

# Portfolio Inertia and Stock Market Fluctuations<sup>#</sup>

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## *Abstract*

Relatively few studies have focused on household stock trading behavior, as opposed to current participation. Existing studies based on administrative brokerage data find excessive trading to the detriment of stockholders, while those based on retirement accounts find extreme inactivity. This paper uses data representative of the population to document the extent of household portfolio inertia in the face of the spread of equity culture and of considerable stock market index movements, and to link it to household characteristics. We document considerable portfolio inertia, both as regards changing participation status in the stock market and as regards trading stocks, and we find that the tendency to exhibit such inertia is linked to household characteristics. The stock market index influences considerably the tendency to trade directly held stocks through brokerage accounts. Although our findings suggest some dependence of overall participation and trading inertia on the performance of the stock market index, they do not indicate that the recent expansion in the stockholder base and the experience of the stock market downswing have significantly altered the overall propensity of households to trade in stocks or to switch participation status in a way that could contribute to stock market instability.

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## 1. Introduction

The spread of equity culture, namely the increase in the percentage of households participating in stockholding over the past twenty years, has now been extensively documented both for the US and for major European countries.<sup>1</sup> Much less well understood are the stock trading behavior of households, the frequency with which they tend to move in and out of the stock market, and whether these have changed over time. Yet these issues are quite important for validating portfolio models and for conducting policy analysis.

Recent portfolio models with background income risk imply that households should adjust their portfolio shares of risky assets taking into account any transactions costs, as they age or when they experience changes in financial resources, or when other changes take place, such as a revision in transactions costs or in their perceived equity premium. Whether households do adjust conditional portfolio shares in response to aging or to certain changes in wealth was recently studied by Ameriks and Zeldes (2004) and by Brunnermeier and Nagel (2005), respectively. Obviously, underlying portfolio share adjustments is the tendency of different households to trade in the stock market.

Links between household characteristics and the frequency of trading or of stock market entry and exit provide channels through which changes in the composition of the stockholder pool could impact both the distribution of wealth and stock market volatility. It has been shown that increased stock market participation and changes in the composition of the stockholder pool influence the distribution of wealth (Guisar, 2002; Biliias et al., 2005).<sup>2</sup> Differential frequency of stock market trading across demographic groups is relevant, because it influences both the degree of adjustment to optimal stockholding levels and the returns realized by households.

Indeed, Barber and Odean (2000) have shown that net portfolio returns actually earned by households can be significantly reduced by overtrading when transactions costs are taken into account. Differential trading frequency can also influence stock market volatility, if new and inexperienced investors are more likely to switch participation status or to trade in response to market movements, as conjectured by Guiso et al. (2003).

Furthermore, the importance of the tendency to trade has long been appreciated in the literature on capital gains taxes payable only at realization, i.e. upon selling the gains.<sup>3</sup> Establishing a link between household characteristics and tendency to trade can contribute to understanding distributional and revenue effects of capital gains taxation.

Although existing literature on stock trading by households is not extensive (see section 2 below), it points to substantial heterogeneity in the frequency with which households trade stocks. There is stark contrast between administrative data from discount brokers, which implies overtrading on the part of households to their detriment, and administrative data from retirement plans, which implies considerable inactivity over long periods of time. This contrast suggests considerable heterogeneity in trading activity among the population, whose determinants are worthy of investigation using data that encompasses all segments of the population.

This paper employs survey data sets representative of the US population to document the extent of portfolio inertia and to link it to household demographics and to stock market performance, over a long period that has witnessed both the spread of equity culture and considerable stock market index movements. Two types of portfolio inertia are studied, namely inertia regarding changing participation status in the stock market, and inertia with respect to stock trading. The analysis encompasses

various types of stockholding, as available in the data (direct, through mutual funds, and through retirement accounts).

Specifically, we study panel data from the Panel Study of Income Dynamics (PSID), using mainly the waves between 1994 and 2003 but sometimes going as far back as 1984, to study the tendency of households not to change stockholding participation status and their tendency not to trade at all. For the minority of households that do trade, we are able to differentiate between directions of trades (buy only, sell only, buy and sell). We also look at a series of cross sections from the US Survey of Consumer Finances (SCF) between 1989 and 2001, which include data on frequency of trading through brokerage accounts, and on the richest 2 percent of US households that are eliminated from PSID due to top coding.<sup>4</sup>

Section 2 of the paper surveys recent literature on stock trading by households. Section 3 discusses the theoretical background to the issue of portfolio inertia in stockholding. Section 4 describes the data. Section 5 presents results from the PSID regarding participation inertia combining all types of stockholding. Section 6 discusses inertia in trading and trading practices regarding directly held stock and mutual funds. Section 7 reports findings on trading directly held stocks through brokerage accounts, based on the SCF. Section 8 offers concluding remarks.

## **2. Existing Literature**

Most of the existing literature on stock trading by households has focused on administrative data sets, with only a few studies using surveys representative of the US population. Even within studies using administrative data, there is a stark contrast between studies that document excessive trading and others that document considerable inactivity on the part of households.

Barber and Odean (2000) study households with accounts at a large US discount broker, who provides trading services for common stocks without financial advice, during the period 1991 to 1996. They show that such households tend to engage in excessive stock trading, arguably because of overconfidence, and that this results in net stock portfolio returns substantially below the market, mainly because it causes them to pay enormous transactions costs. The average household in their sample turns over 75 percent of its portfolio annually. They aptly summarize their findings as showing that ‘trading is hazardous to your wealth’. Barber and Odean (2004) document that men trade 45 percent more than women and earn annual risk-adjusted net returns that are 1.4 percent less than those earned by women.<sup>5</sup> Ivković, Poterba and Weisbenner (2004) use the same data set and distinguish between trading on taxable and tax-deferred accounts. They find differences in trading patterns that are consistent with expected effects of capital gains taxation.

While researchers using discount broker accounts and general stock market registers wonder why there is so much trading, those who focus on individual retirement accounts wonder about the degree of portfolio inactivity. The literature on retirement accounts based on various administrative data sets points to a pronounced tendency of most participants to be passive and do nothing, or what Samuelson and Zeckhauser (1988) called ‘status quo bias in decision making’. Ameriks and Zeldes (2004) use panel quarterly data on (tax-deferred) retirement account balances and contributions held by TIAA-CREF, with participants drawn mainly from faculty and other full-time employees at US institutions of higher education and research. Although their main focus is on estimating age effects on portfolio composition, they also report evidence on trading inertia. They find that over a ten-year period (1987-1996), close to 50 percent of their sample made no changes to the share of stocks in

either their retirement accumulation or in their flow contributions, despite the negligible cost of making such changes.<sup>6</sup>

Agnew, Balduzzi, and Sunden (2004) follow a panel of nearly seven thousand 401(k) retirement accounts from April 1994 to August 1998 and find very limited portfolio reshuffling, in sharp contrast to existing evidence from discount brokerage accounts. Over 87% observations of annual number of trades in their panel are zero, and only 7% of the observations exceed one.

Huberman and Sengmueller (2004) study the dynamics of investment in company stock within 401(k) plans, by employees working in that company. Using aggregate (plan-level) data, constructed from SEC filings, on a panel of 153 plans over at most eight years (1991-98), they study the determinants of transfers in and out of the company stock as a fraction of all assets in the plan, and the fraction of new savings invested in company stock. They find that good past returns attract more investments, but bad past returns do not cause reduction in plan holdings of company stock.<sup>7</sup> As their data are aggregate and contain no information on participant characteristics, they do not study the role of variation in individual attributes. They do stress, however, that participants in defined contribution plans make very few active changes to their portfolios, and that the effects they find are due to the action of the minority of alert participants.

Administrative data sets have certain advantages and disadvantages relative to survey data. On the positive side, administrative data sets tend to be less subject to measurement error and reporting biases than survey data. They track closely the same accounts over extended periods of time, providing exact information on the frequency of trading and on the size of trades. They also make it possible to estimate account-

specific rates of portfolio returns and to analyze performance of individual investors relative to the market, and trades in response to past own performance.

On the negative side, they tend to involve selected samples, as the authors recognize. For example, those with a discount broker account are most likely to be households that want to trade in the stock market and feel confident that they can do so without advice from the brokerage firm (hence their use of discount rather than retail brokers); TIAA-CREF participants are drawn from a specific sector and tend to be more highly educated than the general population, and so on. Secondly, since only accounts are tracked, these data sets are good for analyzing trading behavior but less appropriate for analyzing entry and exit into the stock market. Third, they give a partial view of stockholding behavior, as they only focus on one aspect of stockholding, be it direct holding of common stocks or holding of retirement accounts, with specific liquidity characteristics and costs of rebalancing. For example, infrequent trading on retirement accounts may simply be the result of unwillingness of households to alter their retirement planning, while they would be willing to reshuffle the rest of their portfolio; or it may be a sign of extreme portfolio inertia, given that reallocations of stocks or flow contributions are nearly costless. Finally, administrative data sets typically contain small amounts of information regarding household demographics and other aspects of household portfolios, and they do not allow study of the influence of such household characteristics on portfolio inertia.

To our knowledge, there is little previous work on active trading of stocks using survey data representative of the population, and it has a different focus. In an early paper, Souleles (1999) studies determinants of the size of securities purchases, combining data from the CEX and from the Michigan consumer sentiment surveys. He finds that household-specific hedging motives have independent predictive power

for the size of securities purchases above and beyond the information in returns, with marginal effects estimated to be bigger than those of returns. Given the short panel dimension of the CEX, where each household is surveyed four times but only for one year in total, and the use of two complementary data sources for the same regressions, Souleles had to rely on extensive imputations for some of the key explanatory variables in his regressions.

Guskova, Juster, and Stafford (2004) use PSID data from 1994 and 1999 and compare the relevance of wealth and income for stock market participation in the two years, in order to provide a test of simple cost-based explanations for participation. They find an increased role for income and wealth variables in 1999, and evidence that lower mortgage payments contributed to purchasing stocks during that period.

In a very recent paper, Brunnermeier and Nagel (2005) study the issue of whether wealth fluctuations induce changes in risk aversion, by looking at portfolio shares conditional on participation, and using survey data from PSID and CEX. They find that wealth shocks do not induce households to increase their portfolio share in risky assets, conditional on participation in risky assets, but capital gains and losses do have an impact, with capital gains continuing to affect portfolio shares even after five years. In addition to delivering the authors' main point against time-varying risk aversion, both findings are consistent with inertia in trading stocks, conditional on participation, and they nicely complement our findings on participation and trading inertia across the population of stockholders and non-stockholders.

### **3. Theoretical Background**

There is no general theory of why investors trade stocks. Theoretical implications range from no trading at all<sup>8</sup> (Milgrom and Stokey, 1982) to trading up to the point of



equating the marginal benefit of trading to the marginal cost of doing so (Grossman and Stiglitz, 1980), to models of overconfidence where investors trade to their detriment (e.g., Odean, 1998). In this section, we discuss theoretical insights to the analysis of portfolio inertia in participation and in trading derived mostly by reference to the body of recent literature on household portfolio choice in the face of background, non-asset income risk.<sup>9</sup>

Fixed entry costs are probably the dominant explanation of limited participation in the stock market in existing literature, and thus a key component of understanding what limits entry into the stock market.<sup>10</sup> Factors that reduce the amount of stockholding that the household would undertake if it gained access to the stock market also serve to reduce the probability that it would decide to pay any given fixed cost to switch participation status from non-stockholder to stockholder. Similarly, factors that raise the size of fixed entry costs faced by a household for given demand for stocks, work in the same direction.

Theory leads us to expect positive roles of wealth and of non-asset income on the probability of entry, mainly because of the positive effect of cash on hand on stock demand. The role of educational attainment is more involved. Higher educational attainment tends to be associated empirically with steeper age-earnings profiles and with lower variances of shocks to labor income.<sup>11</sup> This alone would make more educated households less likely to save (to provide for the future and for shocks to income), but this factor can be offset by lower costs faced by the more educated in gathering and processing information relative to stockholding. Empirical participation studies usually find that higher education contributes to stockholding participation.

Poor health increases the costs of processing information, may be associated with committed expenditures on health care, and may raise the perceived risk of future

health expenditures. While higher precautionary wealth demand could boost stock demand, it seems likely that higher participation costs and committed expenditures would discourage entry in the stock market.

Retirement implies dependence on accumulated assets rather than on human wealth for financing consumption, more limited opportunities for time diversification of bad shocks, and more limited possibilities for alleviating such shocks through borrowing and varying labor supply. All these factors would make likely a negative effect on the likelihood of entering the stock market. Finally, empirical participation studies so far imply that belonging to a minority reduces the probability of participation. This is usually interpreted as reflecting more limited targeting of minorities by the financial sector. This would in turn suggest that minorities are less likely to switch into stockholding, controlling for other factors.

Exits from the stock market (i.e. switches from participation to non-participation status) are more involved, yet present in the data, as we shall see below.<sup>12</sup> Models with borrowing constraints in the form of no-short-sales restrictions on stocks and on the riskless asset imply that a drop in current cash on hand (relative to the permanent component of non-asset income) can push a household into the region of binding borrowing constraints where the desire to borrow is so pronounced that no stockholding takes place.

Exit from stockholding could be generated by the presence of recurring participation costs. Factors that generate low demand for stocks (e.g., low resources, aging, retirement) can prompt households to exit when their desired exposure to stocks is not big enough to justify paying the recurring cost of participation. Such tendency to exit would be tempered by having to face re-entry costs that are high

relative to continuing participation costs, as well as by any trading fees (such as commissions and bid-ask spreads).

Exits should also depend on accumulated capital gains or losses of the household in tax systems where gains are taxed at realization, or when behavioral finance considerations such as the ‘disposition effect’ of Shefrin and Statman (1985) are important. Capital gains taxation tends to contribute to a lock-in effect, i.e. a reduced tendency of investors to sell appreciated stock, so as to avoid paying the associated capital gains tax, and an increased tendency to sell depreciated stock. The disposition effect works in the opposite direction. It is associated with investor unwillingness to admit failure and to dispose of assets that have declined in value; and with investor willingness to sell appreciated assets, lest capital gains turn into capital losses.

Let us now turn to the probability of trading. For households that do not currently hold stocks, a decision to actively enter the stock market should imply a decision to purchase (trade) stocks. So, the factors that we have identified as playing a role in entry should apply also to inducing purchases by current non-stockholders. For current stockholders, a decision to buy stocks should result from factors that raise the demand for stocks relative to current holdings, such as an increase in cash on hand, an improvement in the perceived equity premium, a reduction in perceived stock market volatility, improved consumer confidence and expectations regarding future incomes, or an improved health condition. Good performance of the market could also induce purchases, if it leads to expectations of better future performance, rationally or irrationally. ‘Return chasing’ behavior would fall under this category.

To a first approximation, decisions to sell stocks should arise symmetrically. Departures from this symmetry could be induced by tax considerations, such as capital gains taxation at realization, or by behavioral factors such as the disposition

effect favoring trades in one direction rather than the other. ‘Overconfidence’, stressed in the work of Barber and Odean, would encourage excessive trading in both directions, lowering realized returns net of transactions costs.

There is no reason to expect that the same patterns of participation and trading inertia should be observed across all types of stockholding, from direct stockholding, to mutual funds, to stockholding in retirement accounts. Trading costs are not in general the same across these stockholding locations, tax implications of trades are not the same, and investor willingness to trade need not be the same across different types of stockholding. For example, retirement accounts often allow costless changes in allocations or in the composition of new flows (e.g., via the internet) and do not entail tax consequences: stocks can be exchanged for the riskless fund without tax consequences, even when they have incurred capital gains. At the opposite end of the spectrum, trades of directly held stocks may be costly, both in terms of commissions and bid-ask spreads but also in terms of their consequences for capital gains taxes. Even for given costs and tax considerations, households may have lower willingness to engage in speculative trading of their retirement accumulations compared to mutual funds and directly held stocks.<sup>13</sup>

#### **4. The Data**

In this paper, we use panel data from various waves of the PSID, a longitudinal survey that offers a broad set of information on a representative sample of US individuals and their families; and repeated cross sections from the SCF, which is not subject to top coding and includes even more detailed information on portfolios.

The PSID has been interviewing households on an annual basis between 1968 and 1996. Since 1996, interviews are conducted biennially. In this paper, we employ data

from 1984, 1989, 1994, 1999 and 2001, i.e. the survey years that provide detailed information on various household wealth components. We also make use of recently released data from 2003.

In all of our analysis, we study families that experienced no change in their head. Up to and including the 1994 interview, households were asked whether they owned any shares of stocks in publicly held corporations, mutual funds, or investment trusts - including stocks in employer-based pensions or IRAs. From 1999 onwards, there is a separate question regarding ownership of IRAs, as well as information on whether IRAs are mostly invested in stocks, interest earning assets, or split between the two. Based on the latter responses, we allocate 75%, 25% and 50% of the value of IRA to stocks, respectively.

In our regression analysis, we control separately for net financial and net real wealth, to allow for differential effects of wealth components that differ in liquidity. Net financial wealth comprises the total amount held in liquid assets (checking and savings accounts, money market funds, certificates of deposits, savings bonds, or treasury bills), money in private annuities and IRAs, bonds, cash value in a life insurance policy and other assets (a valuable collection for investment purposes, rights in a trust or estate), stocks (shares of stock in publicly held corporations, mutual funds, investment trusts), minus other debts (such as credit cards, student loans, medical or legal bills, or loans from relatives). Net total wealth is derived as the sum of home equity (value of the home minus remaining mortgage principal), equity in other real estate, equity in a farm or business, equity in vehicles plus net financial wealth.

In each interview households were asked about transactions they made in stocks since the last survey year with a wealth supplement (e.g. in 1999 survey for the time

from 1994 to 1999). They were asked to give details on whether they purchased or sold stocks and the amounts they put in or took out of stocks. Information regarding the within-interval frequency of such trading is not available.

Up to 1994 this series of questions refers to transaction in stocks generally, including those invested in IRAs. From 1999 onwards respondents were asked about transactions in non-IRA stocks. Hence, in post-1994 surveys, information on stock transactions in publicly held corporations, mutual funds, or investment trusts, including any automatic reinvestments – but not including any IRAs, is available. We mainly look at such transactions that took place between 1994 and 1999 and between 1999 and 2003. The analysis for the latter period is feasible after combining the relevant information from 1999-2001 and 2001-2003 sub-periods. We also look at transactions prior to 1994, however these refer to a broader definition that takes also into account IRA stocks.

We also employ data from the 1989, 1992, 1995, 1998 and 2001 Surveys of Consumer Finances. Compared to PSID, they are not subject to top coding, and they provide a detailed wealth breakdown and useful information on households' financial attitudes and practices. Nevertheless, the SCF does not track the same unit over time. Households are asked first whether they hold a brokerage account for the purchase or sale of stocks and other securities. Households with brokerage accounts are then asked how many times they bought or sold stocks through a broker during the last year, allowing a comparison of trading practices with the general population.

## **5. Participation Inertia**

### **5.1. Maintaining Participation Status**

We first look at inertia in participation, namely the tendency to have the same

participation status in stockholding at the end of the sample period as at the beginning. Both conceptually and in practice, participation inertia is distinct from trading inertia. In principle, changing stockholding participation status does not require a household to trade. For example, receiving stocks as a part of bequests or transferring stocks to children as a gift during a household's life would induce such changes in participation status without registering trades.

In practice, PSID responses to trading questions do not always match up with responses to questions on stockholding participation. Some of these may reflect stock transfers without trades, some may arise purely from survey collection practices,<sup>14</sup> while others may be due to recall bias (see also Vissing Jorgensen, 2002), but it is impossible to tell what is the reason for the mismatch and which of the two responses (on ownership or on trading) is inaccurate. Our choice to distinguish between participation and trading inertia implies that we do not need to throw away these observations, most of which are likely to represent legitimate statements about at least one of these two types of inertia. Moreover, since both serve as endogenous variables in our regressions, mis-measurement enters the error term and stacks the cards against finding significant effects of explanatory variables.

Tables 1a and 1b present a breakdown of households according to their combination of participation status at the endpoints of periods 1994-1999 and 1999-2003, using 1999 weights for both panels. This shows a tendency of the vast majority of households to exhibit the same participation status over time. Comparing 1994 to 1999 (Table 1a), we see that about three quarters of the sample were in the same participation status at the end of the period as at the beginning, with slightly more than forty percent remaining non-participants. About 8 percent were stockholders at

the beginning of the period but not at the end, while 18 percent had moved in the opposite direction.

Comparing the peak of the stock market, 1999, to 2003, after the downfall (Table 1b), we find that just under 80 percent of households were exhibiting the same participation status at the beginning and at the end of the period, which is even larger than during the period of the stock market upswing. The remaining 20 percent switched status, with slightly more switching into stockownership, despite the intervening market downfall.<sup>15</sup> Of course, looking only at end points does not necessarily imply that households did not trade within the period. This is an issue which we will examine later in the paper.

## **5.2. Determinants of Transition Probabilities**

In this section, we ask which factors tend to influence transitions into and out of participation across two periods of interest: the period encompassing the substantial stock market expansion, 1994 to 1999, and the one encompassing the major market downfall, 1999 to 2003. We consider ownership in directly held stocks, in mutual funds, in investment trusts, and in employer-based pensions and IRAs.

For each period, we estimate a bivariate probit, allowing unobserved heterogeneity to influence participation decisions at both interval end points, and each observable factor to have potentially different effects at each end point. Indeed, we find positive correlation between unobserved factors influencing participation at the beginning and at the end of the period. We consider balanced samples across two nodes at a time, but we do not require households to be present in all three years 1994, 1999, and 2003. Households with zero wealth at both end points of an interval are



excluded from estimation, so as not to equate stock market participation with the decision to hold no assets at all (or the inability to do so).

Tables 2 and 3 present bivariate probit estimates regarding ownership decisions at the beginning and at the end of the two periods: 1994-1999, and 1999-2003. We find that typical results of static participation studies convey to bivariate probits across two periods. We do not find pronounced age effects on participation, except for a negative effect of being under 35 that is present in two of the three years considered. Being married encourages participation both at the peak of the upswing and following the downswing. Having more kids discourages stock market participation. This is likely to be due to the current cost and projected future committed expenditures on children, which seem to dominate the incentive to take advantage of the wealth-building potential of the equity premium and any motives to bequeath capital gains assets.

Belonging to a minority discourages stockholding participation, and this is true in all years under consideration. We do find that poor health discourages participation, but the finding is not consistently present across all years and periods. We confirm the positive role of education on participation found in many other participation studies. The level of resources, whether in the form of income, net financial wealth, or real wealth also encourages participation. Controlling for current resources, stock market participation is further encouraged by having received an inheritance within the past 5 years. By contrast, we do not find any effect on participation of having moved during the period.

Figure 1 plots predicted conditional probabilities of participation, estimated using the bivariate probit estimates, for households that find themselves at the 25<sup>th</sup>, the 50<sup>th</sup>, or the 75<sup>th</sup> percentile of each of the distributions of income, net financial wealth, and

net real wealth, and who have their remaining characteristics set equal to the respective weighted sample medians.

We know from the participation literature that the unconditional probability of participation (non-participation) is increasing (decreasing) in the level of household resources and in the position of the household in the distribution of resources. Figure 1 shows that analogous results hold also for the *conditional* probabilities of participation and non-participation, whether we condition on beginning-of-period participation or non-participation. Probabilities of participation (non-participation), conditional on beginning-of-period participation (non-participation), decrease (increase) with the position of the household in the distribution of resources (income, non-stock financial wealth, and real wealth).

Participation inertia is evident in Figure 1. Conditional on any participation status at the beginning of the period, the probability of exhibiting the same status at the end of the period is greater than the probability of exhibiting a changed status. Estimated probabilities of stock market participation at the end of the period, conditional on participation at the beginning of the period, are not very dissimilar across the stock market expansion and contraction, suggesting that they are not particularly sensitive to the stock market environment.

We find more sizeable differences in the probability of non-participation at the end of the period, conditional on zero stockholding at the beginning. Conditional probabilities of staying out of the market are higher following the stock market downturn than over the boom, for all resource percentiles considered. These results suggest that the stock market downturn has mainly promoted inertia among non-participants rather than encouraging exodus from the stock market.

Figure 2 plots the same estimated conditional probabilities, now varying the educational attainment of the household head. These confirm the presence of participation inertia for households with high school education or below. They show, however, that a college degree contributes to overcoming inertia in terms of staying out of the market. Controlling for all other characteristics (set at the median level), college graduates are actually more likely to switch into ownership than to remain non-participants, both before and after the stock market downswing. Regardless of education, the household that is median in terms of other characteristics has higher probability to stay out of the market after the downswing than during the upswing. Conditional probabilities of exiting are quite similar before and after the downswing, with high school graduates exhibiting some increase in their exit probability, controlling for other characteristics.

Figure 3 repeats the exercise varying the race of the household head. Participation inertia is visible both for minorities and for those without minority status, controlling for other characteristics. Setting other characteristics at their median levels, minority status makes more likely both that households stay out of the stock market and that they get out if they are in. After the downswing, probabilities of staying out increase somewhat regardless of minority status. There is not much of an effect on conditional probabilities of exiting.

Figure 4 shows the small estimated effects of health status. Although the median household exhibits participation inertia regardless of health status of the household head, having a head with self-reported poor health contributes to greater conditional probabilities of staying out of the market and of exiting the market. This health gradient is greater after the downswing than during the expansion.

A way to summarize and assess the implications of these results on conditional probabilities of staying in and of exiting the stock market is to compute the steady state rate of stock market participation, i.e. the rate that would occur over the longer run if these rates of inertia persisted. This can be calculated as

$$\frac{T}{T+1} \quad (1)$$

where  $T = \frac{1-P_{00}}{1-P_{11}}$ , and  $P_{ii}$  is the probability of exhibiting participation status  $i$

conditional on exhibiting the same participation status at the beginning of the period,  $i=0$  represents non-participation, and  $i=1$  participation. These rates are independent of initial conditions and can be more easily compared across different time periods and across different groups.

Table 4 presents steady state participation rates using the relevant estimated conditional probabilities of inertia from the bivariate probits contained in the figures. The first panel refers to households with resources at the 25<sup>th</sup>, 50<sup>th</sup>, and 75<sup>th</sup> percentiles of their respective distributions, and remaining observable characteristics set at weighted medians (from the sample of those who do not have zero wealth at both interval endpoints). For both periods, belonging to higher percentiles of the distribution of resources contributes to higher steady state stock market ownership rates, and in a quite nonlinear fashion, with differences in ownership rates getting smaller as we come nearer to the top. The steady state rates implied by the transition probabilities of 1999-2003 are only somewhat lower than the corresponding ones for the upswing for households at the median and at the 75<sup>th</sup> percentile of resources (and median other characteristics), and almost unchanged for the bottom resource category.

The second panel of Table 4 shows that the estimated effect of having college education on participation inertia produces substantially higher steady state

participation rates than for the other two education categories, but these are virtually unchanged across the stock market upswing and downswing. Indeed, the only characteristic that seems to contribute to substantially lower estimated steady state participation rates following the downswing is being a high-school graduate.

The third panel of Table 4 highlights the big effect on ownership rates resulting from minority status during the upswing, and the relatively small effect of self-reported health status. All participation rates fall after the downswing, but the implied steady-state participation gaps widen, both between minorities and non-minorities, and between those with good and with poor health.

All in all, the conclusion from looking at estimates of participation inertia for all types of stockholding combined is that the degree of inertia depends on a number of household characteristics, but is rather insensitive to whether we refer to the period of the stock market upswing or downswing. The downswing is more likely to have encouraged *staying* out, rather than *getting* out of the market. Nevertheless, it seems to have strengthened the effects of minority status and poor health on participation rates over the longer run.

## **6. Inertia in Trade**

In this Section, we study household inertia in trading in periods of different stock market conditions. The difference in the stockholding measure is imposed on us by data availability considerations, but it also provides a nice supplement to work focusing on trading in retirement accounts. Using the survey responses in PSID, we are able to classify households into those who undertake no trade in stocks in the period considered, those who only buy stocks, those who only sell stocks, and those who report both buying and selling stocks. In order to be able to compare the periods

before and after the stock market downswing, trading here refers to stocks other than stocks in IRA's. This is imposed on us by data limitations, but it provides a nice complement to the work of Ameriks and Zeldes (2004) that focuses on (TIAA-CREF) retirement portfolios.

Although we do not know the actual number of transactions undertaken by households who trade during a given period, it is reasonable to expect that households who report having traded on both sides of the market are on average more active traders than those having traded in only one direction. We do not combine households who report buying only and selling only, so as to be able to distinguish trading against the market from trading with the market.

### **6.1. Inertia in Trade Across Demographic Groups**

In Tables 5a-d, we consider a full balanced panel of households in 1994, 1999, 2001, and 2003, using 1999 weights, to trace any changes in their trading incidence and patterns across the stock market upswing and downswing. We consider the period of stock market boom (1994-1999), and the period following the stock market downswing (1999-2003), which are of almost equal length, so that comparisons of rates of trading inertia between them are meaningful. The period following the burst of the bubble is further broken down into two sub-periods: the immediate aftermath of the downswing (1999-2001), and the subsequent period (2001-2003), by which households have had time to process the implications of the downswing and to adjust their portfolios.

As shown in Table 5a, the vast majority of households exhibit complete inertia in trade, with almost three quarters of them not reporting any stock market trade during the five year boom period considered. The proportion of households who report no

trade during the subsequent four-year period is only slightly smaller. The substantial drop in the stock market that took place around 2000 was not associated with sizeable increases in the incidence of stock market trading in the population. Looking at the three other columns of Table 5a, we find that the downswing was also not associated with massive increases in the proportion of households who only sold stock, and if anything it was associated with some increase in trading in both directions.

We also broke down the period following the downswing into two sub-periods, namely 1999-2001 and 2001-2003. Given the smaller length of these periods compared to the original ones, it is not surprising to observe a larger degree of inertia in trade. We do find evidence of somewhat greater inertia in the period that is more distant to the stock market downswing of 2000 than in the one immediately following it. Among those who did trade, we find that lower proportions of households undertook any stock purchases (either on their own or in conjunction with stock sales) in the 2001-3 period relative to the 1999-2001 period, and more only sold stocks, but those who only sold still do not account for more than 3.5 percent of households.

Table 5b shows inertia in trade and trading patterns for different groups of educational attainment. These do suggest that inertia in trade is more limited across more educated groups, but even among college graduates, the majority report no trade in each of the two longer periods considered, 1994-9 and 1999-2003. Comparing the two sub-periods following the downswing, we see that rates of inertia in trade were higher in the second half of the period, at least for those with a high school certificate or more.

Looking at different age groups in Table 5c, we see that inertia in trade is spread across all ages, but we observe a U-shaped pattern, with inertia in trade being higher for households with heads below 35 and above 65 years, and somewhat lower in the

intermediate age categories. Comparing the upswing to the post-downswing periods, we do not find dramatic changes in proportions of households not trading at all, except perhaps for signs of increased activity among those in the 49-65 age group. Proportions of inactive households have also slightly risen among households 35 years old or younger following the downswing. The U-shaped pattern is preserved when we break down the post-downswing period into 1999-2001 and 2001-2003, with all groups exhibiting somewhat higher inertia in trade in the latter period compared to the former.

There are pronounced differences in trade inertia across net wealth percentiles, as shown in Table 5d. Households that are higher up in the net wealth distribution (excluding wealth held in stocks) tend to exhibit lower inertia in trade with respect to stocks compared to those lower in the distribution. While the proportion of households not trading stocks is higher following the downswing than before among the bottom two quartiles of the (non-equity) net wealth distribution, it is lower among the top two quartiles, especially in the top one where the bulk of stockholding is concentrated. Comparing the two sub-periods following the downswing, we find increased inertia in trade in the second sub-period among all wealth quartiles, with the difference being most pronounced in the richest quartile.

Table 6 takes a more macroscopic view of trading inertia and stock trading practices, looking at the entire period from 1984 to 2003.<sup>16</sup> It should be recalled that the asset classes included in the questions on trading were broader up until 1994 and narrower from 1999 on, as explained above. Even with these limitations, Table 6 confirms the impression that overall trading inertia remains more or less at the same levels, with very small increases in the proportion of households trading, despite stock market fluctuations and the spread of equity culture.<sup>17</sup>



## **6.2. Determinants of Inertia in Trade and of Trading Practices**

In this Section, we study the role of a number of household characteristics in determining inertia in trading and the nature of trading practice, while controlling for remaining characteristics. As in the previous subsection, trading here refers to stocks that are not held in IRAs. We run two multinomial logits, one for the period of the upswing, 1994-99, and the other for the period following the downswing, 1999-2003. In each case, we consider four choices facing the household. The base choice is not to trade stocks at all during the estimation period. To this, three other choices are compared. One is to only buy stocks (trading once or more during the time interval, but only buying stocks). A second choice is to sell stocks (once or more) during the period, without ever buying stocks. And the third option is to trade in both directions during the period, buying and selling stocks. Although we do not observe the actual number of times that purchases or sales of stock are made, it is likely that the third option involves more frequent trading on average than the former two.

Table 7 summarizes our findings. The left panel reports findings on the presence and type of trading that took place between 1994 and 1999, as reported by respondents at the end of the period. The characteristics used refer to 1994. The right panel reports analogous findings for the period 1999-2003, using characteristics from 1999. In both cases, we include regressors that capture changes in key characteristics within the period. Thus, we include as regressors dummy variables that capture reported worsening of health status, move into retirement status, receipt of inheritance or large gifts, and change of address during the estimation period. For the later period, 1999-2003, we are able to distinguish between changes that occurred during the first half and changes that occurred during the second half, as we are combining data from three successive waves.

We focus on significance and sign of coefficients of the more interesting set of variables included in the regressions, for brevity. Positive/negative coefficients that are statistically significant at the 5 percent level are recorded with a +/- sign in the appropriate entry. When coefficients are significant only at the 10 percent level, their sign is recorded in parentheses. Coefficients that are not statistically significant even at the 10 percent level appear as blank entries in Table 7.

Age groups are compared to those between 50 and 65, i.e. in the latter part of working life, closest to retirement. Being younger than those, and controlling for all other factors, makes households more likely to buy stocks, with or without simultaneously selling stocks, rather than not trade. It makes them less likely to engage only in sales of stock. This seems consistent with the stage of young people in the asset accumulation process over the life cycle. Interestingly, such age effects essentially disappear after the stock market downturn. This suggests that the experience of the downturn may have discouraged young people from trading stocks in order to build their portfolios, but we also do not find evidence that they were selling stocks to shift their portfolios towards other assets. Controlling for retirement status, income, and other factors, being above 65 does not appear to influence inertia in trade, either before or after the downturn. This argues against pure horizon effects, that should induce households to be selling stocks, and is consistent with findings in the literature on conditional portfolio shares that finds no systematic reduction in stock exposure as the household ages.

Being married has a weak discouragement effect on trading in both directions before the downswing, but the effect becomes statistically significant and is accompanied by positive inducement to sell following the downswing. Having a larger number of children discourages options that involve purchase of stocks, both

before and after the downswing. A larger number of children acts both as a strain on current resources and as “committed future expenditures” that discourage exposure to stockholding risk, and these considerations appear to dominate the motive to exploit the equity premium in order to build up future wealth.

Controlling for all other factors, minority households tend to exhibit greater tendency towards inertia in trade. This effect is consistently present, both before and after the stock market downswing, and may be related to more limited targeting of minorities by the financial sector.

We do not find strong health effects on portfolio inertia or the nature of trading in this quite representative sample of households from all age groups. Declaring poor or fair health at the start of the period does discourage trading in both directions during the upswing, but has no effect after the downswing. Deterioration in health conditions during the period has no discernible effect during 1994-99 or 2001-03, and has negative effects (significant at the 10 percent level) on options involving stock purchases in the immediate aftermath of the downswing.

We find overall positive effects of education on encouraging trading of any kind relative to inertia, controlling for other factors. Effects are stronger following the downswing: they are uniformly positive and statistically significant at the 5 percent level, whether we refer to high-school education or to college degree, when compared to inertia in trade of high-school dropouts. This implies that educated households were more likely to respond to the downswing through active trading, but also that effects of education were across the board instead of encouraging households only in one direction (e.g. to sell so as to reduce their stock exposure, or to buy stocks at a low price).

Switching to retirement status during the period tends to encourage simultaneous

purchases and sales of stock, certainly during the upswing and marginally in the period immediately following the downswing. This latter effect is only significant at the 10 percent level, and it disappears in the second sub-period following the downswing. Entering retirement does not appear to encourage simple, uni-directional trades, such as liquidating stock wealth to finance consumption needs in view of income drops. It seems consistent with a drop in consumption following retirement, although it is of course not sufficient to establish that such a drop occurs.

We turn next to household resources or “cash on hand”. Controlling for other factors, higher income or higher net financial wealth encourages purchases of stocks, either alone or in conjunction with stock sales. Higher income marginally encourages sales of stock, too, but the effect disappears after the downswing. Larger amounts of net financial assets encourage households to sell stocks following the downswing, presumably to reduce their stock exposure. Net real wealth has no effect prior to the downswing, but it encourages purchases of stock, even combined with sales, following the downswing. The fall in stock prices may have encouraged households with substantial holdings of real equity to trade in stocks, either liquidating some of their real wealth or switching out of less risky assets.

Receipt of inheritance or large gifts often represents a sizeable increase in household resources and one that is in a form not chosen by the household in question but by the person leaving the bequest. Both features could be expected to encourage stock trades. The PSID asks respondents whether they have received inheritance or large gifts in the five-year period preceding the interview. When including dummies for the relevant periods, we find that receipt of inheritance or large gifts, either prior to the beginning of the period or during the period, consistently encourages simultaneous sales and purchases of stock. This is true both before and after the stock

market downswing. However, those who received an inheritance or large gifts during the upswing are also more likely to buy stocks as the market is going up, and more likely to sell stocks following the downswing rather than not trade at all. Those who received inheritance or large gifts during the downswing, on the other hand, are only encouraged to buy and sell stocks simultaneously. These findings suggest that the trading responses of households to receipts of inheritance or large gifts are fairly similar but not identical to their responses to other changes in their wealth, and that they seem to be different before and after the stock market downswing.

Finally, we consider changes of address (moves) during the period in question, which could be associated with asset rebalancing. Controlling for other changes that have already been mentioned, moves do not appear to have significant effects on stock trading behavior before the downswing. We do find some effects on trading after the downswing, but only for those who moved between 1999 and 2001. Such moves seem to have encouraged sales of stock, possibly combined with trades in the opposite direction.

## **7. Trading through Brokerage Accounts**

Given the tension between empirical studies that use administrative data on brokerage accounts and on retirement accounts, we also report results on trading of directly held stocks through brokerage accounts from a data set that is representative of the entire population, namely the SCF. The SCF asks households first whether they have a brokerage account. Those who answer that they do are then asked whether they have traded and how many times they have traded over the year prior to the year of the Survey. We use all available waves of cross-sectional data, from 1989 to 2001.

Table 8 provides a clue to understanding the huge discrepancy in conclusions from existing research based on owners of brokerage accounts and on other segments of the population. The first column reports the percentage of households who hold equity directly during the Survey year. As is well known, this percentage did not vary much during the 1990s, and remains at a high value even following the stock market downswing. The second column shows the percentages of households that report having a brokerage account. This can be either a retail account or a discount brokerage account, and it is thus an overestimate of those who own a discount brokerage account in the population. We see that in all years, less than 20% of households have a brokerage account. We also observe an increase in these percentages, which resulted in doubling the proportion of brokerage account owners between 1989 and 2001. Thus, over this period, the spread of equity culture was accompanied by increased popularity of brokerage services, even though the percentage of account holders remained small.

The third column shows the percentage of households in the population who bought or sold stocks or other securities through a broker during the year preceding the Survey. While this percentage also nearly doubled during the period under consideration, it remained well below 15% of the population. However, when expressed as a percentage of brokerage account owners, it shows that between two thirds and three quarters of such owners actually traded in the year preceding each SCF. Although relatively few households do own brokerage accounts, the vast majority of those who do trade even in the space of a year. This highlights an important source of the discrepancy between existing studies of trading based on brokerage data and other studies.

We now turn to analysis of how trading of directly held stock through brokerage accounts is linked to household characteristics and to stock market performance. Table 9 reports (a subset of) estimates of marginal effects from two probit regressions that

allow for selection and study, respectively, the incidence of trading and of repeated trading (i.e. trading more than once) through a brokerage account during a year. We allow for selection by recognizing that trading directly held stock through a brokerage account can only be observed among households that own stocks directly. We pool data from SCFs between 1989 and 2001.

The first column refers to a probit regression for the incidence of stock trading through a brokerage account during the year prior to the Survey.<sup>18</sup> In addition to allowing for a number of household characteristics, we proxy for stock market performance by including the percentage growth in the S&P 500 index, deflated by the CPI-U, for the year prior to the Survey. As no single household is a big enough trader to influence the stock price index, these growth rates are truly exogenous to its decision whether to trade or not.

These prior-year S&P real growth rates were positive for all Surveys, except for 1995 and 2001.<sup>19</sup> We also include in our regressions an interaction term that allows the coefficient on the real growth rate of the index to differ between years of upswing and downswing. Both terms exhibit large marginal effects, suggesting that stock market performance exerts an important influence on trading of directly held stocks through brokerage accounts.

Taking into account the interaction term, we find that stock market expansions and contractions both contribute to the incidence of trading through a brokerage account, with a large marginal effect. In the reported specification, estimated effects are greater during a contraction rather than an expansion of a given size.<sup>20</sup> Based on these findings, the incidence of trading directly held stocks through brokerage accounts is likely to be greater during downswings, controlling for household characteristics. Note, however,

that even this does not necessarily suggest stock sales: increased incidence of stock trades could refer to purchases, sales, or trades in both directions.

The biggest marginal effects on the probability of trading directly held stocks through brokerage accounts were estimated for the education variables, with a college graduate owner of a brokerage account having 23 percentage points greater probability of trading than a high-school dropout, and a high-school graduate 6.5 percentage points greater probability, controlling for other characteristics.

Next in size of marginal effect are having a bequest motive and not being a minority. Bequest motives could contribute to the incidence of trading through brokerage accounts either by simply encouraging purchases to accumulate stocks or by encouraging more active management of stock portfolios. Thus, the discouragement effect on trading that arises from ‘step up of basis’ provisions for bequeathed capital gains seems to be dominated by other considerations.

Poor health is found to have statistically significant discouragement effects on trading through a brokerage account. Being male, having greater wealth and not being liquidity constrained are in the next tier of contributions to the probability of trading through a brokerage account, with having received inheritance or large gifts lagging slightly behind. The role of gender is consistent with findings of Barber and Odean (2001) for administrative accounts mentioned above. Finally, income has a much smaller contribution, controlling for other factors.

The second column of Table 9 reports marginal effects on the probability of trading directly held stock through a brokerage account at least twice during the year prior to the survey.<sup>21</sup> We see that the effect of growth in the real S&P 500 index is still there, though a bit smaller since we are now being more demanding in terms of the number of stock transactions (at least two versus at least one in the first column). The only



marginal effect that increases is that of ‘financial alertness’, which is now understandably stronger. Education continues to be most important, though now being male also emerges as an influential variable on par with the bequest motive.

The conclusion from this section is that household demographics are quite important even for the incidence and intensity of trading directly held stocks through brokerage accounts. The direction of their effects seems broadly similar to that regarding participation and other types of trading inertia. Our results suggest, however, that trading through brokerage accounts tends to be quite sensitive to movements in the stock market index, unlike what we found for overall trading or participation inertia.

## **8. Concluding Remarks**

In this paper, we documented the extent and studied the determinants of household portfolio inertia in the face of the spread of equity culture and of considerable stock market index movements, using representative data from various waves of the PSID and SCF.

We found substantial inertia in changing stockholding participation status, which was actually larger following the downswing than during the expansion. The degree of inertia depends on a number of household characteristics, but is rather insensitive to whether we refer to the period of the stock market upswing or downswing. The downswing is more likely to have encouraged *staying* out, rather than *getting* out of the market. Nevertheless, it seems to have strengthened the negative effects of minority status and poor health on participation rates over the longer run.

The vast majority of households in the population exhibit complete inertia in trading stocks not held in IRAs, across the upswing and downswing of the stock market, and even across the longer period (1984 to 2003). We find no evidence that

the proportion of households who only sold stocks increased following the downswing, but we observe somewhat greater trading inertia in the period 2001-3 compared to 1999-2001.

We find positive effects of education on discouraging inertia in trade, which are stronger following the downswing. Controlling for other characteristics, being young makes households more likely to be buying stocks rather than not trading during the upswing, but such effects disappear after the downswing. Transition to retirement tends to encourage simultaneous purchases and sales of stock, though marginally so after the downswing. Thus, entering retirement does not appear to encourage simple, uni-directional trades (such as liquidation of stocks). We do not find strong effects of health status on trading inertia. Minority status contributes to greater tendency to not trade stocks (held directly or through mutual funds), controlling for other factors, across the upswing and downswing.

Higher income or net financial assets encourage purchases of stock, either alone or in conjunction with sales, relative to non-trading throughout the upswing and downswing. Following the downswing, higher net financial assets also encourage stock sales, while higher net real wealth becomes significant and encourages purchases of stock, even combined with sales. Receipt of inheritance or large gifts encourages simultaneous purchases and sales of stock, and it also encourages trading *with* the market. These findings suggest that responses to gifts and inheritances are not generally the same as responses to other changes in resources, consistent with Brunnermeier and Nagel (2005).

A key to resolution of the stark contrast between overtrading and inactivity found in existing literature that uses administrative data is provided by our finding that only a small number of households own brokerage accounts, but the vast majority

of those who do, trade within a year. Household demographics are quite important even for the incidence and intensity of trading directly held stocks through brokerage accounts, with direction of effects broadly similar to those in the general case of trading directly held stocks and mutual funds. However, trading through brokerage accounts appears to be quite sensitive to movements in the stock market index, unlike what we found for overall trading or participation inertia.

All in all, we have documented considerable inertia in trading stocks and in entry or exit from the stock market, and we have found that the tendency to exhibit such inertia is linked to household characteristics. Although our findings suggest some dependence on stock market performance, we do not find evidence that the recent expansion in the stockholder base and the experience of the stock market downswing have significantly altered the overall propensity of households to trade stocks or to exit with a potential to destabilize the stock market.

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**Table 1a: Stock Ownership Status in 1994 and 1999**

1994	1999	
	Non-stock owner	Stock owner
Non-stock owner	<b>42.9</b>	<b>17.8</b>
Stock owner	<b>7.7</b>	<b>31.7</b>

Balanced PSID panel 1994,99,01,03 (families with no change in head). Family weights from 1999 are used. "Stock" refers to shares of stock in publicly held corporations, mutual funds, or investment trusts – including stocks in employer-based pensions or IRAs

**Table 1b: Stock Ownership Status in 1999 and 2003**

1999	2003	
	Non-stock owner	Stock owner
Non-stock owner	<b>39.2</b>	<b>11.4</b>
Stock owner	<b>9.9</b>	<b>39.4</b>

Balanced PSID panel 1994,99,01,03 (families with no change in head). Family weights from 1999 are used. "Stock" refers to shares of stock in publicly held corporations, mutual funds, or investment trusts – including stocks in employer-based pensions or IRAs

**Table 2: Bivariate Participation Probit, 1994-99**

	<b>Own in 1994</b>	<b>Own in 1999</b>
Age<35	-.395 (5.00)	-.243 (2.97)
35<Age<49	-.174 (2.93)	-.041 (.83)
Age>65	-.033 (.23)	.001 (.02)
Married	.091 (1.03)	.144 (2.04)
# of kids	-.006 (.32)	-.052 (3.08)
White	.538 (9.28)	.563 (16.90)
Health poor/fair	-.171 (1.78)	-.142 (2.50)
High school graduate	.499 (6.96)	.503 (8.57)
College graduate	.991 (11.59)	1.04 (20.14)
log(Income)	.175 (2.72)	.177 (2.85)
log(net Fin. wealth)	.019 (7.63)	.039 (11.35)
log(net Real wealth)	.045 (6.92)	.043 (3.67)
Received inheritance last 5 yrs	.404 (3.57)	.281 (4.51)
Moved, 1994-99		-.004 (.10)
$\hat{\rho}$	.484 ( <i>s.e.</i> .028)	

Balanced PSID panel 1994, 99 of families with no change in head and with non zero financial wealth in at least one of the two waves. Numbers show estimated coefficients from a Bivariate Probit, modeling the probability of owning stocks in each of the two waves and allowing for correlation between the disturbances of each individual (numbers in parentheses report absolute *t*-values). The *t* statistics have been computed using standard errors corrected for heteroscedasticity assuming independence of observations across different individuals but not necessarily across time for the same individual. Ownership regards shares of stock in publicly held corporations, mutual funds, or investment trusts –including stocks in employer-based pensions or IRAs. Variables refer to the year in question. The regression also controls for gender and labor status.



**Table 3: Bivariate Participation Probit, 1999-03**

	<b>Own in 1999</b>	<b>Own in 2003</b>
Age<35	-.260 (3.66)	-.230 (4.40)
35<Age<49	-.019 (.39)	-.144 (4.29)
Age>65	-.046 (.78)	-.068 (1.21)
Married	.123 (1.66)	.156 (2.03)
# of kids	-.071 (3.84)	-.078 (3.27)
White	.582 (15.10)	.638 (14.69)
Health poor/fair	-.060 (.97)	-.202 (3.30)
High school graduate	.568 (8.11)	.431 (8.42)
College graduate	1.09 (19.54)	1.05 (22.98)
log(Income)	.253 (4.07)	.175 (3.21)
log(net Fin. wealth)	.036 (11.63)	.041 (10.17)
log(net Real wealth)	.045 (3.91)	.028 (2.70)
Received inheritance last 5 yrs	.255 (5.39)	.181 (1.59)
Moved, 1999-03		.005 (.13)
$\hat{\rho}$	.553 (s.e. .026)	

Balanced PSID panel 1999, 01, 03 of families with no change in head and with non zero financial wealth in at least one of the 1999 and 2003 waves. Numbers show estimated coefficients from a Bivariate Probit, modeling the probability of owning stocks in each of the two waves and allowing for correlation between the disturbances of each individual (numbers in parentheses report absolute  $t$ -values). The  $t$  statistics have been computed using standard errors corrected for heteroscedasticity assuming independence of observations across different individuals but not necessarily across time for the same individual. Ownership regards shares of stock in publicly held corporations, mutual funds, or investment trusts –including stocks in employer-based pensions or IRAs. Variables refer to the year in question. The regression also controls for gender and labor status.

**Table 4: Estimated Steady State Participation Rates**

<i>Net financial wealth, net real wealth and income</i>	<b>1994-1999</b>	<b>1999-2003</b>
at 25 <sup>th</sup> percentile	.41	.40
at 50 <sup>th</sup> percentile	.62	.56
at 75 <sup>th</sup> percentile	.70	.62
<b><i>Head educational attainment</i></b>		
Less than high school education	.42	.41
High School Graduate	.62	.55
College Graduate	.80	.79
<b><i>Head status</i></b>		
Non White	.39	.30
White	.62	.56
Health Good	.62	.56
Health Poor	.57	.44

Note: Steady states are calculated from estimated conditional probabilities derived from the two Bivariate Probit models of Tables 2 & 3 over the respective samples.

**Table 5a: Stock Trading Inertia and Stock Trading Practices over Time**

period	No trade	Buy only	Sell only	Buy & Sell
1994-99	73.8	11.9	2.7	11.7
1999-03	71.9	11.7	3.5	12.9
1999-01	78.2	11.2	2.3	8.4
2001-03	82.3	7.0	3.5	7.3

Balanced PSID panel 1994,99,01,03 (families with no change in head, 4,169 observations). Family weights from 1999 are used. “Stock” refers to shares of stock in publicly held corporations, mutual funds, or investment trusts – not including stocks in employer-based pensions or IRAs

**Table 5b: Stock Trading Inertia by Education of Household Head**

	No trade 94-99	No trade 99-03	No trade 99-01	No trade 01-03
Less than high school	93.8	95.1	97.3	97.3
High school graduate	80.2	78.1	83.3	87.7
College graduate	53.4	51.0	60.9	66.1

Balanced PSID panel 1994,99,01,03 (families with no change in head). Education refers to the beginning of each period. Family weights from 1999 are used. “Stock” refers to shares of stock in publicly held corporations, mutual funds, or investment trusts – not including stocks in employer-based pensions or IRAs

**Table 5c: Stock Trading Inertia by Age of Household Head**

	No trade 94-99	No trade 99-03	No trade 99-01	No trade 01-03
Age<35	78.0	79.4	83.9	88.6
35<Age<49	71.8	71.5	76.8	82.6
49<Age<65	71.9	67.5	75.7	79.6
Age>65	74.6	73.5	80.3	81.3

Balanced PSID panel 1994,99,01,03 (families with no change in head). Age refers to the beginning of each period. Family weights from 1999 are used. “Stock” refers to shares of stock in publicly held corporations, mutual funds, or investment trusts – not including stocks in employer-based pensions or IRAs

**Table 5d: Stock Trading Inertia by Non-equity Net Total Wealth**

Non-equity Net Total Wealth	No trade 94-99	No trade 99-03	No trade 99-01	No trade 01-03		
1 <sup>st</sup> quartile	(<\$11592)	90.5	(<\$16742)	92.5	93.9	96.1
2 <sup>nd</sup> quartile	(\$11592< <\$62140)	78.9	(\$16742< <\$81852)	80.7	85.5	89.3
3 <sup>rd</sup> quartile	(\$62140< <\$176861)	69.1	(\$81852< <\$212126)	65.2	74.6	77.9
4 <sup>th</sup> quartile	(\$176861<)	56.8	(\$212126<)	49.3	58.9	65.8

Balanced PSID panel 1994,99,01,03 (families with no change in head). Net wealth quartiles from the beginning of each period are considered. Family weights from 1999 are used. “Stock” refers to shares of stock in publicly held corporations, mutual funds, or investment trusts – not including stocks in employer-based pensions or IRAs. Amounts refer to \$2001 values.

**Table 6: Stock Trading Inertia and Stock Trading Practices over Time**

<b>period</b>	<b>No trade</b>	<b>Buy only</b>	<b>Sell only</b>	<b>Buy &amp; Sell</b>
<b>1984-89 *</b>	72.0	13.4	2.9	11.7
<b>1989-94 *</b>	70.2	18.0	1.7	10.0
<b>1994-99**</b>	72.4	12.3	2.7	12.5
<b>1999-03**</b>	70.0	12.7	3.8	13.4
<b>1999-01**</b>	77.2	11.9	2.3	8.7
<b>2001-03**</b>	80.7	7.5	3.9	7.8

Balanced PSID panel 1989,94,99,01,03 (families with no change in head, 2,914 observations). Family weights from 1999 are used.

\*Refers to shares of stock in publicly held corporations, mutual funds, or investment trusts – including stocks in employer-based pensions or IRAs

\*\*Refers to shares of stock in publicly held corporations, mutual funds, or investment trusts – not including stocks in employer-based pensions or IRAs

**Table 7: Determinants of Inertia in Trade and of Trading Practices**

	PSID 1994-99			PSID 1999-03		
	Buy only	Sell only	Buy & Sell	Buy only	Sell only	Buy & Sell
Age<35	+	-	+			
35<Age<49	+	-	(+)	(+)		
Age>65						
Married			(-)		+	-
# of kids	-		-	-		-
White	+	+	+	+	+	+
Health poor/fair			-			
Health gets worse, 1994-99						
Health gets worse, 1999-01				(-)		(-)
Health gets worse, 2001-03						
High school graduate	+		(+)	+	+	+
College graduate	+	(+)	+	+	+	+
Become retired, 1994-99			+			
Become retired, 1999-01						(+)
Become retired, 2001-03						
log(Income)	+	(+)	+	+		+
log(net Fin. wealth)	+		+	+	+	+
log(net Real wealth)				+		+
Received inheritance, 1989-94			+			
Received inheritance, 1994-99	+		+		+	+
Received inheritance, 1998-03						+
Moved, 1994-99						
Moved, 1999-01					(+)	+
Moved, 2001-03						

Balanced PSID panels 1994,99 and 1999,01,03 of families with no change in head and with non zero financial wealth in at least one of the two waves. Estimates are taken from a Multinomial Logit (those who do not trade form the comparison group). Trading regards shares of stock in publicly held corporations, mutual funds, or investment trusts – not including stocks in employer-based pensions or IRAs. The regression also controls for gender and labor status. Parentheses used to denote significance at 10%.

**Table 8: Trading in the Population and Among Owners of Brokerage Accounts**

<b>Period</b>	<b>Stock ownership rates *</b>	<b>Stock trading rates ***</b>	<b>Brokerage account **</b>	<b>Stock trading rates among brokerage account owners</b>
1988-89	17.0%	6.8%	9.4%	72%
1991-92	17.1%	8.5%	12.4%	69%
1994-95	15.5%	8.3%	12.1%	69%
1997-98	19.7%	11.8%	15.5%	76%
2000-01	21.5%	13.5%	18.2%	74%

SCF 1989,92,95,98,01, weighted data.

\* % of households with directly held equity

\*\* % of households that bought or sold stocks or other securities through a broker

\*\*\* % of households with a brokerage account for the purchase or sale of stocks and other securities

**Table 9: Stock trading Probits**

	<b>Pr(trading) <sup>1</sup></b>	<b>Pr(trading at least twice) <sup>2</sup></b>
Male	.055 (1.84)	.059 (3.43)
Married	.004 (.16)	.002 (.10)
Has kids	-.051 (3.47)	-.036 (3.59)
White	.076 (2.75)	.037 (2.20)
Health poor	-.101 (2.12)	-.023 (.76)
High school graduate	.065 (1.75)	.049 (1.76)
College graduate	.227 (5.88)	.158 (5.26)
Save for “rainy days”	-.005 (.32)	-.002 (.18)
Financial alertness	.031 (2.12)	.042 (3.88)
log(Income)	.007 (2.64)	.002 (1.24)
log(net Wealth)	.046 (6.76)	.038 (10.23)
Bequest motive	.089 (5.42)	.053 (3.97)
Has received inheritance	.037 (2.72)	.019 (1.97)
Credit constrained	-.068 (2.52)	-.029 (1.71)
<b>S&amp;P 500 real growth rate</b>	<b>.203</b> <b>(2.69)</b>	<b>.151</b> <b>(3.02)</b>
<b>S&amp;P 500 real growth rate * (D95+D01)</b>	<b>-.668</b> <b>(2.86)</b>	<b>-.454</b> <b>(2.89)</b>
$\hat{\rho}$	-	-.293 ( <i>s.e.</i> .021)

Pooled data from SCF 1989,92,95,98,01.

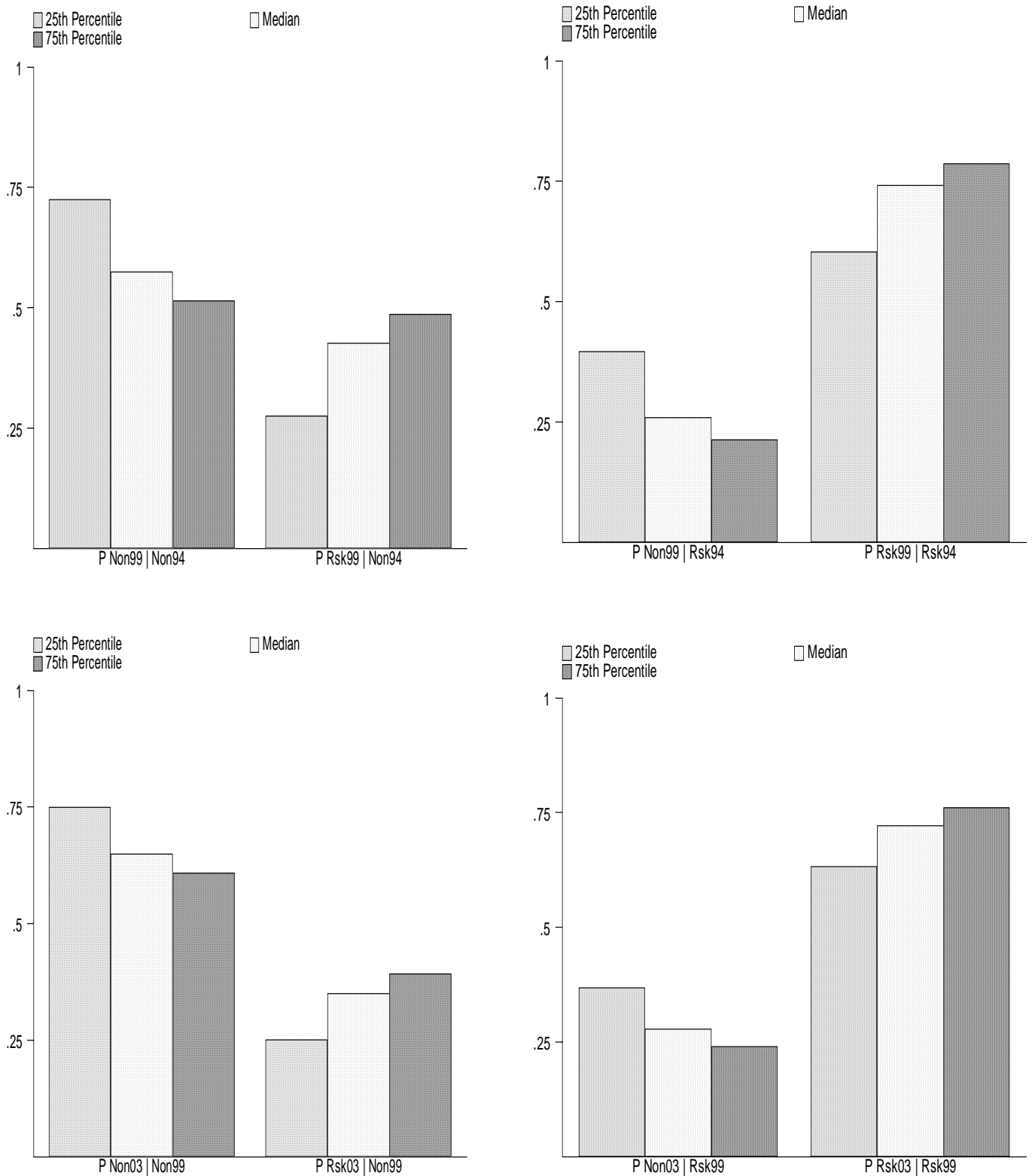
1. Marginal effects on the probability of having traded stocks the year before the interview (numbers in parentheses report absolute t-values). They are derived from a probit model on stockholders (a two step probit correcting for the probability of holding stocks failed to reject the null of zero correlation).

2. Conditional marginal effects on the probability of having traded stocks at least twice the year before the interview (numbers in parentheses report absolute t-values). They are calculated from the second step of a bivariate probit with selection which takes into account unobserved correlation with the probability of stock ownership. Age variables are excluded from the second stage for identification.

All marginal effects refer to changes in the probability of the occurrence of the event with marginal changes in continuous variables (change in dummy variables from 0 to 1 is assumed) by fixing the other covariates at their means. Both specifications also control for labor status.

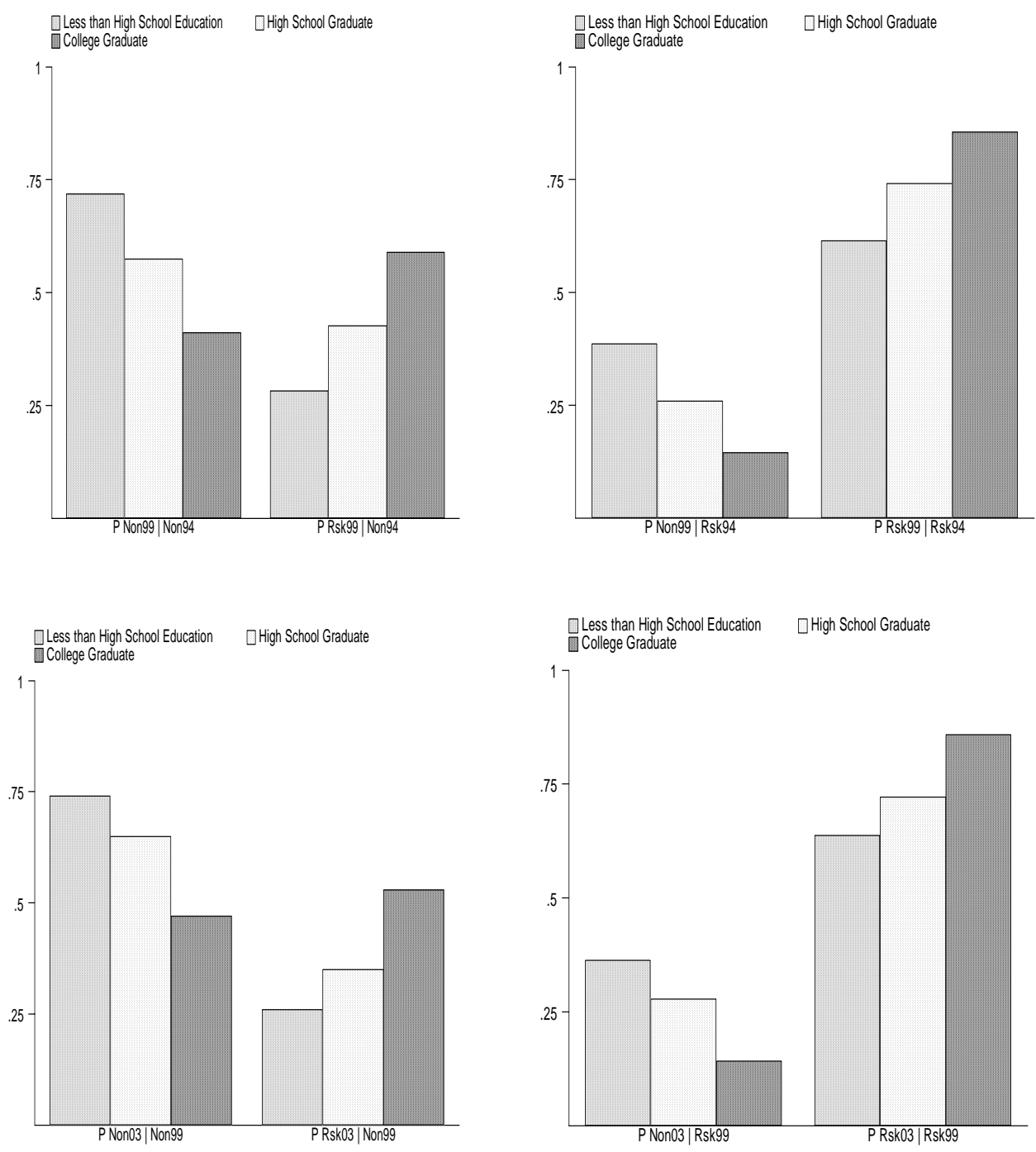
“S&P500 real growth rates” refer to the one year period preceding the interview (the index has been deflated by CPI-U).

**Figure 1: Conditional Probabilities of Stock Ownership: Effects of Income and Wealth**

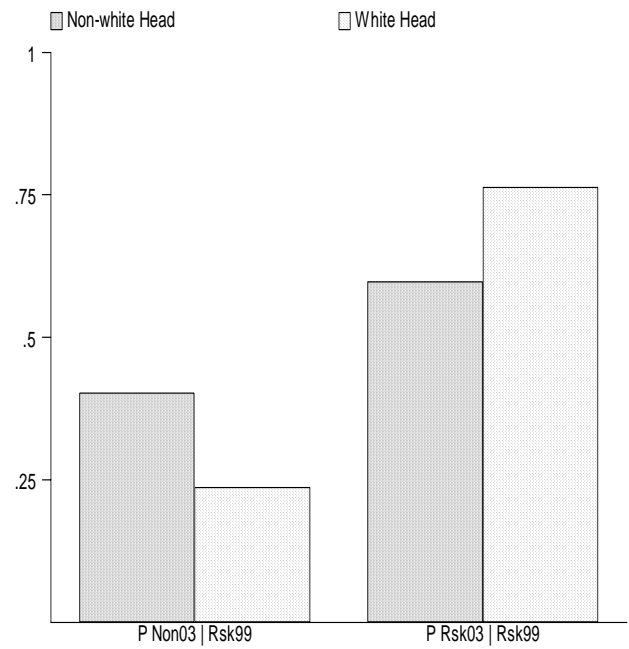
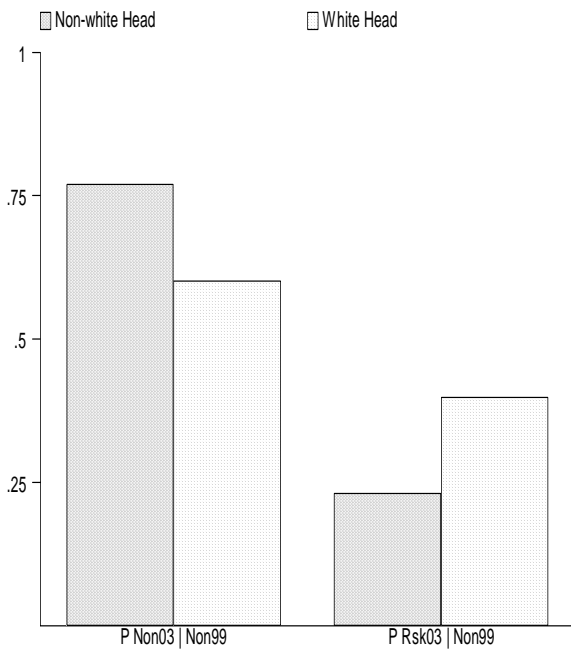
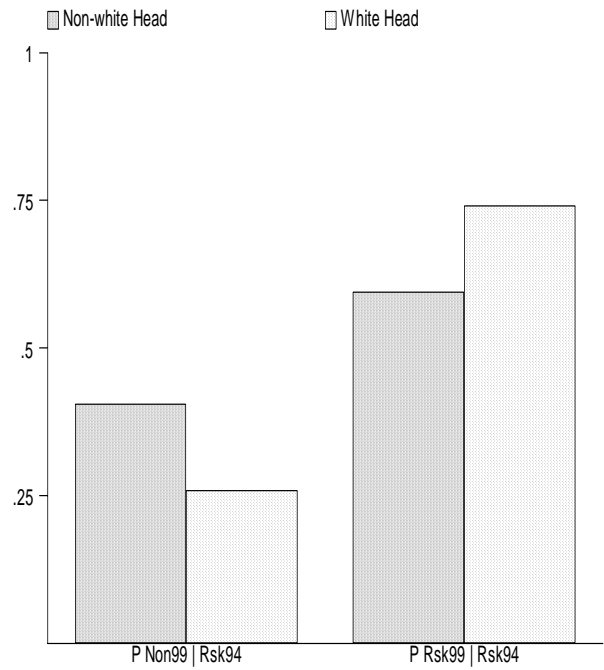
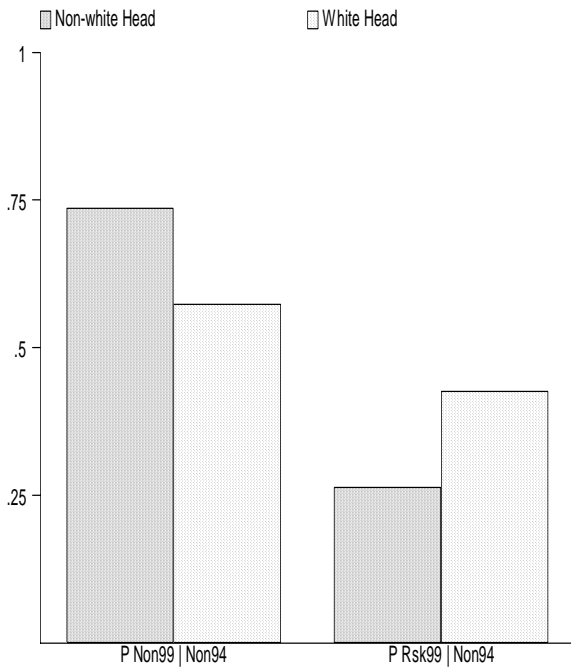




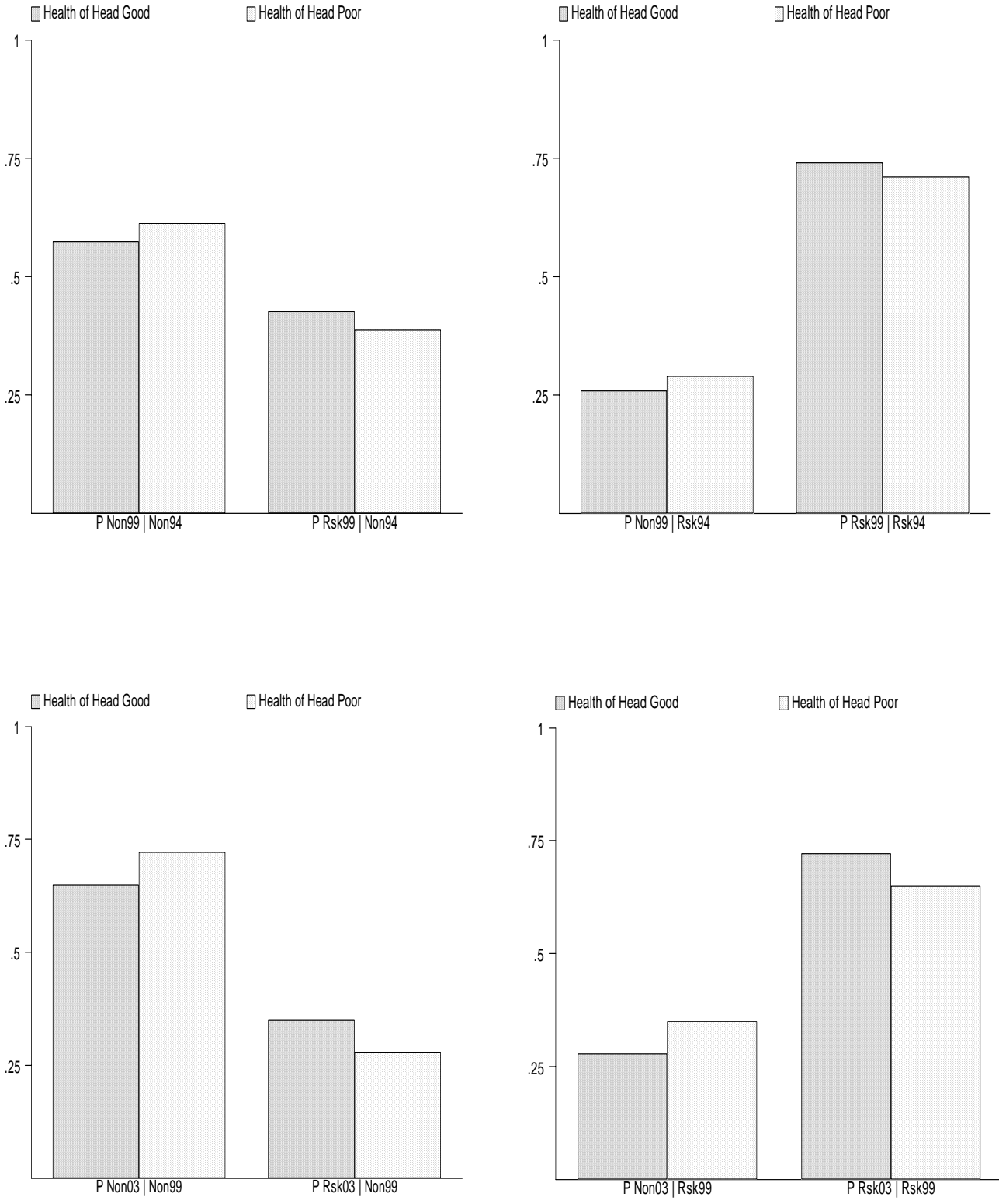
**Figure 2: Conditional Probabilities of Stock Ownership: The effect of Education**



**Figure 3: Conditional Probabilities of Stock Ownership: The effect of Race**



**Figure 4: Conditional Probabilities of Stock Ownership: The effect of Health**



## Endnotes

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<sup>1</sup> See, for example, the contributions in Guiso, Haliassos, and Jappelli (2001).

<sup>2</sup> Effects of increased participation on the equity premium are probably less sizeable (Heaton and Lucas, 1999; Polkovnichenko, 2000).

<sup>3</sup> Recently, Ivković, Poterba, and Weisbenner (2004) have compared trading behavior in taxable versus tax-deferred accounts within a group of discount broker accounts.

<sup>4</sup> The SCF eliminates only households on the Forbes 400 list.

<sup>5</sup> Grinblatt and Keloharju (2001) use data from the central register of shareholdings for Finnish stocks in the Finnish Central Securities Depository that cover all stock market participants (individuals and institutions) but obviously not individuals that are not stockholders. They employ Logit regressions to identify the determinants of buying and selling activity of individuals and institutions over a two-year period, and they find evidence that investors are reluctant to realize losses, that they engage in tax-loss selling activity, and that past returns and historical price patterns affect trading.

<sup>6</sup> Just under 90 percent made zero or one change in accumulated assets, while more than two thirds made zero or one change in their flow allocations.

<sup>7</sup> This is in line also with Sirri and Tufano (1998), who find a similar asymmetry for mutual fund flows: mutual fund consumers chase returns, flocking to funds with the highest recent returns, though failing to flee from poor performers.

<sup>8</sup> Milgrom and Stokey showed that, under rational expectations and regardless of the institutional structure, if the initial allocation is ex ante Pareto-optimal, then receiving private information cannot create incentives to trade. This is because, under Pareto optimality, the trader only hopes to find an advantageous bet, but the mere willingness of the other traders to accept their parts of the bet convinces at least one trader that his own part is unfavorable. Common knowledge that the trade is both feasible and acceptable to all traders is a crucial assumption for this result.

<sup>9</sup> See, for example, Haliassos and Bertaut (1995), Cocco, Gomes and Maenhout (1997), Heaton and Lucas (2000), Gollier (2001), Viceira (2001), Campbell and Viceira (2002), Haliassos and Michaelides (2003), and Gomes and Michaelides (2004).

<sup>10</sup> For empirical estimates of thresholds to fixed entry costs, see Vissing Jorgensen (2002) and Paiella (2004).

<sup>11</sup> See, for example, Laibson et al. (2000).

<sup>12</sup> An early empirical study that documented such exits using a panel subsample of the SCF in the 1980s, was Bertaut (1998).

<sup>13</sup> Barber and Odean (2000) found using their discount broker accounts data that the frequency of trading was lower in IRA accounts than in taxable accounts, and that liquidity shocks were more likely to induce trading in mutual funds than in directly held stocks. They conjecture that the former finding is due either to tax-motivations or to more limited willingness of households to trade speculatively on their retirement accumulation because they associate it with future safety. The latter may be due to lower transactions costs associated with mutual fund trades.

<sup>14</sup> Survey collection issues include the following. First, the data center merges families with the same head, but it is conceivable that the head is the same but the family is different. Second, prior to 1999 the question about stocks included stocks in IRAs, but in 1999 the question was split in two, separating IRAs from stocks in individual accounts and mutual funds. It is possible that some respondents' answers to the stock ownership question were affected by this change, especially if they were used to the old question sequence. Third, the 2001 interview was the first where active saving questions refer to a two- rather than four-year period, and some errors might be due to this change. Fourth, some respondents may be thinking not in terms of the interval between interviews but in terms of calendar years. We are grateful to Ms. Donna Nordquist of the PSID for bringing these issues to our attention.

<sup>15</sup> This latter observation is consistent with the finding from SCF data that overall stockholding participation rates were slightly higher in 2001 than in 1998.

<sup>16</sup> This is not costless, as the requirement for a balanced panel lowers the number of observations from more than 4,000 to slightly less than 3,000.

<sup>17</sup> The only exception seems to be the increase in the proportion of households buying only under the broader definition of stockholding in the period 1989-94, presumably due to the sizeable entry of households into retirement accounts.

<sup>18</sup> This is actually a straight probit on the subsample of direct stockholders, as a bivariate probit failed to reject the null hypothesis of zero correlation between unobserved factors influencing both direct stock ownership and trading through a brokerage account.

<sup>19</sup> Specifically, they took the following values: +.07 (12/1987-12/1988), +.23(12/1990-12/1991), -.04(12/1993-12/1994), +.29(12/1996-12/1997), -.13(12/1999-12/2001).

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<sup>20</sup> Interaction terms for household characteristics did not turn out to be statistically significant, implying identical effects of characteristics on the incidence of trading through brokerage accounts across upswings and downswings and were not included in the final specification.

<sup>21</sup> Here we report effects computed from a bivariate probit that includes a first stage for participation in directly held stocks, as we have estimated a statistically significant (negative) correlation between effects of unobserved factors on the probability of direct stock ownership and that of trading intensively through brokerage accounts.