1
<i>Bonds_{i,t}</i>	0.207	0	0.015	0
<i>Home_{i,t}</i>	11.738	12.904	6.802	10.857
<i>Hasbus_{i,t}</i>	0.518	1	0.187	0
<i>Income_{i,t}</i>	12.680	12.411	10.857	10.814
<i>Debt_{i,t}</i>	8.593	11.550	7.898	9.903

Households that own stocks are older, male, more highly educated, married and own homes or businesses. The average age of the heads of household that own stocks is 55.641 years compared to 49.308 years for those that do not own stocks. Of those that own stocks, 90.8% have a male as the head of the household. Households that own stocks have, on average, higher levels of education compared to households that do not own stocks and the proportion of married households is higher for those households that own stocks than those that do not own stocks. Interestingly, Table 3 indicates that the average household that does *not* own stocks has more children living at home, giving us insight that there may be a negative relationship between number of children and stock ownership. In addition, 20.7% of U.S households that own stocks also own bonds. However, only 1.5% of U.S. households that do not own stocks own bonds. Households that own stocks are also more likely to own a home or business, have higher incomes and levels of debt. The above descriptive statistics tell us that the demographic characteristics of U.S. households that own stocks are, in many ways, fundamentally different from the demographic characteristics of the households that do not own stocks.

4. Empirical Models and Results

4.1 Empirical Models

The main dependent variable in this study is *Stocks*, a binary variable that takes on a value of 1 if U.S. household “i” owns stock and 0 otherwise. We utilize Probit model estimation for the main analysis (Note 3). To corroborate our evidence in our primary model, we also estimate simple regression models utilizing the continuous dependent variable, *Stocks_Amt*, the natural logarithm of the total value of directly held stocks owned by the household, and *Equity_Exposure*, the natural logarithm of the total value of financial assets held by the house that are invested in stocks. *Stocks_Amt* measures the amount of direct stock ownership while *Equity_Exposure* measures the amount of indirect stock ownership through mutual funds, retirement accounts or other avenues.

Model A is the Probit model used in this study where *Stocks* is the dependent variable:

$$Stocks_{i,t} = \beta_0 + \beta_1 Age_{i,t} + \beta_2 Sex_{i,t} + \beta_3 Educ_{i,t} + \beta_4 Married_{i,t} + \beta_5 Kids_{i,t} + \beta_6 Working_{i,t} + \beta_7 Savings_{i,t} + \beta_8 Hascheck_{i,t} + \beta_9 Bonds_{i,t} + \beta_{10} Home_{i,t} + \beta_{11} Hasbus_{i,t} + \beta_{12} Income_{i,t} + \beta_{13} Debt_{i,t} + \varepsilon_{Ai,t}$$

Model B is the regression model used in this study where *Stocks_Amt* is the dependent variable:

$$Stocks_Amt_{i,t} = \beta_0 + \beta_1 Age_{i,t} + \beta_2 Sex_{i,t} + \beta_3 Educ_{i,t} + \beta_4 Married_{i,t} + \beta_5 Kids_{i,t} + \beta_6 Working_{i,t} + \beta_7 Savings_{i,t} + \beta_8 Hascheck_{i,t} + \beta_9 Bonds_{i,t} + \beta_{10} Home_{i,t} + \beta_{11} Hasbus_{i,t} + \beta_{12} Income_{i,t} + \beta_{13} Debt_{i,t} + \varepsilon_{Bi,t}$$

Model C is the regression model used in this study where *Equity_Exposure* is the dependent variable:

$$Equity_Exposure_{i,t} = \beta_0 + \beta_1 Age_{i,t} + \beta_2 Sex_{i,t} + \beta_3 Educ_{i,t} + \beta_4 Married_{i,t} + \beta_5 Kids_{i,t} + \beta_6 Working_{i,t} + \beta_7 Savings_{i,t} + \beta_8 Hascheck_{i,t} + \beta_9 Bonds_{i,t} + \beta_{10} Home_{i,t} + \beta_{11} Hasbus_{i,t} + \beta_{12} Income_{i,t} + \beta_{13} Debt_{i,t} + \varepsilon_{Ci,t}$$

Because the above models include surveys from 2001 through 2013, we also estimate them separately for each

survey year to understand the association between demographic variables and stock ownership behavior over time.

4.2 Empirical Results

The results of the above empirical models are found in Tables 4-7. All results are robust to heteroskedasticity. Table 4 is the results of the estimations of *Models A, B and C* for all surveys combined from 2001-2013. For all three models, many of the demographic variables tested are significant factors in determining not only the occurrence of but also the amount of equity ownership of U.S. households. Not surprisingly, age, gender, level of education, employment status, savings and income are positive and highly significant. Other positive factors that explain stock ownership that are not as intuitive are the amount of home equity, business ownership status and bond ownership status. The number of children living in the household has a significantly negative effect on both the occurrence and amount of stock ownership. This may be due to the fact that having more children is more costly and could cause household priorities to shift away from investing. Finally, there is no relationship between marital status, owning a checking account or the level of household debt and stock ownership.

Table 4. Combined results of the estimations of *Models A, B and C* from 2001-2013

<i>Variables</i>	<i>Predicted signs</i>	<i>Model A</i>	<i>Model B</i>	<i>Model C</i>
		<i>Stocks_{i,t}</i>	<i>Stocks_Amt_{i,t}</i>	<i>Equity_Exposure_{i,t}</i>
<i>Intercept</i>		-4.8723***	-10.5410***	-16.2882***
<i>Age_{i,t}</i>	+	0.0028***	0.0134***	0.0297***
<i>Sex_{i,t}</i>	+	0.3013***	0.4870***	0.4990***
<i>Educ_{i,t}</i>	+	0.1349***	0.3303***	0.5866***
<i>Married_{i,t}</i>	+	-0.0131	0.0236	0.0751
<i>Kids_{i,t}</i>	-	-0.0521***	-0.0791***	-0.1686***
<i>Working_{i,t}</i>	+	0.0600**	0.3230***	0.7888***
<i>Savings_{i,t}</i>	+	0.0766***	0.2570***	0.5914***
<i>Hascheck_{i,t}</i>	+	0.0262	0.7278	0.1039
<i>Bonds_{i,t}</i>	+	0.9113***	5.1021***	2.1882***
<i>Home_{i,t}</i>	+	0.0489***	0.1309***	0.2395***
<i>Hasbus_{i,t}</i>	+	0.2311***	1.3282***	0.8728***
<i>Income_{i,t}</i>	+	0.1234***	0.6863***	0.8599***
<i>Debt_{i,t}</i>	unknown	-0.0017	-0.0480***	-0.0090
P-value of Pseudo-general F Test:		0.000		
Adjusted R ² :			0.3924	0.5272

Note. *** Significant at 1%; ** Significant at 5%; * Significant at 10%.

Table 5. Results of the estimations of *Model A* by survey year from 2001-2013 where dependent variable is *Stocks_{i,t}*

<i>Variables</i>	<i>Predicted Sign</i>	<i>Estimates</i>				
		<i>2013</i>	<i>2010</i>	<i>2007</i>	<i>2004</i>	<i>2001</i>
<i>Intercept</i>		-5.388***	-4.8855***	-4.977***	-5.2815***	-5.0313***
<i>Age_{i,t}</i>	+	0.0065***	0.0040**	0.0059***	0.0038*	-0.0022
<i>Sex_{i,t}</i>	+	0.3461***	0.3359***	0.2969***	0.2363***	0.2978***
<i>Educ_{i,t}</i>	+	0.1421***	0.1518***	0.1542***	0.1252***	0.1123***
<i>Married_{i,t}</i>	+	-0.0327	0.0035	-0.0284	-0.0451	-0.0223
<i>Kids_{i,t}</i>	-	-0.0461**	-0.0407**	-0.0373*	-0.0486**	-0.0684***
<i>Working_{i,t}</i>	+	0.0691	0.0867	0.0786	0.0497	0.1986***
<i>Savings_{i,t}</i>	+	0.0809*	0.0707*	0.0106	0.1925***	0.0756
<i>Hascheck_{i,t}</i>	+	0.0172	-0.0131	0.0134	0.1388**	0.1250**
<i>Bonds_{i,t}</i>	+	1.0872***	0.9329***	0.7561***	0.8338***	0.7987***
<i>Home_{i,t}</i>	+	0.0447***	0.0514***	0.0402***	0.0424***	0.0456***
<i>Hasbus_{i,t}</i>	+	0.2398***	0.2973***	0.2453***	0.0852	0.1497***
<i>Income_{i,t}</i>	+	0.1169***	0.0776***	0.1092***	0.1741***	0.2289***
<i>Debt_{i,t}</i>	unknown	-0.0017	-0.0038	-0.0058	-0.0028	-0.0039

Note. *** Significant at 1%; ** Significant at 5%; * Significant at 10%.

Tables 5-7 show the results of the estimations of *Models A, B and C* for each (Note 4) of the five surveys

separately from 2001-2013 in order to better understand how stock ownership may change over time. Table 5 contains the results of *Model A* by survey year, utilizing the dependent variable *Stocks*, which is a binary variable that takes on a value of 1 for households that own individual stocks and 0 otherwise. An examination of the results of *Model A* by year gives us some interesting observations. First, these results support the above findings that gender, level of education and income are positive and highly significant factors. However, age was not a significant factor in 2001 and became highly significant from 2007-2013. Other positive factors that explain stock ownership are the amount of home equity, business ownership status and bond ownership status. The number of children living in the household also has a significantly negative, but slightly weaker, effect on the occurrence of stock ownership. Second, some interesting differences are that household savings is either a weak or an insignificant factor, depending on the survey year, and employment status was only a significant factor in 2001 and insignificant in other years. In addition, owning a checking account was only a significant factor in earlier years (i.e., 2001-2004) and became insignificant in later years. This may be due to the ubiquity of online checking accounts since the Information Age. Finally, an examination of Table 5 indicates that there is no relationship between marital status or the level of household debt and stock ownership.

Table 6. Results of the estimations of *Model B* by survey year from 2001-2013 where dependent variable is *Stocks_Amt_{i,t}*

Parameter	Predicted Sign	Estimates				
		2013	2010	2007	2004	2001
Intercept		-10.6765***	-7.9766***	-12.1648***	-12.1095***	-13.3885***
Age _{i,t}	+	0.0165***	0.0118***	0.0300***	0.0125**	0.0061
Sex _{i,t}	+	0.5135***	0.3920**	0.6120**	0.4451*	0.5560**
Educ _{i,t}	+	0.2774***	0.3366***	0.3797***	0.3271***	0.3290***
Married _{i,t}	+	-0.1695	0.1539	0.0400	-0.0661	-0.0582
Kids _{i,t}	-	-0.0644	-0.0226	-0.0242	-0.1220*	-0.1239*
Working _{i,t}	+	0.1026	0.2143	0.3460*	0.4422**	0.9905***
Savings _{i,t}	+	0.2303**	0.2590	0.4146***	0.0734	0.3236**
Hascheck _{i,t}	+	0.5580	0.6044	0.6547***	0.4593**	1.0028***
Bonds _{i,t}	+	5.8500***	5.4945***	4.4745***	4.8599***	4.0584***
Home _{i,t}	+	0.1086***	0.1402***	0.0947***	0.1271***	0.1255***
Hasbus _{i,t}	+	1.3261***	1.5569***	1.3817***	0.7665***	0.9519***
Income _{i,t}	+	0.6955***	0.3866***	0.7248***	0.8614***	1.1104***
Debt _{i,t}	unknown	-0.0465***	-0.0342***	-0.0610***	-0.0548***	-0.0480***
Adjusted R ² :		0.3631	0.3475	0.3937	0.4183	0.4380

Note. *** Significant at 1%; ** Significant at 5%; * Significant at 10%.

Table 6 contains the results of *Model B* by survey year, utilizing the dependent variable *Stocks_Amt*, which measures the amount of direct stock ownership of U.S. households. An examination of the results of *Model B* by year gives us some additional insight. First, these results support the above findings that gender, level of education and income are positive and highly significant factors. Other positive factors that explain stock ownership are the amount of home equity, business ownership status and bond ownership status. Similarly to *Model A*, age was not a significant factor in 2001 and became highly significant in the later years of our sample period. In addition, employment status and owning a checking account was only a significant factor in the earlier years and insignificant for later years. Second, a major difference between the results from *Model A* is that the number of children living in the household virtually is an insignificant factor for explaining the amount of direct stock ownership (as opposed to the occurrence of direct stock ownership tested in *Model A*). In the combined results of the estimations of *Models A, B and C* from 2001-2013 shown in Table 4, the number of children living in the household is negative and highly significant. Another distinct difference between the results from *Model A* is that the level of household debt is a significantly negative factor for explaining the amount of direct stock ownership, as opposed to being insignificant in *Model A*. Finally, an examination of Table 6 confirms that there is no relationship between marital status and the amount of direct stock ownership, while having savings is inconclusive.

Table 7. Results of the estimations of *Model C* by survey year from 2001-2013 where dependent variable is *Equity_Exposure_{i,t}*

Parameter	Predicted Sign	Estimates				
		2013	2010	2007	2004	2001
Intercept		-18.1775***	-15.3487***	-17.2635***	-16.2264***	-15.9076***
Age _{i,t}	+	0.0330***	0.0393***	0.0444***	0.0179***	0.0090
Sex _{i,t}	+	0.2100	0.6560***	0.5633**	0.4372**	0.7751***
Educ _{i,t}	+	0.5947***	0.6138***	0.6001***	0.5437***	0.5474***
Married _{i,t}	+	0.7773***	0.5554***	0.5013**	0.5821***	0.1265
Kids _{i,t}	-	-0.1989***	-0.1319***	-0.1295**	-0.2512***	-0.1098*
Working _{i,t}	+	1.2181***	1.0501***	0.8029***	0.3578*	0.1189
Savings _{i,t}	+	0.5624***	0.5815***	0.5820***	0.8363***	0.4317***
Hascheck _{i,t}	+	0.2389	0.0149	-0.0868	0.3985**	0.0972***
Bonds _{i,t}	+	2.7178***	2.5490***	1.6670***	1.6856***	2.0168***
Home _{i,t}	+	0.2138***	0.2488***	0.2270***	0.2469***	0.2321***
Hasbus _{i,t}	+	0.6624***	1.1144***	0.7944***	0.5893***	0.7527***
Income _{i,t}	+	0.9698***	0.6091***	0.9041***	1.0184***	1.0614***
Debt _{i,t}	unknown	0.0042	-0.0459***	-0.0137	-0.0163	0.0067
Adjusted R ² :		0.5242	0.4938	0.5503	0.5464	0.5327

Note. *** Significant at 1%; ** Significant at 5%; * Significant at 10%.

Finally, Table 7 contains the results of *Model C* by survey year, utilizing the dependent variable *Equity_Exposure*, which measures the amount of indirect stock ownership of U.S. households through mutual funds, retirement accounts or other avenues. First, the results of *Model C* confirm much of our previous findings, namely that gender, level of education and income are positive and highly significant factors. Other positive factors that explain the amount of indirect stock ownership are the amount of home equity, business ownership status and bond ownership status. Interestingly, age is once again a positive and highly significant factor. Second, a distinct difference found in Table 7 from our previous results is that marital status is a positive and highly significant factor for explaining indirect stock ownership. This could be because married households may have more than one spouse contributing to a workplace retirement account, which typically invest in mutual funds with some level of equity exposure. In addition, the number of children living in the household once again becomes a significantly negative factor for explaining indirect stock ownership, supporting the overall findings and the results of *Model A*. Finally, an examination of Table 7 tells us that there is no relationship between the level of household debt and indirect stock ownership.

5. Conclusion

This paper examines the factors associated with the stock investment behavior of U.S. households. We primarily address the question of what factors determine whether U.S. households directly invest in individual stocks; however, additional analyses are conducted to see if results change when evaluating the amount of direct stock ownership as well as indirect stock ownership through mutual funds, tax-deferred retirement accounts or other avenues. Thirteen different demographic factors are analyzed from 2001-2013. Overall, our findings conclude that age, gender, level of education, and income are positive and highly significant factors for explaining all levels of equity investment. Other positive factors are the amount of home equity, business ownership status and bond ownership status. Marital status is an insignificant factor overall, but a positive and highly significant factor for explaining indirect stock ownership. Finally, the number of children living in the household is generally a negative factor. These results are largely consistent with our expectations. For example, one would expect U.S. households to be more likely to own stocks with more education and income. It is also reasonable to expect that U.S. households are more likely to own stocks as they grow older.

These results should be of interest to financial scholars, economists, corporate managers and policy makers as increased stock market participation has substantial benefits. A better understanding of the factors that contribute to stock market participation may also help investment banks and financial intermediaries. Our results suggest that demographic factors, such as gender and education, strongly affect stock investment behavior.

If policy makers and regulators want to increase the participation level of U.S. households in the stock market, they may consider introducing programs that educate households that are unlikely to invest in stocks on the benefits of stock ownership. Based on our results, these households include households led by females and those

led by younger, less-educated individuals. Policy makers may choose to implement governmental programs, such as tax deductions for stock investment, targeting these households. Such actions may attract more U.S. households to actively participate in the stock market.

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Notes

Note 1. The full dataset can be obtained at <http://www.federalreserve.gov/econresdata/scf/scfindex.htm>.

Note 2. For ease of writing, we exclude the subscripts *i* and *t* from all of the variable descriptions.

Note 3. Although we can observe this binary response on *Stocks*, it provides limited information about the underlying level of utility that causes households to invest in stocks. To fully understand the factors associated with stock market participation, we must investigate the relationships between these factors and the levels of utility that U.S. households receive from investing in stock. We chose to use the Probit model instead of a simple linear regression model such as ordinary least squares (Note 1) to estimate these factors due to the following limitations. First, the variance of the error term will be non-constant since it is based on *Stocks*, a binary variable. This non-constant variance of the error term may lead to heteroskedasticity in the model and produce inefficient estimates if a simple linear regression model is used. Second, the distribution of the error term will not be normally distributed which violates a major assumption of simple linear regression models. Third, any calculated marginal effects of the independent variables of the final model on *Stocks* may not be correctly predicted by a simple linear regression model if the relationships between the dependent and independent variables are non-linear. Finally, if we use a simple linear regression model, any predicted probabilities generated by the final model may lie outside the range of 0-100%, rendering the model useless. This is known as the unboundedness problem of linear probability models.

To overcome these limitations, we may assume that there exists a continuous, but unobservable, variable *Stocks** that indicates the level of utility obtained from investing in stock. Let us also assume that *Stocks** is greater than zero when *Stocks* = 1 and *Stocks** is less than or equal to zero when *Stocks* = 0. *Stocks** is a continuous variable that takes on any value between $-\infty$ to $+\infty$. Since the variable *Stocks** is continuous, the error term is also continuous. Furthermore, the variance of the error term does not depend on the values of *Stocks*. Thus, the use of *Stocks** removes heteroskedasticity in the model. Assuming that the model is correctly specified, the estimates will be efficient.

Note 4. The Survey of Consumer Finances (SCF) is a triennial survey; therefore, Tables 5-7 display results separately for 2001, 2004, 2007, 2010 and 2013.

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