

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

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## *Abstract*

Existing studies of household stock trading using administrative data offer conflicting results: discount brokerage accounts exhibit excessive trading, while retirement accounts show inactivity. This paper uses population-wide data from PSID and SCF to examine the overall extent of household portfolio inertia in participation and trading and its link to household characteristics and stock market movements. We document considerable portfolio inertia, linked to characteristics (e.g., low education or limited resources), but hardly to index movements. The downswing seems to have encouraged *staying* out, rather than *getting* out of the market. We find important differences in trading patterns of the small minority with brokerage accounts relative to the population; and small fractions of owners' wealth in those accounts. Our findings strengthen the case for default options in retirement accounts and for funds with built-in trading provisions. While households did not overreact to the downswing through massive sales or exits, this seems more a manifestation of widespread inertia than of optimal response to stock market fluctuations.

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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 (see Campbell, 2006; and the contributions in Guiso, Haliassos, and Jappelli, 2001). 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, in the face of increased participation and of stock market fluctuations. Yet these issues can be quite important, as households increasingly undertake stockholding risk in their portfolios and are asked to provide for old age.

There is no general theory of what determines stock trading behavior. Implications of theoretical models range from no trading at all (Milgrom and Stokey, 1982)<sup>1</sup> 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, 1998b). Recent theoretical models of household portfolio choice with background income risk<sup>2</sup> imply that households should adjust their stockholding participation status or portfolio shares of risky assets in response to household-specific changes (e.g., in wealth, income or age) or to changes in the market environment (e.g., expected returns or volatility).

Existing empirical literature on household stock trading, mostly based on administrative data, is remarkably polarized. One strand, emanating from Finance, focuses on (discount) brokerage account data and argues that households overtrade to their detriment, because of high transactions costs.<sup>3</sup> The other, emanating from Economics, studies retirement account data and 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’.<sup>4</sup> Researchers have gone their separate ways, with Finance focusing on households with brokerage accounts as relevant for asset pricing; and Economics on public policy and retirement financing.

Despite several attractive features, administrative data fail to provide answers to three important sets of questions. First, what determines household entry into and exit from the particular market? Second, how widespread is each type of trading behavior across the population, and which household groups does it mostly concern? Third, does a particular trading pattern characterize most of household stockholding or only relatively small fractions of households and of their assets?

This paper uses two population-wide surveys with complementary strengths to study participation transitions and stock trading behavior of US households at large, and the demographic characteristics that correlate with them. We address two sets of questions. First, how widespread is inertia in participation status and in stock trading, how does it depend on household characteristics, and has it changed in response to the stock market downturn? Second, how widespread is overtrading in the population, compared to among brokerage account owners; and what fraction of assets of the latter do brokerage accounts represent?

The extent of portfolio inertia is relevant for a number of topical issues. First, in designing retirement savings plans, attention has recently been paid to ‘default options’.<sup>5</sup> If portfolio inertia is widespread, attention is needed in designing such options, as people are likely to stay with them for a long time. Furthermore, policy makers or the finance industry can respond to widespread inactivity in certain demographic groups by directing them to schemes with built-in mechanisms for changing allocations as households age or their conditions change (e.g., life-cycle plans). Portfolio inertia can also strengthen the implications of recent research on

financial sophistication and the potential importance of investment mistakes:<sup>6</sup> In its presence, certain household categories may not only be prone to making investment mistakes but also unlikely to correct them over time. This is particularly relevant as equity culture spreads and ‘marginal’ investors, who are ‘small’ in terms of resources and less financially sophisticated, are drawn into the market.<sup>7</sup>

We employ several waves from the Panel Study of Income Dynamics (PSID) and of the Survey of Consumer Finances (SCF), the two US representative data sets with the most detailed information on household wealth and its components.<sup>8</sup> The PSID is a natural candidate for tracking changes in participation status and trading activity, because of its panel structure. It can describe well the median household in the economy which often holds very little wealth in stocks. The SCF can instead tell us a lot about the wealthy households who hold the bulk of stock wealth, including those who are more likely to hold brokerage accounts than the general population. We consider various types of stockholding: direct, through mutual funds, and through retirement accounts.

Panel survey data, whether on household finances or on labor market status, sometimes contain responses that appear inconsistent, and this may discourage some from exploiting the information they provide, both across households and across time. We take these concerns seriously and perform extensive robustness analysis to show that our basic results are not sensitive to the treatment of conflicting responses.

We find that, while households with brokerage accounts exhibit great incidence and frequency of trading consistent with the literature on overtrading, the bulk of the population exhibits considerable inertia, both in trading and in entry and exit, to an extent linked to characteristics but hardly to stock market conditions. By contrast, frequency of trading in brokerage accounts does appear sensitive to index

movements. Still, we find that households with brokerage accounts typically hold a small share of their financial assets and of their net wealth in those accounts, limiting the importance of returns on those accounts for overall household finances.

To our knowledge, there is little previous work on stock trading using representative survey data, and with different focus. Souleles (1999) studies determinants of the size of securities purchases, combining data from the Consumer Expenditure (CEX) and the Michigan consumer sentiment surveys. He finds that household-specific hedging motives have predictive power above and beyond information in returns. Guskova, Juster, and Stafford (2004) use PSID data from 1994 and 1999 to test simple cost-based explanations for participation.<sup>9</sup> Brunnermeier and Nagel (2005) study whether wealth fluctuations induce changes in risk aversion, using PSID and CEX. They find that wealth shocks do not induce households to change their risky portfolio share, conditional on participation, but capital gains and losses do. Both findings are consistent with trading inactivity, conditional on participation, and they nicely complement ours.

Section 2 describes the data and the steps to ensure that our results are not caused by potentially inconsistent responses. Section 3 presents results from the PSID regarding entry and exit, combining all types of stockholding. Section 4 first uses PSID to document and study inertia in trading, and trading practices regarding directly held stock and mutual funds. It then reports findings on trading directly held stocks through brokerage accounts, based on the SCF. Section 5 concludes.

## **2. The Data**

We use panel data from the PSID, the best population-wide panel survey data on stock trading and participation;<sup>10</sup> and repeated cross sections from the SCF, which

includes even more detailed information on portfolios and characteristics; and retrospective questions on a shorter time period. Summary statistics of the main variables are provided in Appendix A.

The PSID has been interviewing households on an annual basis between 1968 and 1996. Since 1996, interviews are conducted biennially. We employ data from the survey years that provide detailed information on wealth components: 1984, 1989, 1994, 1999, 2001 and 2003. We confine attention to families that experienced no change in head. Up to and including 1994, 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 regression analysis, we control separately for net financial and net real wealth, to allow for differential effects. Net financial wealth includes 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).<sup>11</sup> Net real 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 plus equity in vehicles.<sup>12</sup>

In each interview, households were asked about stock transactions since the last survey year: whether they purchased or sold stocks and the amounts transacted. Information on the within-interval frequency of such trading is not available. Up to 1994, questions refer to transactions including in IRAs. From 1999 onwards respondents were asked about transactions in non-IRA stocks only.<sup>13</sup> We mainly look at transactions between 1994 and 1999; and between 1999 and 2003, combining information from the 1999-2001 and 2001-2003 sub-periods. We also look at transactions prior to 1994, which also include stocks in IRAs.

For some households, PSID responses to trading questions do not always match up with responses to questions on stockholding participation. For example, a household may respond that it was a stockholder (non-stockholder) during the previous wave, that it is currently a non-stockholder (stockholder), and that it has never sold (bought) stocks in between. Some of these responses may reflect stock transfers without trades, some may arise purely from survey collection practices, 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. Rather than ignoring these data points, we have chosen to take a number of steps to ensure robustness of our results.

First, we use variables that are normally subject to less measurement error, namely responses of binary nature regarding the *incidence* of trading, rather than stated amounts. Interestingly, some recent careful studies have found plausible results using amounts.<sup>14</sup> Second, we look at both participation and trading inertia: since current ownership is likely to be subject to less measurement error than reported past trading practices, it is interesting that both point to widespread inertia in the population at large. Third, since we focus our analysis on periods 1994-1999 and

1999-2003, it is sufficient to use questions for trading only from 1999 onwards. These – in contrast to what was the case before 1994- do not include stocks in employer-based pensions or IRAs for which trading may be less obvious to respondents. Fourth, when studying the period 1999-2003, we use information from waves 2001 and 2003 that record trading for a shorter period (two years) and are thus less likely to suffer from recall bias.

Perhaps most importantly, we redo the whole statistical and econometric analysis by dropping all observations that contain potential inconsistencies,<sup>15</sup> and we report the tables corresponding to 6a - 6d, 8 and 9 in an Appendix available from the authors on request. Results in all tables are highly comparable in terms of sign, significance and magnitude, whether potentially inconsistent responses are included or not. The very few exceptions refer only to orders of magnitude and will be explicitly noted below. Thus, even if not all responses are consistent, inconsistent responses do not appear to distort results.

We also employ data from the 1989, 1992, 1995, 1998, 2001 and 2004 Surveys of Consumer Finances (see Appendix B for description of variables). Unlike the PSID, the SCF does not track the same unit over time, so the data represent a time series of cross sections. However, SCF does include useful retrospective questions. Households are first asked whether they hold a brokerage account for the purchase or sale of stocks and other securities. Those 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. In view of the more limited horizon of the retrospective question, similarity of results between the PSID and the SCF yields further support to the notion that recall problems, if present, are not sufficiently strong to distort results based on PSID data.

### **3. Stock Market Entry and Exit**

#### **3.1. Entries and Exits in PSID Data**

The period 1984-2003 has been one of continuous increase in the proportions of US households participating in the stock market, in virtually all age-income and age-wealth groups. Tables 1.a and 1.b show that this increase continued (with few exceptions for those 35-49) even in the period 1999-2003, which incorporates the downswing. On the whole, poorer households exhibited much greater increases proportionally than households in the top quartile of either the income or the wealth distribution, but not sufficient to catch up with the richest quartiles.

In order to study inertia in stockholding participation status, we first look at the tendency to have the same status at the end of the sample period as at the beginning. Both conceptually and in practice, inertia of this type is distinct from trading inactivity. In principle, a stockholder can trade a lot without changing participation status; and changing 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 could induce entry or exit without registering trades.

Tables 2a and 2b present a breakdown of households according to their combination of participation status at the endpoints of periods 1994-1999 and 1999-2003, using 1999 sample 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 2a), 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 2b), 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>16</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.

### **3.2. What Determines Entry, Exit, and Inertia in Participation Status?**

In this section, we ask which factors tend to influence entry, exit, or unchanged participation status across 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.

To study switches of participation status, we estimate bivariate probits regarding status at the beginning and at the end of the two periods (1994-1999, and 1999-2003). We allow unobserved heterogeneity to influence participation decisions at both interval end points, and each observable factor to have potentially different effects at each end point. We consider balanced samples across two nodes at a time, but 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 non-participation with the decision to hold no assets at all (or the inability to do so).

Fixed entry costs are probably the dominant factor explaining limited participation in the stock market in existing literature, and key to understanding what limits entry into the stock market.<sup>17</sup> Factors that reduce the amount of stockholding that the household would undertake if it gained access to the stock market or raise fixed entry costs have been found in existing static participation literature to be relevant for participation status. Such factors also serve to reduce the probability that a household would decide to pay any given fixed cost to switch participation status from non-stockholder to stockholder.

Tables 3 and 4 present marginal effects from our bivariate probit regressions.<sup>18</sup> Results on participation in a given period are consistent with static participation studies. We find positive correlation between unobserved factors influencing participation at the beginning and at the end of the period (estimated correlations are denoted by  $\rho$  at the bottom of the table).

Figure 1 plots predicted conditional probabilities of participation for households in the 25<sup>th</sup>, the 50<sup>th</sup>, or the 75<sup>th</sup> percentile of each distribution of resources (income, net financial wealth, and net real wealth), with remaining characteristics set equal to weighted sample medians. Probabilities of maintaining or switching to stockholder status are higher for those higher in these distributions. This is consistent with theory, because of the positive effect of cash on hand on stock demand.

Conditional on participation status at the start of the period, the probability of exhibiting the same status at the end is greater than the probability of exhibiting a changed status, a manifestation of inertia. Estimated conditional probabilities of staying in the stock market are not very dissimilar across the upswing and downswing, suggesting that they are not particularly sensitive to the stock market environment when we look at the population at large. 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 discouraged non-participants from entering rather than encouraging a mass exodus from the stock market.

The role of educational attainment in participation status inertia is less clear a priori. Higher educational attainment tends to be associated empirically with steeper age-earnings profiles and with lower variances of shocks to labor income.<sup>19</sup> This alone reduces the incentive of more educated households to save, but is to be set against their lower costs in processing information relevant for stockholding.

Figure 2 plots estimated conditional probabilities varying the educational attainment of the household head. Controlling for other characteristics (set at the median), college graduates are more likely to switch into ownership than to remain non-participants, both before and after the stock market downswing. Households with lower attainment tend to exhibit participation inertia. Regardless of education, the median household (in terms of other characteristics) has higher probability to stay out of the market after the downswing than during the upswing.

Exits from the stock market (i.e. switches from participation to non-participation status) have received little attention in existing literature.<sup>20</sup> As Figure 2 shows, conditional probabilities of exit are quite similar before and after the downswing, with high school graduates exhibiting some increase in their exit probability, controlling for other characteristics.

In theory, a drop in current cash on hand (relative to the permanent component of non-asset income) can push a household previously holding stocks into a region of binding borrowing constraints, where stockholding is no longer optimal. Recurring participation costs can induce exits even without major drops in resources. In their

presence, factors that reduce demand for stocks (e.g., drop in resources, aging, retirement) can prompt households to exit when paying the participation cost is no longer warranted.

Table 5.1 presents marginal effects on the estimated probability of having exited from the stock market by the end of the period. Lower household resources (income, non-stock net financial wealth, or net real wealth) significantly encourage exit from the stock market, in good and in bad times. Liquid resources, but not real wealth, become more important in bad times, as indicated by larger marginal effects.

Minority status encourages exit to a large extent in both periods, but especially in bad times. The typical finding in static participation studies that minority status reduces participation probability is usually attributed to limited targeting of minorities by the financial sector. Our findings suggest that the effect extends to a more ‘shaky’ participation status of minorities, even after they decide to become stockholders.

Poor health could also contribute to exits, by increasing costs of processing information and imposing expenditure commitments. Higher precautionary wealth demand arising from increased perceived risk of future health expenditures could have an opposite effect by boosting stock demand. We find no overall effect of poor health on the conditional probability of exit during the upswing, but an increase in the exit probability during the downswing of about 6 percentage points.

All in all, entry and exit for all types of stockholding combined have not changed much across 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.<sup>21</sup> Nevertheless, exits depend on a number of household characteristics, and the downswing seems to have strengthened the effects of factors such as liquid resources, minority status, and poor health.

#### **4. Stock Trading Incidence and Patterns**

In this Section, we compare household trading behavior in periods of different stock market conditions. We first look at trading behavior of the population at large, using data representative of median behavior, namely the PSID. We then confront the apparent incompatibility of the ‘overtrading’ literature with the ‘portfolio inactivity’ literature, using SCF data. SCF encompasses households with brokerage accounts and gives a good picture of the top wealth percentiles where such households and a lot of stockholding are concentrated.

Clearly, factors discussed in the previous section as contributing to changes in participation status can be expected to contribute also to trading, typically used to change status. Factors that influence demand for stocks would also be relevant for trading by stockholders who do not change participation status. The same holds for those that influence per period participation costs. Good performance of the market could also induce purchases, if it leads to expectations of better future performance, e.g., because of ‘return chasing’. Asymmetries between decisions to buy and to sell could be induced by tax considerations, such as capital gains taxation at realization, or by behavioral factors such as the disposition effect. ‘Overconfidence’, stressed by Barber and Odean, could encourage excessive trading in both directions.

There is no reason to expect the same trading patterns across all types of stockholding. Trading costs, tax implications, and investor willingness to trade can all differ. 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. Trades of directly held stocks may be costly, both in terms of commissions and bid-ask spreads but also in terms of capital gains taxes. Households

may be less willing to engage in speculative trading of their retirement accumulations compared to mutual funds and directly held stocks.<sup>22</sup>

When using PSID data, we focus on stocks other than stocks in IRAs. While this is done in order to be able to compare data before and after the stock market downswing, it provides a nice complement to the work of Ameriks and Zeldes (2004) that focuses on (TIAA-CREF) retirement portfolios. In our discussion of brokerage accounts using the SCF, we focus on the relevant part of stockholding for overtrading, namely directly held stocks.

#### **4.1. Trading Incidence and Patterns Across Demographic Groups**

Using the survey responses in PSID, we 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 PSID data, unlike in SCF, we do not observe the number of transactions. In Tables 6a-d, we consider a full balanced panel of households in 1994, 1999, 2001, and 2003, using 1999 sample weights. The period of stock market boom (1994-1999) and that following the downswing (1999-2003) are of almost equal length, so that comparisons of rates of inertia are meaningful. The period following the burst of the bubble is further broken down into the immediate aftermath of the downswing (1999-2001), and the subsequent period (2001-2003), by which households have had time to adjust their portfolios.

As shown in Table 6a, the vast majority of households exhibit trade inactivity, with those reporting no stock market trade being almost three quarters during the five year boom period, and only slightly fewer during the subsequent four-year period. Not only is there a high level of inertia, but also an important and persistent asymmetry in

behavior: households are much more likely to buy rather than sell stocks. This remains true across time periods. The stock market downswing was not associated with sizeable increases in the incidence of stock trading or of only selling stock, but with some increase in trading in both directions.

When breaking down the downswing into two sub-periods, namely 1999-2001 and 2001-2003, we do find evidence of somewhat greater inactivity in the sub-period more distant to the downswing of 2000. Among those who did trade, lower proportions purchased stocks (either on their own or in conjunction with stock sales) in 2001-2003 relative to 1999-2001 and more only sold stocks, though they do not account for more than 3.5 percent of households.

Table 6b shows that inactivity is more limited across more educated groups, but even the majority of college graduates reports no trade in each of 1994-1999 and 1999-2003.<sup>23</sup> Rates of inertia in trade were higher in the second sub-period following the downswing, at least for those with a high school certificate or more.

Table 6c shows that inactivity is spread across all ages but in a U-shaped pattern, with inactivity being higher for households with heads below 35 and above 65 years. Comparing the upswing to the downswing, we do not find dramatic changes in proportions not trading at all, except perhaps for signs of increased activity among those in the 49-65 age group. Proportions of inactive households have 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, with all groups exhibiting somewhat higher inactivity in the second sub-period.

The incidence of inactivity differs across net wealth percentiles excluding wealth held in stocks, with those higher up tending to exhibit lower incidence (Table 6d).<sup>24</sup> Among the bottom two quartiles, the proportion not trading stocks is higher

following the downswing than before. It is lower among the top two quartiles, especially in the top one where the bulk of stockholding is concentrated. We find increased inactivity in the second sub-period following the downswing among all wealth quartiles, especially among the richest.

Table 7 looks at the entire period from 1984 to 2003.<sup>25</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. Overall trading inactivity 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>26</sup>

#### **4.2. What Determines Inactivity and Trading Practices?**

In this Section, we study the role of a number of household characteristics in determining inactivity and trading patterns for stocks not held in IRAs. We run two multinomial logits, for 1994-1999 and for 1999-2003. We divide households into five, mutually exclusive, categories. The first comprises those who do not trade stocks at all during the estimation period and also do not report ownership of stocks in either period. The second represents those who do not trade but report owning stocks in at least one of the two interview years. This distinguishes between those who do not trade because they have no involvement in stocks and those who are involved but inactive. For those reporting some stock trading, three choices are considered: to buy only, to sell only, and to trade in both directions.<sup>27</sup>

Tables 8 and 9 report marginal effects for 1994-1999 and 1999-2003, respectively.<sup>28</sup> During the upswing, and controlling for other factors, being younger than 50 makes households more likely not to have any involvement in stocks (relative to those between 50 and 65), but if they do, to show some trading activity.

Interestingly, age effects on trading activity essentially disappear after the stock market downturn. This suggests that the experience of the downturn may have discouraged young people from trading stocks to build their portfolios, but we also do not find evidence that they were selling stocks to shift towards other assets. Being above 65 does not appear to influence inactivity. This argues against pure horizon effects that should induce households to sell 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. Similarly, entering retirement does not appear to encourage unidirectional sales of stock to finance consumption, nor trade in both directions.

Having more children discourages not only stock market participation but also options that involve purchase of stocks. A larger number of children acts both as a strain on current resources and as committed future expenditures that discourage exposure to stockholding risk. These considerations appear to dominate the motive to exploit the equity premium for generating future wealth.

Belonging to a minority tends to encourage inactivity in trade, both before and after the stock market downswing. Again, this is consistent with more limited targeting of minorities by the financial sector. We do not find strong health effects on portfolio inactivity or on trading patterns, except for some negative effect on the tendency to buy and sell stocks in the same period.

Education encourages trading in any direction and effects are stronger following the downswing. Higher income or higher net financial wealth encourages purchases of stocks, alone or in conjunction with stock sales. Net real wealth has no effect prior to the downswing, but following the downswing it strongly encourages purchases of stock, even combined with sales. The fall in stock prices may have

encouraged households with substantial holdings of real equity to trade in stocks, either liquidating some real wealth or switching out of less risky assets. Interestingly, controlling for the level of real wealth, owning a business has no effect on stock trading. We thus find no obvious link between entrepreneurial spirit or entrepreneurial risk taking and tendency to trade stocks actively, although in Tables 3 and 4 we did find that business ownership is significantly correlated with stock ownership.

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 receiving household. Both features could encourage stock trades. We find that the response of trading to receipts of inheritance or large gifts since the last survey is fairly similar but not identical to the response to other changes in wealth. Receipt of inheritance or large gifts tends to encourage simultaneous sales and purchases of stock. However, such receipt seems to encourage stock purchases during the upswing, but options involving stock sales during the downswing.<sup>29</sup>

### **4.3. Trading through Brokerage Accounts**

Given the tension between administrative data on brokerage and on retirement accounts, we use the SCF to study trading of directly held stocks through brokerage accounts. Representative data allow us to correct for the fact that brokerage account owners represent a non-random sample. The SCF asks households first whether they have a brokerage account. Those who do are then asked whether they have traded and how many times over the year prior to the Survey. We use all waves, 1989-2004.

Table 10 demonstrates that, although relatively few households do own brokerage accounts, the vast majority of owners trade even in the space of a year. The first column reports the percentage of direct stockholders. The second 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 with the latter. Despite a doubling in the proportion of brokerage account owners between 1989 and 2001, less than 20% of households have a brokerage account. The third column shows the percentage of households who bought or sold stocks or other securities through a broker during the year preceding the Survey. While this percentage also nearly doubled, it remained well below 15%. However, among brokerage account owners, between two thirds and three quarters traded in the year preceding each SCF. This fundamental difference in behavior underlies the very different results obtained to date on the basis of different sets of administrative accounts.

We ask next what fraction of their own financial wealth households with brokerage accounts hold in these accounts. This is relevant for understanding how important these accounts are for their owners' finances. We compute the total value of directly held stocks among brokerage account owners plus the value of cash or call money accounts minus outstanding margin loans. As Table 11 shows, the median brokerage account as a share of household financial wealth for brokerage account owners is of the order of 10% or less. As a share of net total wealth, it is of the order of 3.5%. The respective median shares in the population as a whole are zero.

Econometric analysis allows us to probe further into the role that characteristics play in determining ownership of brokerage accounts, and the role characteristics and market conditions play in determining both whether trading through brokerage accounts occurs and how frequent it is. We find that household characteristics have a significant role to play, but so do stock market conditions that were not found in previous sections to influence much the population at large.

We pool data from SCFs between 1989 and 2004 and estimate a two step probit regression, which allows for selection. The first stage models the probability of having a brokerage account, while the second models the probability of having traded through a brokerage account during the year prior to the survey. The first column of Table 12 refers to marginal effects on the probability of holding a brokerage account and the second displays conditional marginal effects for the incidence of stock trading through a brokerage account during the year prior to the survey.

In addition to allowing for a number of household characteristics, we include in the first stage a full set of time dummies, while in the second 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 big enough to influence the stock price index, these growth rates are truly exogenous to its trading decision. These prior-year S&P real growth rates were positive for all Surveys, except for 1995 and 2001.<sup>30</sup> Apart from the S&P real growth rates and a dummy that represents years which show a negative rate, we also include in our specification an interaction term allowing the coefficient on the real growth rate of the index to differ between periods of upswing and downswing.

Our findings reject the null of zero correlation between unobserved determinants of the two decisions (the estimated  $\rho$ , reported at the bottom of the table, is .99 and strongly significant). This implies that we cannot ignore the selection mechanism (probability of owning brokerage accounts) when studying the incidence of trading directly held stocks. We find sizeable marginal effects of the education variables on the probability of owning a brokerage account, with a college graduate being 17 percent more likely to own such an account. Strong positive effects were also obtained with respect to financial control variables, intention to leave a bequest, and

expressed willingness to take above average financial risk. On the other hand, poor health and children reduce the probability of having a brokerage account. Finally, the time dummies suggest a significant increase in ownership of brokerage accounts throughout the period under consideration.

In the second stage, stock market performance exerts an important influence on trading directly held stocks through brokerage accounts. Based on our estimates, a faster drop in the index during a downswing contributes more to the probability that the household with a brokerage account will trade directly held stocks than a faster increase in the index during upswings<sup>31</sup>. Note that this does not necessarily imply stock sales: increased incidence of trades could refer to purchases, sales, or trades in both directions. This finding may arise from capital gains taxation considerations: the faster the index changes the more likely it is that a given household experiences capital losses (gains) on the asset in question. The fact that capital losses but not capital gains can be written off could contribute to this asymmetry. The phenomenon could be further strengthened by behavioral considerations, such as extrapolation of current low (high) returns to the future for assets currently held by the household.

Other factors that significantly affect the probability of trading within a year, given brokerage account ownership and controlling for remaining characteristics, are net financial and net real wealth, being a college graduate, the willingness to take more than average financial risk, reporting a bequest motive,<sup>32</sup> ownership of a business, and working (or having worked) in the financial industry sector.<sup>33</sup> Each of the latter two factors increases the probability of owning a brokerage account by about 3pp, and the (conditional) probability of having traded stocks the year prior to the survey by a similar amount. This is in contrast to the result we obtained for PSID data:

entrepreneurial activity does contribute to ownership of, and to trading through brokerage accounts, but not to stock trading in general by households at large.

In order to study the frequency of trading, we estimate a two-step Heckman model where we first model the probability of holding brokerage accounts followed by estimation of the (logarithm) of the number of trades reported within a year. This yields very similar results to those we presented in Table 12 and are not shown for brevity. The effect of growth in the real S&P 500 index is still present, suggesting a similar pattern to the one we found earlier for the incidence of trading. Gender is now added to the factors reported earlier as having a significant effect on the probability of trading. The role of gender is consistent with the findings of Barber and Odean (2001) for administrative accounts.

The conclusion from this section is that trading through brokerage accounts tends to be much more frequent than trading among the general population and for other types of stockholding. It tends to be quite sensitive to movements in the stock market index, unlike what is implied by our findings for overall trading inactivity or entry and exit from the market. Households with brokerage accounts tend to hold only a small fraction of their financial assets in such accounts.

## **5. Concluding Remarks**

In this paper, we documented the extent and studied determinants of inertia in stockholding participation status and in stock trading in the face of considerable stock market movements. We used PSID and SCF data to capture behavior of median US households and those at the top of the distribution, respectively. Entry and exit in the population at large depend on a number of household characteristics, but are not fundamentally different across the stock market upswing and downswing. The

downswing is more likely to have encouraged *staying* out, rather than *getting* out of the market. Nevertheless, we find stronger influences of minority status, poor health, and limited liquid resources on the decision to exit the market during the downswing.

The vast majority of households in the population exhibit complete inactivity in trading stocks (not held in IRAs), across the upswing and downswing of the stock market, and even across the longer period from 1984 to 2003. We find no evidence that the proportion of households who only sold stocks increased following the recent downswing, but we observe somewhat greater trading inactivity in the period 2001-2003 compared to 1999-2001.

We have estimated positive effects of education on discouraging this inactivity, which become stronger following the downswing. Being young contributes to buying stocks during the upswing, but not after the downswing. Entering retirement does not appear to encourage trades to simply liquidate stocks. Higher income or net financial assets encourage purchases of stocks, alone as well as with sales, throughout the upswing and downswing. Receipt of inheritance or large gifts encourages simultaneous purchases and sales, and it also encourages trading *with* the market.

Results help resolve the stark contrast between overtrading and inactivity in administrative data. Only a small fraction of households own brokerage accounts, the vast majority of owners trade within a year, and their trading frequency responds to the index. Brokerage account ownership could serve as a proxy for high trading activity when trading data are not available. Owners of such accounts are few and tend to invest in them only small fractions of their financial assets. To the extent that trading in brokerage accounts induces volatility, overtrading may be relevant for asset pricing, but it seems dubious that it is of major importance for household finances.

Our findings of widespread inertia and of the relevance of low education and limited resources for promoting such inertia strengthen considerably the case for default options in retirement accounts and for funds that have built-in trading provisions, such as ‘lifecycle’ funds. While it is comforting that households did not overreact to the downswing through massive sales or exits from the stock market, this seems to be more a manifestation of widespread inertia regardless of stock market movements than an indication of optimal response to stock market fluctuations.

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## Appendix A: Summary Statistics of the Data

Table A1 presents summary statistics from the 3 waves of the PSID. Table A2 summarizes covariates from the pooled SCF data since 1989, for the whole sample and for the sub-sample of brokerage account owners.

**Table A1: PSID Data, by Wave**

	<b>1994</b>	<b>1999</b>	<b>2003</b>
Age	46	51	54
Male	0.75	0.75	0.75
Married	0.57	0.58	0.57
Number of children under 18 yrs old	0.71	0.62	0.53
White	0.83	0.84	0.84
High school graduate	0.54	0.54	0.54
College graduate	0.33	0.33	0.33
Health poor/fair	0.12	0.14	0.17
Household owns business	0.14	0.15	0.15
Unemployed	0.03	0.03	0.03
Retired	0.17	0.20	0.23
Others	0.06	0.07	0.06
Received inheritance last 5 yrs	0.07	0.09	0.05
Income (median)	47573	50420	49616
non equity net Fin. Wealth (median)	3585	5847	7700
net Real wealth (median)	51385	65164	77964

Weighted statistics from PSID 1994, 1999, 2003 balanced panel data. Numbers denote prevalence, except for age (mean), income, net real wealth, net financial wealth (medians in 2003 prices).

**Table A2: SCF Data, Pooled**

	<b>Whole Sample</b>	<b>Brokerage Account Owners</b>
Age	48.7	52.5
Male	0.72	0.84
High school graduate	0.50	0.32
College graduate	0.33	0.65
Married	0.59	0.71
Has children	0.44	0.38
White	0.76	0.92
Retired	0.25	0.24
Unemployed/ Other	0.06	0.02
Household works(ed) in financial industry	0.20	0.29
Household owns business	0.12	0.24
Household saves for “rainy days”	0.29	0.28
Financial alertness	0.21	0.23
Willingness to take above average fin. risk	0.18	0.37
Self-reported poor health	0.06	0.02
Intention to leave a bequest	0.29	0.48
Has received inheritance	0.21	0.35
Household is credit constrained	0.22	0.09
Investment horizon > 10 years	0.14	0.24
Non-investment Income (median)	36470	72788
non equity net Financial Wealth (median)	7225	152037
net Real Wealth (median)	55255	190720

SCF 1989,92,95,98,01,04 weighted data. The reported statistics are corrected for multiple imputation. Numbers denote prevalence, except for age (mean), non-investment income, net real wealth, net financial wealth (medians in 2004 prices).

## Appendix B: Definitions of Variables in SCF Data

**non equity net Financial Wealth:** Total Financial Assets – publicly traded Stocks – Other lines of credit - Credit Card Debt - Installment loans - Other Debt (loans against pensions, loans against life insurance, margin loans, miscellaneous)

**net Real Wealth:** [1] + [2] + [3] + [4] + [5] - [6] - [7] - [8]

[1] Wealth in Primary Residence: Gross value of primary residence

[2] Other Residential Real Estate (includes land contracts/notes household has made, properties - other than the principal residence - classified under certain codes for family residences, time shares and vacations homes)

[3] Gross equity in Non-residential Real Estate (real estate - other than the principal residence, properties classified under certain codes for family residences, time shares, and vacation homes)

[4] Business Equity (for businesses where the HH has an active interest, value is net equity if business were sold today, plus loans from HH to business, minus loans from business to HH not previously reported, plus value of personal assets used as collateral for business loans that were reported earlier; for businesses where the HH does not have an active interest, market value of the interest)

[5] Other Wealth: value of vehicles plus other non-financial miscellaneous assets

[6] Principal Residence Debt (mortgage, home equity loans and HELOCs --mopup LOCs divided between HE and other)

[7] Debt for Other Residential Property (includes land contracts, residential property other than the principal residence, misc. vacation, and installment debt reported for cottage/vacation home)

[8] Debt for non-residential real estate mortgages and other loans taken out for investment real estate

**Non-investment Income:** income from wages, salaries, professional practice or business unemployment compensation, social security, annuity, or other pensions.

**Note:** All monetary values have been deflated using the CPI-U-Research Series index and expressed into constant 2004 prices.

**No high school diploma** (omitted variable): Highest grade completed (X5901)<12 & No high school diploma or passed equivalent test (X5902=5) **High school graduate:** Highest grade completed (X5901)<12 & Has got high school diploma (X5902=1) or passed equivalent test (X5902=2) OR Highest grade completed (X5901)=12 OR Highest grade completed (X5901)>12 & No college degree (X5904=5) **College graduate:** Highest grade completed (X5901)>12 & Has got a college degree (X5904)=1

**Save for “rainy days”:** The survey question is “Now I'd like to ask a few questions about your (family's) savings. People have different reasons for saving. What are your (family's) most important reasons for saving?” The dummy refers to those reporting one of the following reasons: Emergencies; “rainy days”; other unexpected needs; for "security"/independence (X3006=25 or X3007=25).

**Financial alertness:** The survey question is “When making major decisions about borrowing and saving, some people shop around for the very best terms while others

don't. What number would you be on the scale?" The 10-number scale ranges from 1- "almost no shopping" to 10- "a great deal of shopping". Since 1995 the above question has been replaced by two separate ones – one for borrowing and one for saving – with responses coded on a 1 to 5 scale. We have standardized these measures by averaging the two questions asked in post 1995 surveys and express them in 1-10 scale. The dummy represents those declaring that they do a great deal of shopping (values 9, 10 in the scale).

**Credit constrained:** Indicates household response that it has been turned down for credit in the past five years or did not receive amount originally requested or did not apply for credit because it thought it might be turned down.

**Willingness to take above average financial risk:** The survey question is "Which of the following statements comes closest to the amount of financial risk that you and your (spouse/partner) are willing to take when you save or make investments?"

1. take substantial financial risks expecting to earn substantial returns
2. take above average financial risks expecting to earn above average returns
3. take average financial risks expecting to earn average returns
4. not willing to take any financial risks"

The dummy represents those answering 1 or 2. (X3014=1 or X3014=2).

**Health poor:** The survey question is "Would you say your health is excellent, good, fair, or poor?" Those describing their health as being poor are represented by the dummy (X6030=4).

**Intention to leave a bequest:** Yes to "Do you expect to leave a sizable estate to others?" (X5825=1).

**Has received inheritance:** Yes to "Have you ever received an inheritance, or been given substantial assets in a trust or in some other form?" (X5801=1).

**Investment horizon:** The dummy represents those declaring that a period longer than 10 years is important when making their family's saving and spending plan (X3008)

**Household work(s/ed) in the financial industry:** The dummy represents households in which any member of the couple works in the "Finance, Insurance & Real Estate" or "Business & Repair Services" sectors (x7402, x7412). The same applies to those who currently work full or part time in a different sector or they do not work (unemployed, inactive or retired) and they used to work in the past in one of these two sectors (x7406, x7416 / x7408, x7418 / x7410, x7420).

## Appendix C: Simulated Average Marginal Effects

Standard econometric packages automatically report marginal effects for each variable evaluated at mean remaining characteristics. Although it is standard practice to report such automatically generated marginal effects, this is often not economically relevant and sometimes even misleading. For example, it fails to distinguish among single dummy variables and groups of dummy variables that represent a given attribute; or properly evaluate effects of continuous variables entering with particular nonlinear forms; or of variables interacted with other regressors.<sup>34</sup> Deriving averages of marginal effects that have been first evaluated at each single observation can provide instead a more realistic and economically relevant interpretation.

In this paper, we compute reported marginal effects in the following way. We start by estimating the relevant limited dependent variable model. We then simulate the model parameters (including  $\rho$  for models of bivariate probit and probit with selection) by making 1000 independent draws from the multivariate normal distribution, subject to the restrictions that the average of simulated values be equal to the respective estimated parameter and that the structure of the estimated robust variance covariance matrix be preserved. For each such set of simulated parameters, we calculate marginal effects for each individual household and then derive the weighted average marginal effect for the relevant population. We repeat the process for every set of simulated parameters, thus computing a series of average marginal effects. The mean of this series is the estimated marginal effect and the standard error is the simulated standard error of the marginal effect.

In cases of bivariate probit and probit with selection models we distinguish between unconditional and conditional marginal effects, using the formulae described in Green (2000, p.857 & 860) and calculating the average marginal effects over the full and selected samples, respectively. This allows us to make statements for the population or for a specific group that meets the first stage condition, taking into account correlations in unobserved heterogeneity or correcting for sample selection.

For SCF data, a final point is in order. SCF data have been constructed on the basis of repeated imputation, to eliminate missing values. Five different sets of imputed data are provided. We take into account this feature, by first applying the above procedure to each of the five imputates and then deriving marginal effects and standard errors that are corrected for multiple imputation according to Rubin (1987).

**Table 1.a: Stock Ownership Rates by Age-Income Quartiles, PSID Data**

	Age < 35				Age:35-49				Age:50-64				Age:65+			
	QI 1	QI 2	QI 3	QI 4	QI 1	QI 2	QI 3	QI 4	QI 1	QI 2	QI 3	QI 4	QI 1	QI 2	QI 3	QI 4
1984	4.8	12	22.2	42.1	5.5	13.1	25.3	48.7	3.4	18.7	30.1	57.9	7.6	23.5	40.6	55.9
1989	4.1	11.7	26.9	46.0	7.6	16.8	27.5	52.5	7.5	18.0	36.4	61.4	8.0	27.9	58.9	62.8
1994	3.7	18.0	30.6	54.7	7.9	21.3	37.4	60.7	19.1	31.3	43.0	70.2	11.0	33.2	56.7	77.9
1999	8.4	18.8	31.9	59.4	8.0	25.5	42.3	67.6	24.5	39.3	54.2	73.7	23.3	53.9	73.2	80.6
2003	11.0	20.4	40.7	59.3	13.8	22.8	41.1	66.3	24.3	44.0	62.5	78.3	31.0	56.6	65.5	85.9

Participation rates in stock ownership for each PSID wave since 1984 and for each Age – Income cell, using survey weights. “Stock” refers to shares of stock in publicly held corporations, mutual funds, or investment trusts – including stocks in employer-based pensions or IRAs.

**Table 1.b: Stock Ownership Rates by Age-Net Wealth Quartiles, PSID Data**

	Age < 35				Age:35-49				Age:50-64				Age:65+			
	QW 1	QW 2	QW 3	QW 4	QW 1	QW 2	QW 3	QW 4	QW 1	QW 2	QW 3	QW 4	QW 1	QW 2	QW 3	QW 4
1984	8.7	18.9	32.6	39.3	5.7	19.7	32.5	49.9	2.4	11.8	27.1	53	1.4	6.3	22.6	40.1
1989	6.2	25.3	35.2	44.2	7.7	22	36.2	57.4	3.1	17.2	28.3	58.1	1.2	6.5	24.8	48.7
1994	11.3	25.4	42.5	44.6	11.9	28.5	47.7	65.1	15.8	18.9	42.6	64.4	4.8	11.1	30.5	53
1999	14.3	25.8	45.5	58.3	10.9	29.3	54.1	78.4	9.4	27.5	54.9	77.7	6.3	24.1	44.4	69.3
2003	15.4	30.7	52.2	72.6	12.8	28.2	51.5	75.3	19.9	32.5	55.7	87	9.2	32.6	42.9	77.2

Participation rates in stock ownership for each PSID wave since 1984 and for each Age – Net Wealth (total wealth minus total debts and total stocks) cell, using survey weights. “Stock” refers to shares of stock in publicly held corporations, mutual funds, or investment trusts – including stocks in employer-based pensions or IRAs.

**Table 2a: 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 2b: 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 3: Bivariate Participation Probit, 1994-99**

	Own in 1994		Own in 1999	
	Marginal Effect	<i>t-value</i>	Marginal Effect	<i>t-value</i>
Age<35	-.1247	<i>5.21</i>	-.0793	<i>3.08</i>
35<Age<49	-.0569	<i>3.06</i>	-.0113	<i>0.72</i>
Age>65	-.0122	<i>0.28</i>	.0013	<i>0.07</i>
Married	.0276	<i>0.90</i>	.0453	<i>2.03</i>
# of children	-.0018	<i>0.30</i>	-.0164	<i>3.00</i>
White	.1636	<i>9.30</i>	.1727	<i>16.14</i>
Health poor/fair	-.0526	<i>1.81</i>	-.0429	<i>2.34</i>
High school graduate	.1498	<i>7.34</i>	.1612	<i>8.86</i>
College graduate	.3196	<i>11.93</i>	.3394	<i>19.57</i>
Household owns business	.0034	<i>0.15</i>	.0881	<i>4.17</i>
Income	.0020	<i>3.74</i>	.0026	<i>4.67</i>
non equity net Fin. Wealth	.0050	<i>7.40</i>	.0092	<i>9.48</i>
net Real wealth	.0040	<i>8.76</i>	.0044	<i>4.11</i>
Received inheritance last 5 yrs	.1340	<i>3.66</i>	.0851	<i>4.70</i>
Moved, 1994-99			.0009	<i>0.07</i>
$\hat{\rho}$	<i>.48 (s.e. .027)</i>			
Observations: 4,094	<i>log likelihood: -4133.4</i>			

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. 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. Marginal effects, averaged across households (using 1999 family weights), refer to changes in the probabilities of owning stocks in each of the two waves caused by changes in regressors. The regression accounts also for gender and labor status. It controls for income, non equity net financial wealth and net real wealth by logarithms using the transformation  $y=\ln(x)$  if  $x\geq 1$ ,  $y=-\ln(|x|)$  if  $x\leq -1$  and  $y=0$  if  $-1<x<1$ . The marginal effects for income, non equity financial wealth and net real wealth are based on a \$1000 increase in the underlying variables. Numbers in italics report absolute t-values, derived from simulated standard errors (details can be found in Appendix C).

**Table 4: Bivariate Participation Probit, 1999-03**

	Own in 1999		Own in 2003	
	Marginal Effect	<i>t-value</i>	Marginal Effect	<i>t-value</i>
Age<35	-.0788	<i>3.45</i>	-.0723	<i>4.18</i>
35<Age<49	-.0048	<i>0.32</i>	-.0452	<i>4.42</i>
Age>65	-.0106	<i>0.62</i>	-.0172	<i>1.08</i>
Married	.0373	<i>1.70</i>	.0491	<i>2.07</i>
# of children	-.0213	<i>3.99</i>	-.0233	<i>3.28</i>
White	.1716	<i>14.92</i>	.1961	<i>13.79</i>
Health poor/fair	-.0189	<i>1.06</i>	-.0610	<i>3.09</i>
High school graduate	.1705	<i>8.50</i>	.1380	<i>8.39</i>
College graduate	.3401	<i>19.55</i>	.3366	<i>20.56</i>
Household owns business	.0837	<i>5.11</i>	.0592	<i>3.57</i>
Income	.0028	<i>6.75</i>	.0022	<i>3.89</i>
non equity net Fin. wealth	.0091	<i>11.96</i>	.0114	<i>10.94</i>
net Real wealth	.0046	<i>4.22</i>	.0032	<i>2.89</i>
Received inheritance last 5 yrs	.0758	<i>5.71</i>	.0586	<i>1.71</i>
Moved, 1999-03			.0029	<i>0.23</i>
$\hat{\rho}$	<i>.55 (s.e. .028)</i>			
Observations: 4,884	log likelihood: -4679.5			

Balanced PSID panel 1999, 03 of families with no change in head and with non zero financial wealth in at least one of the two waves. 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. Marginal effects, averaged across households (using 1999 family weights), refer to changes in the probabilities of owning stocks in each of the two waves caused by changes in regressors. The regression accounts also for gender and labor status. It controls for income, non equity net financial wealth and net real wealth by logarithms using the transformation  $y=\ln(x)$  if  $x\geq 1$ ,  $y=-\ln(|x|)$  if  $x\leq -1$  and  $y=0$  if  $-1<x<1$ . The marginal effects for income, non equity financial wealth and net real wealth are based on a \$1000 increase in the underlying variables. Numbers in italics report absolute t-values, derived from simulated standard errors (details can be found in Appendix C).

**Table 5: Selected Marginal Effects on the Probability to Exit from the Stock Market Conditional on Participation in the first period**

	1994-1999		1999-2003	
	Marginal Effect	<i>t-value</i>	Marginal Effect	<i>t-value</i>
White	-.1182	<i>8.49</i>	-.1460	<i>9.01</i>
Health poor/fair	.0241	<i>1.46</i>	.0559	<i>2.82</i>
Income	-.0013	<i>2.85</i>	-.0020	<i>3.67</i>
non equity net Fin. wealth	-.0053	<i>10.30</i>	-.0066	<i>10.75</i>
net Real wealth	-.0025	<i>3.59</i>	-.0023	<i>2.71</i>

Conditional marginal effects, averaged across households who own stocks in period one (using 1999 family weights), have been derived from the bivariate probit specifications presented in Tables 2 and 3. They refer to changes in the conditional bivariate probabilities of not owning stocks in period two given ownership in period one, caused by changes in regressors. The marginal effects for income, non equity financial wealth and net real wealth are based on a \$1000 increase in the underlying variables in the second period. Numbers in italics report absolute t-values, derived from simulated standard errors (details can be found in Appendix C).

**Table 6a: Stock Trading Inactivity 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 6b: Stock Trading Inactivity 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 6c: Stock Trading Inactivity 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 6d: Stock Trading Inactivity 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 7: Stock Trading Inactivity 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

♦ Percentages in these two rows are comparable between them but not directly comparable to the rest, as they refer to shorter periods of time.

**Table 8: Multinomial Logit of Inactivity in Trade and of Trading Practices: 1994-1999**

	No involvement with stocks		Involvement with stocks, but no trade		Buy only		Sell only		Buy & Sell	
	Marginal Effect	<i>t-value</i>	Marginal Effect	<i>t-value</i>	Marginal Effect	<i>t-value</i>	Marginal Effect	<i>t-value</i>	Marginal Effect	<i>t-value</i>
Age<35	.0612	2.35	-.1109	3.92	.0456	2.31	-.0314	2.98	.0355	1.93
35<Age<49	.0339	1.40	-.0647	2.49	.0339	2.03	-.0248	2.38	.0218	1.53
Age>65	-.0015	0.05	-.0218	0.59	-.0078	0.36	.0044	0.26	.0267	1.13
Married	-.0265	1.24	.0406	1.70	.0213	1.30	-.0024	0.27	-.0330	1.85
# of children	.0165	2.47	.0086	1.16	-.0137	2.81	-.0012	0.41	-.0102	1.84
White	-.1930	10.48	.0501	2.74	.0503	4.26	.0224	3.52	.0702	6.55
Health poor/fair	.0712	2.95	-.0324	1.29	-.0043	0.20	.0071	0.61	-.0416	2.23
Health gets worse, 1994-99	.0350	1.27	.0163	0.51	-.0300	1.31	-.0064	0.59	-.0149	0.61
High school graduate	-.1793	6.55	.0914	3.45	.0624	3.62	.0030	0.27	.0224	1.31
College graduate	-.3540	11.28	.1173	3.85	.1002	5.08	.0112	0.88	.1253	6.09
Become retired, 1994-99	-.0116	0.33	-.0600	1.74	.0067	0.23	.0141	0.82	.0509	1.73
Household owns business	-.0258	1.20	.0112	0.53	.0072	0.52	.0097	0.97	-.0023	0.17
Income	-.0037	5.80	.0012	2.26	.0010	4.46	.0002	1.60	.0013	4.54
non equity net Fin. Wealth	-.0064	6.96	.0031	3.65	.0022	4.67	-.0002	0.78	.0013	3.46
net Real wealth	-.0037	3.49	.0027	3.01	.0006	1.08	.0000	0.07	.0005	0.87
Received inheritance, 1989-94	-.1278	4.09	.0584	1.78	-.0102	0.52	.0141	0.99	.0655	3.20
Received inheritance, 1994-99	-.1061	4.09	-.0461	1.73	.0683	3.31	.0011	0.10	.0828	4.83
Moved, 1994-99	.0231	1.58	-.0255	1.58	-.0072	0.62	.0030	0.42	.0066	0.60
Observations:	log likelihood: -4412.9									

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. Trading regards shares of stock in publicly held corporations, mutual funds, or investment trusts – not including stocks in employer-based pensions or IRAs. Marginal effects, averaged across households (using 1999 family weights), refer to changes in the probability of an event’s occurrence caused by changes in regressors. The regression accounts also for gender and labor status. It controls for income, non equity net financial wealth and net real wealth by logarithms using the transformation  $y=\ln(x)$  if  $x\geq 1$ ,  $y= -\ln(|x|)$  if  $x\leq -1$  and  $y=0$  if  $-1<x<1$ . The marginal effects for income, non equity financial wealth and net real wealth are based on a \$1000 increase in the underlying variables and for children on the presence of an additional child. Numbers in italics report absolute t-values, derived from simulated standard errors (details can be found in Appendix C).

**Table 9: Multinomial Logit of Inactivity in Trade and of Trading Practices: 1999-2003**

	No involvement with stocks		Involvement with stocks, but no trade		Buy only		Sell only		Buy & Sell	
	Marginal Effect	<i>t-value</i>	Marginal Effect	<i>t-value</i>	Marginal Effect	<i>t-value</i>	Marginal Effect	<i>t-value</i>	Marginal Effect	<i>t-value</i>
Age<35	.0731	<i>3.31</i>	-.1020	<i>4.19</i>	.0121	<i>0.74</i>	.0000	<i>0.00</i>	.0168	<i>1.01</i>
35<Age<49	.0439	<i>2.33</i>	-.0620	<i>2.79</i>	.0206	<i>1.41</i>	.0053	<i>0.53</i>	-.0078	<i>0.61</i>
Age>65	.0386	<i>1.36</i>	-.0335	<i>1.01</i>	-.0228	<i>1.25</i>	-.0056	<i>0.44</i>	.0232	<i>0.99</i>
Married	-.0305	<i>1.56</i>	.0388	<i>1.75</i>	.0119	<i>0.81</i>	.0276	<i>2.30</i>	-.0478	<i>3.22</i>
# of children	.0223	<i>3.77</i>	.0005	<i>0.08</i>	-.0064	<i>1.16</i>	-.0026	<i>0.90</i>	-.0138	<i>2.75</i>
White	-.1745	<i>11.94</i>	.0582	<i>3.44</i>	.0341	<i>3.22</i>	.0191	<i>3.12</i>	.0631	<i>6.12</i>
Health poor/fair	.0651	<i>3.23</i>	-.0261	<i>1.10</i>	-.0078	<i>0.42</i>	-.0130	<i>1.39</i>	-.0182	<i>0.94</i>
Health gets worse, 1999-01	.0541	<i>2.23</i>	-.0302	<i>1.05</i>	-.0101	<i>0.48</i>	-.0184	<i>1.39</i>	.0046	<i>0.20</i>
Health gets worse, 2001-03	.0634	<i>2.43</i>	-.0147	<i>0.47</i>	-.0201	<i>0.89</i>	-.0029	<i>0.20</i>	-.0258	<i>1.13</i>
High school graduate	-.1669	<i>7.16</i>	.0458	<i>1.87</i>	.0612	<i>4.26</i>	.0186	<i>2.15</i>	.0414	<i>3.06</i>
College graduate	-.3230	<i>11.52</i>	.0346	<i>1.19</i>	.0945	<i>5.38</i>	.0402	<i>3.96</i>	.1537	<i>9.78</i>
Become retired, 1999-01	-.0354	<i>1.08</i>	-.0243	<i>0.66</i>	-.0143	<i>0.56</i>	.0266	<i>1.13</i>	.0475	<i>1.61</i>
Become retired, 2001-03	.1154	<i>3.32</i>	-.1022	<i>2.69</i>	.0107	<i>0.35</i>	-.0072	<i>0.40</i>	-.0167	<i>0.66</i>
Household owns business	-.0577	<i>2.91</i>	.0397	<i>1.90</i>	.0139	<i>1.04</i>	-.0040	<i>0.51</i>	.0082	<i>0.63</i>
Income	-.0034	<i>4.49</i>	.0015	<i>2.75</i>	.0006	<i>2.43</i>	-.0001	<i>0.17</i>	.0013	<i>10.23</i>
non equity net Fin. Wealth	-.0090	<i>9.97</i>	.0056	<i>6.41</i>	.0018	<i>3.67</i>	.0002	<i>0.64</i>	.0014	<i>4.48</i>
net Real wealth	-.0050	<i>4.07</i>	.0016	<i>1.47</i>	.0018	<i>3.88</i>	.0003	<i>0.60</i>	.0013	<i>2.70</i>
Received inheritance, 1994-99	-.0486	<i>1.96</i>	-.0555	<i>2.15</i>	.0001	<i>0.01</i>	.0281	<i>2.05</i>	.0758	<i>4.19</i>
Received inheritance, 1998-03	-.0469	<i>1.46</i>	-.0307	<i>0.90</i>	.0062	<i>0.29</i>	.0354	<i>1.91</i>	.0360	<i>1.77</i>
Moved, 1999-01	-.0032	<i>0.22</i>	-.0416	<i>2.36</i>	.0080	<i>0.65</i>	.0157	<i>1.68</i>	.0210	<i>1.60</i>
Moved, 2001-03	.0067	<i>0.50</i>	-.0206	<i>1.26</i>	.0073	<i>0.60</i>	.0002	<i>0.02</i>	.0064	<i>0.52</i>
Observations: 4,976	log likelihood: -5406.4									

Balanced PSID panel 1999, 01 and 03 of families with no change in head and with non zero financial wealth in at least one of the three waves. Trading regards shares of stock in publicly held corporations, mutual funds, or investment trusts – not including stocks in employer-based pensions or IRAs. Marginal effects, averaged across households (using 1999 family weights), refer to changes in the probability of an event's occurrence caused by changes in regressors. The regression accounts also for gender and labor status. It controls for income, non equity net financial wealth and net real wealth by logarithms using the transformation  $y=\ln(x)$  if  $x\geq 1$ ,  $y= -\ln(|x|)$  if  $x\leq -1$  and  $y=0$  if  $-1<x<1$ . The marginal effects for income, non equity financial wealth and net real wealth are based on a \$1000 increase in the underlying variables. Numbers in italics report absolute t-values, derived from simulated standard errors (details can be found in Appendix C).

**Table 10: Trading in the Population and Among Owners of Brokerage Accounts**

<b>Period</b>	<b>Stock ownership rates *</b>	<b>Brokerage account **</b>	<b>Stock trading rates ***</b>	<b>Stock trading rates among brokerage account owners</b>
1988-89	16.9%	9.4%	6.8%	72.0%
1991-92	17.0%	12.5%	8.6%	69.0%
1994-95	15.3%	12.1%	8.3%	68.3%
1997-98	19.2%	15.5%	11.8%	76.2%
2000-01	21.3%	18.2%	13.5%	74.3%
2003-04	20.7%	15.8%	10.4%	65.4%

SCF 1989,92,95,98,01,04 weighted data. The reported statistics are corrected for multiple imputation.

\* % of households with directly held equity

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

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

**Table 11: Fraction of Financial Wealth Held in Brokerage Accounts**

Year	Mean Unconditional Share	Mean Conditional Share	Median Unconditional Share	Median Conditional Share
1989	0.028*	0.268*	0*	0.190*
1992	0.026	0.189	0	0.094
1995	0.020	0.154	0	0.025
1998	0.035	0.207	0	0.109
2001	0.037	0.190	0	0.094
2004	0.031	0.182	0	0.078
<b>All</b>	<b>0.03</b>	<b>0.194</b>	<b>0</b>	<b>0.093</b>

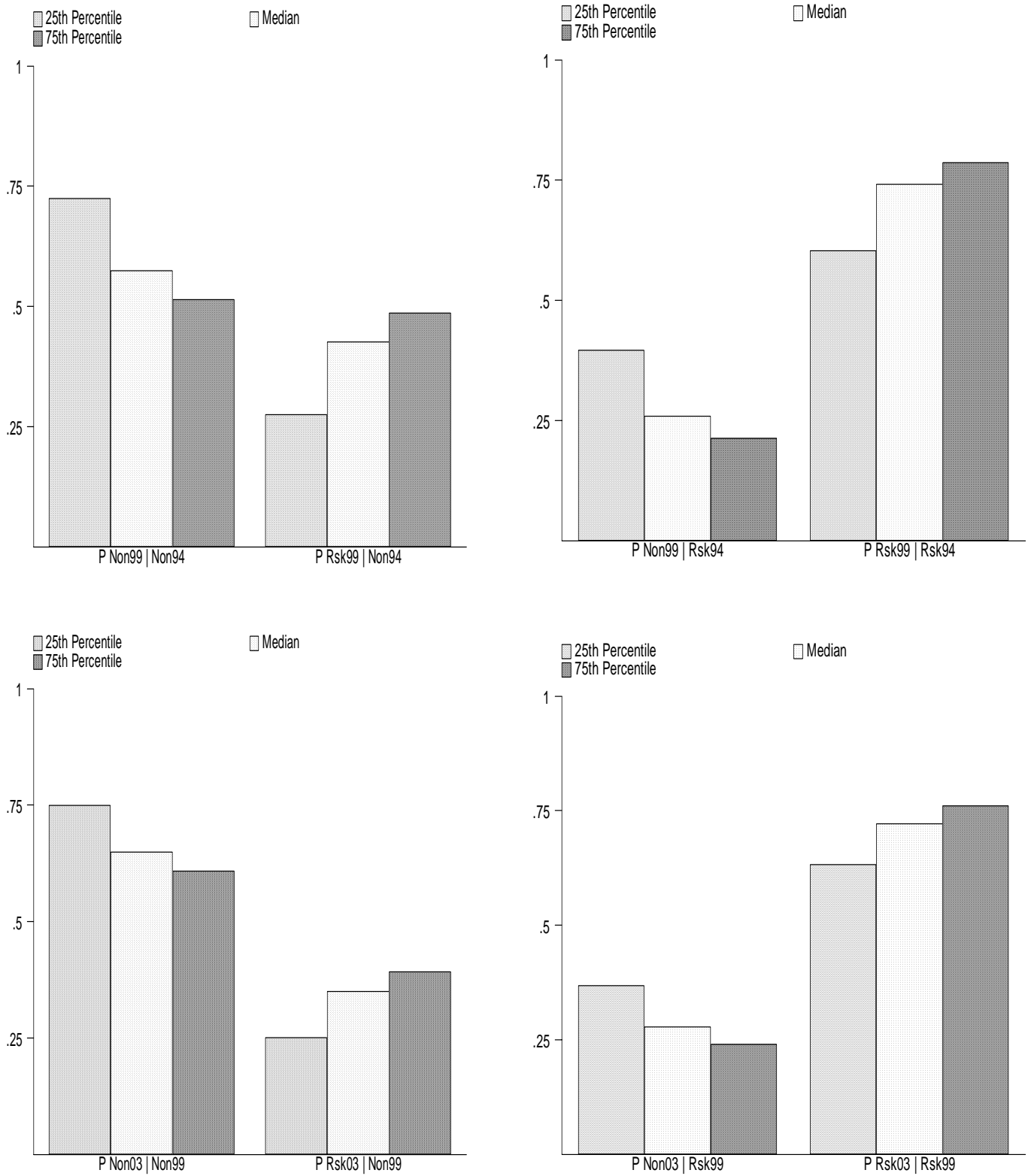
Notes: SCF weighted data, reported statistics are corrected for multiple imputation. Value of brokerage accounts is computed as the total value of directly held stocks among brokerage account owners plus value of cash or call money accounts minus outstanding margin loans. \*Statistics for 1989 are not directly comparable to the rest, as only respondents with positive stockholding were asked questions on brokerage accounts in 1989.

**Table 12: Probit model (with selection) of the Probability of Trading Stocks through Brokerage Accounts**

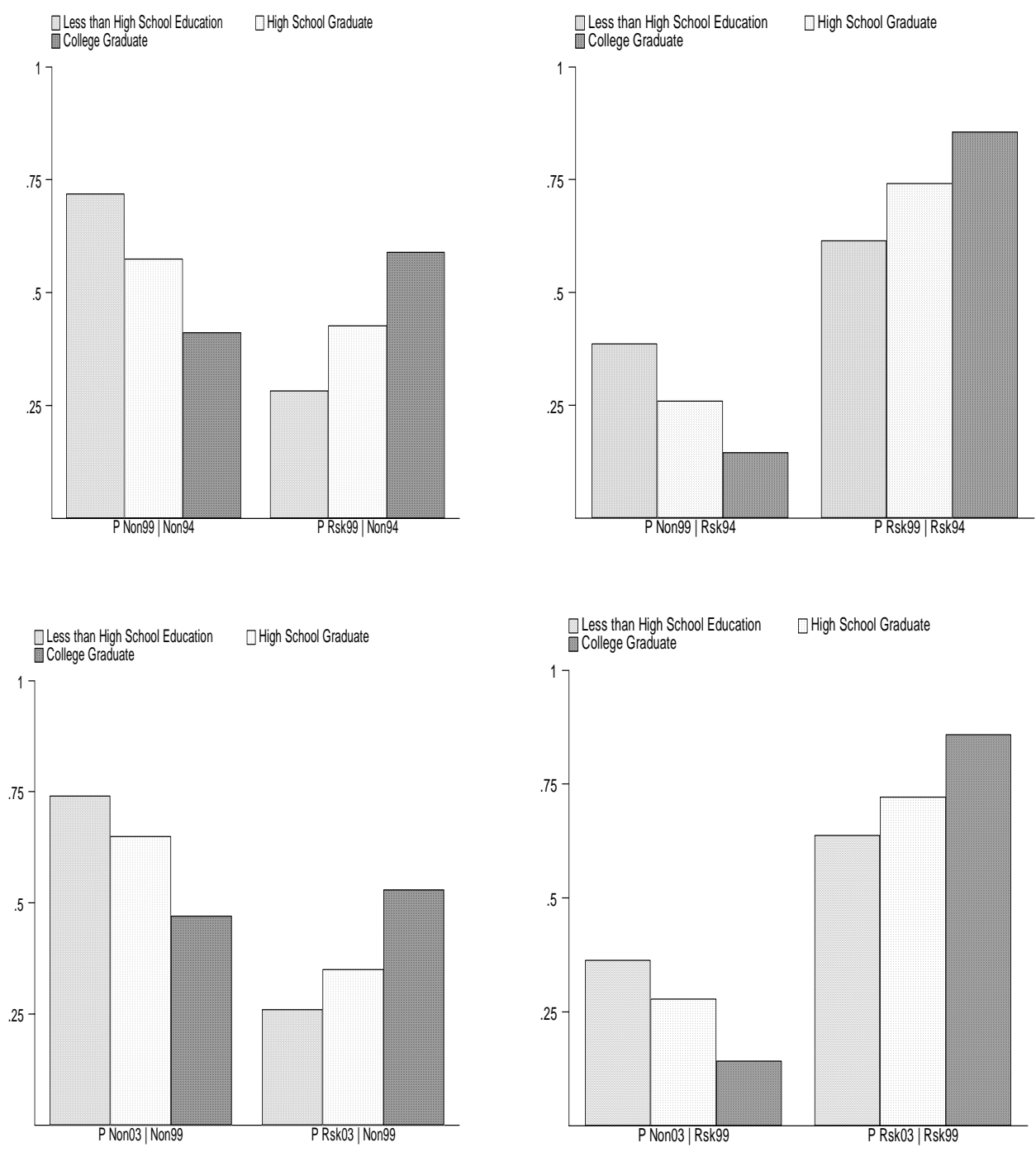
	Pr(Brokerage Account)		Pr(Trading)	
	Marginal Effect	<i>t-value</i>	Marginal Effect	<i>t-value</i>
Age	.0013	<i>6.96</i>	.0015	<i>2.66</i>
Male	.0285	<i>4.31</i>	.0359	<i>1.45</i>
Married	-.0060	<i>-1.01</i>	.0193	<i>0.98</i>
Has children	-.0191	<i>-4.54</i>	-.0106	<i>-0.73</i>
White	.0565	<i>10.24</i>	.0413	<i>1.59</i>
Health poor	-.0457	<i>-4.61</i>	-.0167	<i>-0.35</i>
High school graduate	.0654	<i>11.38</i>	.0224	<i>2.08</i>
College graduate	.1663	<i>24.75</i>	.0936	<i>0.98</i>
Save for “rainy days”	-.0007	<i>-0.17</i>	-.0160	<i>-1.22</i>
Financial alertness	.0101	<i>2.25</i>	-.0022	<i>-0.17</i>
Household works(ed) in the financial industry	.0302	<i>6.71</i>	.0304	<i>2.40</i>
Household owns business	.0352	<i>5.71</i>	.0394	<i>2.67</i>
Non-investment Income	.0007	<i>5.92</i>	.0003	<i>0.58</i>
non equity net Financial Wealth	.0022	<i>19.01</i>	.0004	<i>2.32</i>
net Real Wealth	.0022	<i>26.14</i>	.0007	<i>1.36</i>
Intention to leave a bequest	.0571	<i>12.68</i>	.0424	<i>3.12</i>
Has received inheritance	.0322	<i>6.98</i>	-.0030	<i>-0.21</i>
Credit constrained	-.0308	<i>-4.79</i>	-.0042	<i>-0.18</i>
Willingness to take above average financial risk	.0795	<i>15.37</i>	.0589	<i>4.06</i>
Investment horizon > 10 years	.0322	<i>6.32</i>	.0216	<i>1.53</i>
Year 1992	.0297	<i>5.66</i>	-	-
Year 1995	.0362	<i>5.70</i>	-	-
Year 1998	.0378	<i>5.91</i>	-	-
Year 2001	.0582	<i>8.65</i>	-	-
Year 2004	.0489	<i>8.78</i>	-	-
<b>+1 pp in S&amp;P 500 real growth rate (&gt;0)</b>	-	-	.0085	<i>4.31</i>
<b>-1 pp in S&amp;P 500 real growth rate (&lt;0)</b>	-	-	-.0101	<i>-2.94</i>
$\hat{\rho}$	<i>.99 (se: .006)</i>			
Observations: 24,614	log likelihood: -12505.5			

Pooled data from 1989,92,95,98,01,04 SCFs. Two-stage probit regression, correcting for selectivity bias among brokerage account owners. The specification accounts for age through a 2<sup>nd</sup> order polynomial, and for labor status. It controls for logarithms of income, non equity net financial wealth and net real wealth using  $y=\ln(x)$  if  $x \geq 1$ ,  $y = -\ln(|x|)$  if  $x \leq -1$  and  $y=0$  if  $-1 < x < 1$ . “S&P500 real growth rates” (in the year preceding the interview), an interaction term with years showing a negative rate (1995 and 2001), and a dummy representing these years are included in the second stage to allow for asymmetric effects between periods of positive and negative rates. Marginal effects are averaged across households (using survey weights). The marginal effects for income, non equity financial wealth and net real wealth are based on a \$1000 increase in the underlying variables and for age on a one year increase. Marginal effects in the second stage are calculated conditional on brokerage account ownership. For S&P500 real growth rate they show the effects on the probability of trading caused by a 1% increase in the S&P500 real growth rate during expansions and contractions. Numbers in italics report absolute t-values, derived from simulated standard errors (details can be found in Appendix C). Reported estimates are corrected for multiple imputation.

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



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



## Endnotes

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<sup>1</sup> Milgrom and Stokey (1982) 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>2</sup> See, for example, Haliassos and Bertaut (1995), Heaton and Lucas (2000), Gollier (2001), Viceira (2001), Campbell and Viceira (2002), Haliassos and Michaelides (2003), Cocco, Gomes and Maenhout (2005), and Gomes and Michaelides (2005).

<sup>3</sup> Seminal papers in this literature are Barber and Odean (2000; 2001). In 2000, they find that overtrading among customers at a discount brokerage firm between 1991 and 1996 results in net stock portfolio returns substantially below the market, with the average household in their sample turning over 75 percent of its portfolio annually. Barber and Odean (2001) document that men trade 45 percent more, and earn annual risk-adjusted net returns 1.4 percent less than women. Using the same data, Ivković, Poterba and Weisbenner (2005) find differences in trading patterns between taxable and tax-deferred accounts that are consistent with expected effects of capital gains taxation.

<sup>4</sup> This includes Agnew, Balduzzi, and Sunden, 2003; Ameriks and Zeldes, 2004; Mitchell et al., 2006. Ameriks and Zeldes use panel quarterly data on retirement accounts held by TIAA-CREF mainly for faculty and other employees in US higher education and research. 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 retirement accumulation or in flow contributions, despite the negligible cost of making such changes. Just fewer than 90 percent made zero or one change in accumulated assets, while more than two thirds made zero or one change in their flow allocations. Agnew, Balduzzi, and Sunden find that, in a panel of nearly seven thousand 401(k) retirement accounts from 4.1994 to 8.1998, over 87% observations of annual number of trades are zero, and only 7% exceed one. Mitchell et al. find that 80% of 1.2 million 401(k) plan participants in over 1,500 plans initiate no trades, and an additional 11% make only a single trade in two years. Even among traders, portfolio turnover rates are one-third the rate of professional money managers.

<sup>5</sup> See, for example, Beshears, Choi, Laibson, and Madrian (2005), Benartzi and Thaler. (2007), and Horneff, Maurer, Mitchell, and Dus (2007).

<sup>6</sup> Campbell (2006) argues that households make investment mistakes with respect to (non)participation, (under)diversification, and debt refinancing. Calvet, Campbell, Sodini (2005) find, using Swedish data, that mistakes are disproportionately present among groups of lower education and resources. Poor understanding of investment options has been linked to lack of international diversification (Graham, Harvey, Huang, 2005) and to poor planning for retirement (Lusardi and Mitchell, 2005).

<sup>7</sup> See, for example, Guiso et al., 2003. Biliias, Georgarakos, Haliassos (2007) provide evidence that the stock market upswing in the 1990s has attracted marginal investors, while the following downswing increased the representation of larger investors in the pool.

<sup>8</sup> Controlling for wealth is dictated both by theory, with its emphasis on ‘cash on hand’ as a key determinant of asset holding and trading, and by the need to avoid confounding the role of other determinants with that of wealth, when the latter is not controlled for in the regression.

<sup>9</sup> 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.

<sup>10</sup> Two notable alternative panel sources are the Consumer Expenditure Survey (CEX) and the Health and Retirement Survey (HRS). The former contains very limited information on assets and wealth, while the latter surveys only households with head aged 50 or more.

<sup>11</sup> In regressions where endogeneity bias may be an issue, our net financial wealth measure does not include the value of stocks.

<sup>12</sup> All money values have been deflated using the CPI-U index and expressed into constant 2001 prices.

<sup>13</sup> To the extent that automatic reinvestments do not represent active trading, one would want to exclude cases that report trading *only* on the basis of such reinvestments. Although it is not possible to exclude them, this actually works against the hypothesis that portfolio inertia is widespread.

<sup>14</sup> For example, Juster et al. (2005) use reported asset values and reported active saving from the PSID to compute measures of capital gains which they then use to explain part of the drop in the US saving rate by year 2000. Brunnermeier and Nagel (2005) use PSID data on reported size of trades.

<sup>15</sup> This regards all families from the first wave who switched their status to owning (not owning) stocks in the second one and did not report any purchases (sales) of stocks in the meantime.

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<sup>16</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>17</sup> For empirical estimates of thresholds to fixed entry costs, see Vissing Jorgensen (2002) and Paiella (2004).

<sup>18</sup> In this paper, we try to avoid some pitfalls involved in automatic computation of marginal effects by standard econometric software, which have recently been emphasized. We explain how we overcome these problems in Appendix C.

<sup>19</sup> See, for example, Laibson et al. (2003).

<sup>20</sup> An early empirical study that documented such exits using a panel subsample of the SCF in the 1980s was Bertaut (1998).

<sup>21</sup> This finding is consistent with the idea behind the disposition effect, namely unwillingness to sell depreciated stock (see Shefrin and Statman, 1985; and Odean, 1998a).

<sup>22</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>23</sup> When we omit all potentially inconsistent responses in the PSID, the percentages of college graduates that report no trade in 94-99 and in 99-03 drop, respectively, to 43 and 45.7 percent.

<sup>24</sup> Omitting the potentially inconsistent observations does not change this conclusion, but lowers the percentages of inactive households in the top quartile to 47 percent in 94-99 and to 43.4 percent in 99-03.

<sup>25</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>26</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>27</sup> We use LR tests to see whether any of the categories we consider is statistically indistinguishable from another. For all possible pairs, we reject the null that a given pair of outcomes is indistinguishable. This reflects the distinct roles that variables in the model play for each of the options considered.

<sup>28</sup> All characteristics refer to the first period. We exclude households with zero financial wealth holdings at both endpoints of 1994-99, and those with zero financial wealth in all three waves 1999-2001-2003. The latter choice explains the somewhat higher number of observations in the model of Table 8 compared to Table 4. Hausman tests failed to reject the IIA assumption for both models estimated over the periods 1994-99 and 1999-2003. The results discussed are robust to the inclusion or exclusion of potentially inconsistent PSID responses.

<sup>29</sup> We also 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, geographical moves do not appear to have significant effects on stock trading behavior before or after the downswing.

<sup>30</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), +.24(12/2002-12/2003).

<sup>31</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 they were not included in the final specification.

<sup>32</sup> In all models using PSID or SCF, we control for inheritance received. This partly proxies for being from a wealthy family, since wealthy families are more likely to leave bequests to their heirs. In regressions using the SCF, we also control for reported intention to leave a bequest. This may also proxy partly for coming from a wealthy family, to the extent that households which have received a sizeable inheritance exhibit a stronger bequest motive.

<sup>33</sup> Working or having worked in the financial industry sector could induce familiarity with financial products due to work environment, as distinct from the effects of education and financial alertness. None of the cross correlations among the dummies of being a college graduate, doing a great deal of shopping around, and working in the financial industry exceed .10 in the data.

<sup>34</sup> There is growing discussion of these issues and an effort to provide codes that circumvent some inefficiencies of standard software packages (see, for instance, King et al., 2003; and Bartus, 2005).

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Brambor et al. (2005) discuss models with interactions and point to problems in empirical literature. We follow their notion in calculating the effect of the interacted S&P500 real growth rate.