Account Turnover and Demographic Profiles: Which Investors Trade Too Much?

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Abstract
Recent empirical studies investigating the issue of individual investor trading activity have reported that some individual investors tend to overtrade securities and to earn returns less than the market overall. The present paper uses a fixed effects logit and regression model to analyze a dataset of 1027 full-service brokerage equity accounts (1998-1999) to provide insights into whether higher trading is more likely to occur in accounts held by members of specific demographic groups. We find that, among all investors, the elderly, minority, and clients with less wealth are the most likely retail brokerage clients to exhibit excessive trading activity. This study may help policymakers to more readily identify clients who have a propensity toward excessive trading in full-service brokerage accounts.

INTRODUCTION
Trading activity in financial markets is an important topic in a rich and varied literature addressing issues relevant to both institutional and individual investors. Works which address trading activity in the institutional arena include articles involving pension funds as well as those of the broad mutual fund literature. However, the literature comprising papers investigating individual investor activity is much more limited.

The earliest works to analyze individual investor trading activity are those of Schlarbaum, Lewellen, and Lease (1978 a, b) who report that individual investors’ stock returns at a full-service broker are similar to those of value-weighted indices for the 1964-1970 period. More recently, Odean (1999) and Barber and Odean (2000 a) investigate the trading activity and performance of individual investors at a discount brokerage and report that individual investors tend to overtrade securities and to generate returns lower than the market overall. Subsequently, Barber and Odean (2001) partition a sample of investors on the basis of gender and document that men trade much more frequently than women and earn lower risk-adjusted returns than do women.

This paper extends the current body of literature which focuses on individual investors’ trading activity. Our research strives to answer whether high trading occurs randomly among all investors or whether specific demographic groups such as women, minorities, lower income, or elderly investors, are more likely to be associated with accounts that have higher trading activity. This study is the first academic work to investigate the relationship between trading activity and various demographic characteristics of investors using full-service brokerage accounts.

To address this question we utilize an account turnover ratio as a measure of account activity. Using a dataset of 1027 full-service accounts, we estimate a fixed effects regression as well as a fixed effects logit regression. The fixed effects specification controls for “the broker effect” so that we can predict account turnover due to client characteristics independent of broker specific practices. Section 2 discusses overtrading within an asymmetric information framework. Section 3 briefly reviews some earlier findings on both the risk-taking behavior and the investing tendencies of several demographic groups. Section 4 presents metrics of historical returns, mutual fund expenses, and our turnover/expected return model (explained in Section 4), which yields a zero expected return at a turnover rate between 2.0 and 3.0. Section 5 includes a description of both the data employed and our methodology, as well as our findings. This is followed by a brief summary of our findings and a conclusion.

ASYMMETRIC INFORMATION AND OVERTRADING

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As is the case for many professional services, the market for financial services is characterized by asymmetric information between buyers and sellers. Asymmetric or unequal information about product quality exists because the stockbroker is “an expert” and has significantly more knowledge and experience in the area of financial products and services than do many clients or “buyers.” When there is a steep learning curve about a product or service, consumers often lack full information and rely on “expert” sellers. This provides an opportunity for consumers to be mislead into purchasing inferior or overpriced products (Akerlof).

In markets with asymmetric information, licensing and regulatory bodies are likely to emerge in order to protect both buyers and high quality sellers (Leland). In the financial services industry institutions like the NYSE, SEC, and NASD promulgate and enforce quality standards via numerous and substantive licensing requirements for stockbrokers and other financial planners that help establish minimum standards to insure that the broker generally has sufficient financial services education and training. Although not foolproof, being an accredited and licensed professional provides some assurance of a broker’s expertise. In addition, brokers face potentially harsh consequences for professional misconduct: regulators can revoke a broker’s license and prevent them from working in the industry.

Despite industry regulations, markets characterized by asymmetric information may have some equilibrium level of fraud and, not surprisingly, there will probably be more extensive fraud when there is a high degree of consumer ignorance (Darby and Karni). Such “lack of knowledge” underlies Lord Keynes’ (1936) discussion of the “mass psychology of a large number of ignorant individuals” who are market participants.

In the context of excessive account turnover, the cause of such activity may lie either solely with the broker, solely with the investor, or partly with both. The broker may facilitate overtrading by: (1) not emphasizing commissions as a key component of portfolio returns, or (2) persuading the client that the capital gains earned from excessive trading will more than compensate for the commissions paid. However, in addition to hapless investors, there may also be clients who are risk-seeking and who may be willing to gamble away commissions in exchange for the chance to earn above normal returns.

Asymmetric information combined with consumer ignorance about investing provides a framework to explain how over-trading could occur in this market at all. Over-trading could be a random occurrence, or certain demographic groups may be characteristically less educated and experienced in financial management or perhaps more risk-seeking. It is not important whether the client or the broker is ultimately responsible for high trading activity, indeed the fixed effects model specification controls for broker specific tendencies: this paper is only concerned with whether or not high trading activity can be predicted based upon particular demographic profiles.

RELATED FINDINGS

There is some prior literature reporting that various demographic groups may have differing investment tendencies. As mentioned above, Barber and Odean (2001) report that women may be more conservative investors and that they trade less in their investment accounts than men. There is also a descriptive study by the Women’s Center for Business Research finding that high net worth women are comparable to high net worth men in the areas of financial knowledge, investment goals, and strategies (Weaver). Based upon these somewhat conflicting results, it is not clear that women are necessarily inclined to have lower account turnover than men, all else equal.

Some other studies investigate minority investment activity. There is evidence that blacks are more conservative investors in so far as they invest less as a proportion of savings in the stock market. In a related survey of high income households, blacks were more likely to respond that they needed more experience and education about financial issues than other races (Ariel Schwab). To the extent that stock trading activity could be seen as somewhat akin to gambling, minorities as well as lower income households have lower participation in gambling related activities (Welte et al.). In contrast to these findings, numerous studies of lottery sales show minorities are more likely than whites to participate in numbers games and instant scratch-off games. Thus, there is little but somewhat conflicting evidence
about how this group may tend to trade their stock accounts. This study provides new evidence about whether minorities trade their accounts differently than whites.

Although elderly investors are routinely included in anecdotal evidence blaming brokers for account mismanagement (including overtrading) (AARP; Romano), there are no academic studies that verify whether the elderly are more likely to have excessively traded accounts. To the extent that the elderly have less investment knowledge or may be less attuned to financial matters, their accounts may exhibit higher turnover. On the other hand, accounts of older clients may have lower turnover than those of younger clients, who may be more interested in an aggressive, high-growth investment strategy for their stock accounts. Now that we have briefly reviewed the status of pertinent findings on how some demographic groups may behave in trading stocks, we turn to an overview of the interrelationship of historical returns, mutual fund expenses, and turnover ratios relative to our turnover/expected return model.

**HISTORICAL RETURNS, MUTUAL FUND EXPENSES AND TURNOVER ACTIVITY**

In personal investing, as in any economic activity, the issue of costs versus benefits must be considered. For most retail investors, future long-term return benefits in investment markets are probably most commonly estimated by viewing historical returns.

**Historical Returns**

In the case of equity investments over the past seven decades, returns have averaged in the vicinity of 11% (Ibbotson Associates). These returns are gross returns before the consideration of expenses for investment management. The expenses that most investors may expect depend on the professional management they choose, or on whether they manage their own portfolios. Mutual funds are the professional vehicle chosen by a large portion of individual investors.

**Mutual Fund Expenses**

Investors can select from a gamut of funds with investment objectives ranging from nearly riskless to highly speculative, depending upon the investments employed in the fund’s portfolio. Some funds are no-load whereas others have front-loads, rear-loads, or level loads. However, almost all funds charge annual fees for on-going management. Because of the wide variety of fee structures, it is difficult to estimate a single total expense fee. The following Table I shows estimated total fees computed by the Investment Company Institute for three basic categories of funds (Rea et al.). Total shareholder costs comprise annual fees, management expenses, and an annualized sales load over the expected holding period. According to the Institute it is reasonable that most bond and equity mutual fund investors can expect to pay between 1% and 2% annually for total expenses.

The services provided for the management expenses component are both record-keeping and portfolio management, which may range from very active to passive. Activity in the portfolio is of interest to us because it adds to the investor’s ultimate expense burden as well as providing a guideline for turnover activity for portfolio management.

**Turnover Ratios**

Turnover is important because it adversely influences fund returns via commissions and market impact expenses. A turnover ratio compares the total cost of securities purchased (or sold) for a portfolio within a time period (annualized) to the average equity in the portfolio over the period. The annualized turnover rate (ATR) is frequently computed as Equation 1.

\[
\text{ATR} = \frac{P}{E} \times \frac{365}{D}
\]

where \( P \) = total cost of purchases in period, 
\( E \) = average net equity in the account in period, and 
\( D \) = number of days in the period.
Alternately, some compute the turnover rate employing the lesser of purchases or sells rather than the purchases. This latter method is used by *Morningstar*, from which we take our data below.

Mutual fund portfolio trading ultimately results in two indirect expenses for the fund shareholder. The first expense is the commission, which generally amounts to approximately 6¢ per share. The second expense is manifest in the price impact of purchases and sales, which is less obvious than commissions but is of significant economic impact, depending upon the market liquidity of the target security. For our purposes we conservatively assume an impact cost of 4¢ per share (Bessembinder).

Turnover ratios for mutual funds range from very low for index funds to a mean of roughly 0.8 for most equity funds. This ratio is essentially identical to that of discount broker clients reported by Odean (1999). Table II shows the average turnover rate for a sample of funds for the 1996-2001 period.

As an example we assume a stock mutual fund with annual assets of $1 billion, turnover of 0.8, and shares priced at $40 on average. The fund would trade 40 million shares annually (25,000,000 x 0.8 x 2) and the percentage expense would be:

\[
\text{Trading Expense} = \frac{\text{Shares Traded} \times \text{Price Per Share}}{\text{Annual Assets}} = \frac{40,000,000 \times 40}{1,000,000,000} = 0.4\%
\]

Obviously, this 0.4% (0.24% commission plus 0.16% impact) is significant in size relative to the other expenses of approximately 1.9% incurred by fund shareholders. When combined, the total expense is 2.3%. As noted above, equity returns have averaged approximately 11% annually for the past seven decades. After considering total expenses of 2.3% the expected return is reduced to 8.7% annually. These numbers are consistent with those reported by Bogel (2003), who reports that equity mutual funds in recent years have returned to shareholders approximately three percentage points less than the broad indexes. However, for our purposes we are concerned with the impact that turnover has on the accounts of retail investors, not on mutual funds per se.

**Turnover/Expected Return Model**

Investors who use retail full-service brokers may negotiate commission rates depending on their financial savvy and account size. For our purposes we assume a one-way commission of 2%, which approximates retail commissions frequently charged by full-service brokers. If a retail account has a turnover ratio of 0.8, then the expected commission expense is 3.2% (0.8 x 2 x 0.02), which when combined with an impact expense of 0.16%, equals a 3.36% total annual expense. This is 46% greater than the amount the investor would pay on average in a fund with similar activity. Thus, the expected net return for a retail account is 7.64%, compared to 8.7% expected for an investor holding a mutual fund with a comparable rate of portfolio activity. If we consider a retail investor with a turnover rate of 2, then the expected commission expense is 8% with an impact expense of 0.4%, for a total of 8.4% expense. A turnover rate of 3.0 results in a commission expense is 12% with an impact expense of 0.6%, for a total of 12.6% expense which exceeds the annual historical return of 11%. Accounts with turnover greater than 3.0 (or 300%) annually by any reasonable standard may be considered to be excessively traded because their annual trading expenses exceed annual average historical returns. As an example, in our sample of 1027 accounts which is discussed below, we find that approximately 50% those accounts with turnover of 3.0 or greater experienced negative annual returns during the 1998 or 1999 years when an average of broad market indices were up approximately 27 and 34% annually, respectively.

**DATA AND METHODOLOGY**

Account data for this study come from 1998 and 1999 year-end statements which were provided by a retail brokerage accounts firm. Each file contains customer(s) name and address, opening and closing balances for types of assets (cash, stocks, bonds, mutual funds, and other), total portfolio value, deposits, withdrawals, debit balances, gross sales proceeds, and expenses. Other similar data sets in the
literature include those of a retail broker used by Schlarbaum et al. (1978a,b) and by Badrinath & Lewellen (1991) for the periods 1964-1970 (2,500 accounts) and 1971-August 1979 (3,000 accounts), respectively. Also, discount broker data are employed by Odean (1999), who studies 10,000 accounts for the 1987-1993 time period. Our data differ from these in that they do not include trades for individual accounts, only year-end account summary statistics.

The initial data set includes more than 10,000 accounts divided among 31 brokers. We sort the data into three groups, depending on the primary (greater than 50%) account holdings: (1) stocks, (2) bonds, or (3) mutual funds/money market funds, and delete bond and mutual fund/money market fund accounts from the sample. The remaining stock accounts are cleaned in order to remove inactive accounts as well as unreliable data resulting from data entry error and account closings/openings during mid-year. In cases where a client holds more than one account, in order to avoid double counting households, we include only the account with the highest average net balance. Finally, if the household held the account in both 1998 and 1999, our sample chooses the year that had higher turnover. The final sample of stock accounts numbers 1,027.

Many of these accounts have turnover ratios that fall well within industry norms as represented by mutual fund statistics and discount brokerage client activity, while others have transaction rates that exceed 3.0. The mean turnover rate in our sample is 1.89, and the turnover range is .008 to 11.4. This broad range obviously reflects diverse preferences and perspectives of account management.

The demographic variables used in the model are based upon brokerage firm account data in conjunction with both ESRI and census data. We collect gender and address information from account statements and geocode each client to their neighborhood block group. A block group includes a small homogeneous neighborhood consisting of 50-400 families. Neighborhood block groups are designed to be homogeneous with respect to population, economic status, and ethnic characteristics (Iceland and Steinmetz, 2003). The 1990 census data for each block group includes a variety of demographic characteristics such as age, ethnicity, and household income. Data from these small homogeneous block groups are routinely used to estimate household characteristics by government and businesses undertaking market or policy analysis (US Census Bureau). To these data we add information from ESRI Geographic Information Systems Business Analyst (2004) software that includes measures of 1999 household earnings and net worth for each block group. The census and ESRI block group data are used as independent variables in our analysis to proxy household characteristics. The descriptive statistics for variables used in the analysis are shown in Table III.

Our sample contains wide variation of trading practices as indicated by many accounts with high turnover and others with very low turnover. The differences in trading activity may be purely random or may reflect systematic differences in broker investment strategies, or in client characteristics and preferences. Our hypothesis is that variation in account turnover can be explained by client characteristics, after accounting for broker practices. Specifically, our study examines whether clients with different income, wealth, ages, gender and ethnicity have significantly different propensities to over trade; independent of their choice of brokers.

To discern whether there are client characteristics that are significant predictors of account turnover, we first estimate a fixed effects regression of account turnover. It is possible that some brokers trade accounts more actively than others so we use a fixed effects regression model. This is roughly equivalent to including broker specific dummy variables in the regression\(^\text{12}\). After controlling for the “broker effect”, the regression coefficients on client characteristics show whether the level of account turnover differs significantly for lower income, minority or elderly clients (compared to clients who are younger or from higher income socioeconomic backgrounds). The fixed effects model is shown in Equation 3. The \(a_i\) are separate constant terms attached to a group, or in this case, broker specific dummy variables. The error terms are classical disturbance terms.

\[
\text{Turnover}_{ij} = a_1 d_{1j} + a_2 d_{2j} + \ldots + \beta' X_{ij} + \varepsilon_{ij} \\
\text{Turnover}_{ij} = a_i + \beta' X_{ij} + \varepsilon_{ij} \\
\varepsilon_{ij} \sim N(0, \sigma^2)
\] (3)
Secondly, in order to model more explicitly excessive trading in a stock account we estimate a logit fixed effects regression. This regression predicts the likelihood that the account has an annual turnover ratio greater than 3.0. The fixed effects logit is similar to the linear regression above and incorporates terms equivalent to separate broker specific dummy variables (Greene). With the inclusion of these broker fixed effects, the model is able to measure whether gender, wealth and ethnicity affect the likelihood of having an account that is overtraded. Taken together these two regressions provide a picture of account management practices for different demographic groups of investors, independent of broker practices.

**EMPIRICAL RESULTS**

Our empirical model includes broker fixed effects, net worth, annual earnings, gender, ethnicity, and age as predictors of account turnover. We also create a variable that is the interaction of age with net worth, thereby segmenting the sample into smaller demographic groups. The interaction of Over 65 and High Net Worth answers the question about whether account turnover is different for all high net worth individuals compared to elderly investors with high net worth. The results show that there are several significant predictors of account turnover. The most important predictors of account turnover are broker specific effects which increase the Adj. R² from 5%, without the broker effects, up to 15% including all predictors. Table IV presents the fixed effects regression results for account turnover. The first variable is included in the regression to proxy household income which one might expect to be an important determinant of turnover. All else equal, lower income clients may be less apt to have investment experience compared to households with higher incomes and this may lead to more risk averse investing. However, on the other hand, a less prudent investor may generate high turnover activity. The results show that the coefficient on the Lower Income variable is not significantly different than zero indicating that annual income is not a significant predictor of account turnover. After accounting for broker practices, there is no significant difference in expected turnover in accounts among clients with higher income versus lower income.

The coefficients on the High Net Worth variable and the interaction of Over65 with High Net Worth variable are statistically significant. One would expect that clients with high net worth would have more experience in and knowledge about the financial markets, and thus they would be less inclined to overtrade their accounts. The fact that they have higher wealth may be evidence of their successful and better informed investment strategies. Indeed the negative and significant coefficient on High Net Worth shows that across the board, high net worth clients tend to have lower turnover ratios than clients with lower net worth.

The positive and significant coefficient on the interaction variable Over65 * High Net Worth indicates that not all high net worth clients have lower average turnover. In fact, among those who have high net worth, the elderly have higher turnover than younger clients. This is an interesting finding because elderly clients are often thought to be the more conservative investors and because they are nearing or in retirement, most professionals advise that they should not be doing a lot of trading in their investment accounts. This finding confirms the recommendations in the study by the AARP (2002) which suggest that elderly investors need to be wary of mismanagement and take time to be knowledgeable about financial services products and practices.

The negative and significant coefficient on Female shows that female headed accounts have lower turnover than others (jointly held or held by a male only.) This finding is consistent with other studies showing that women are more risk averse and that they trade less in investment accounts as reported by Barber and Odean (2001). This provides additional evidence that this generally conservative management style extends to stock accounts for women, as well.

The coefficient on Minority suggests that African American and Hispanic accounts tend to have higher account turnover than Whites. The higher turnover may be indicative of a more risk seeking investment strategy in their stock accounts. More risk tolerant behavior is consistent with previous studies that show that minorities have statistically higher rates of participation in lottery games (Stranahan and
Borg, 1998). On the other hand, African Americans and Hispanics may have less investment experience which could manifest as overtrading in their accounts. Whereas the Ariel Schwab (2003) study found that African Americans allocate less to stocks in their overall portfolio allocation, this study says that within their stock accounts, they tend to do more trading than whites.

The results of the logit regression, reported in Table V, further affirm excessive trading in the stock accounts of specific demographic groups. The dependent variable in the logit regression represents the probability of having an account turnover ratio of 3.0 or greater.

The coefficient on Lower Income is negative but not significantly different than zero. This suggests that lower income clients are not more likely to have overtraded accounts compared with higher income clients. Consistent with the fixed effects regression, the logit results suggest that high net worth clients are less likely to have account turnover of 3.0 or more. However, the coefficient on the interaction of High Net Worth * Over65 suggests that this is not universally true for all high net worth individuals. Again, somewhat surprisingly, we find that elderly high net worth clients, those who arguably should not be aggressively trading, are more likely to have excessive trading activity. The coefficient on Female strongly supports the finding that females pursue a more conservative strategy in their stock accounts. Females are significantly less likely than males to have a stock account that is overtraded. Finally, the coefficient on Minority shows that African Americans and Hispanics are more likely than whites to have a stock account that is traded excessively. These results from the fixed effects logit confirm the results reported in the fixed effects regression.

Table VI shows the results of the fixed effects logit used to calculate the predicted probability of having account turnover greater than or equal to 3.0 for four different client types. We see a clear difference in the likelihood of account overtrading for different demographic groups. The Higher Socioeconomic (high SES) Male has independent variables representing a white client with high annual earnings and high net worth. For comparison, the Lower Socioeconomic (low SES) Male is a minority client with income below $75,000 and net worth below $150,000. The model predicts that Low SES clients have a significantly higher chance of excessive trading. The probability of having a stock account overtraded increases from 2.5% for a high SES client up to 11% for a low SES client.

The likelihood of having a poorly managed stock account is much higher for an elderly high income, high net worth client compared to an otherwise similar younger client. Higher Socioeconomic Elderly Males have a 10.1% chance of having excessive turnover compared to a 2.5% chance for an otherwise similar Younger Male. Similarly, the logit predicts that a high SES elderly female has a 6.8% chance of having a stock account with excessive turnover compared to just 2.5% for the younger male. Younger high SES clients have a lower predicted probability of excessive account turnover compared to elderly males, elderly females or low SES minority clients. The results suggest that minority Low SES clients as well as elderly well to do clients, both male and female, have a much higher predicted probability of having significantly over traded accounts in comparison to younger high SES clients.

SUMMARY AND CONCLUSIONS

In this research we employ 1,027 brokerage accounts to analyze the stock account trading activity which occurs in a full-service brokerage office. We estimate a fixed effects regression and fixed effects logit model to examine whether excessive trading occurs randomly among all investors or whether specific demographic groups such as women, minorities, lower income, or elderly investors, are more likely to have accounts with excessive turnover, after accounting for broker specific practices. The logit model utilized employs a turnover guideline of 3.0 to indicate excessive trading. This turnover rate generates expenses that exceed average historical expected returns of 11%; thus such a rate of activity is clearly excessive.

We find that minority investors are more likely to experience excessive turnover in their accounts. The reasons for this may be that this group is less knowledgeable about investment management or that they are more risk loving. On the other hand, we find that white, high net worth investors are likely to have lower turnover in their full-service stock accounts. It is possible that high net worth individuals are more experienced and better educated in wealth building strategies. Further, our
results expand on previously reported findings that women are more conservative investors. We find that in the area of stock accounts, women tend to have lower turnover than men. Finally, elderly high net worth investors, both male and female, have significantly higher account turnover than the similar non-elderly clients. This is worth noting because there is little reason for those nearing retirement to be aggressive stock traders; indeed, clients in this group should usually be oriented toward income or preservation of principal. These results indicate that this group needs to be especially wary of overtrading in their stock accounts.

In summary, although a large amount of the variation in trading activity as measured by turnover is accounted for by broker specific practices, a significant and well defined portion of the variation in turnover as well as the probabilities associated with excessive trading is explained by client demographic characteristics. We conclude that, among all investors, it is those who can probably least afford financial mistakes -- the minority, the less wealthy, and the elderly clients, who should be swayed from a strategy of excessive trading in stock accounts. A better understanding of which clients are most prone to overtrading their stock accounts should be helpful to financial services executives targeting information and education to the investing public.
### Table I  Total Shareholder Costs

<table>
<thead>
<tr>
<th>FUND TYPE</th>
<th>Median</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity</td>
<td>1.85%</td>
<td>1.93%</td>
</tr>
<tr>
<td>Bond</td>
<td>1.44%</td>
<td>1.51%</td>
</tr>
<tr>
<td>Money Market</td>
<td>.59%</td>
<td>.62%</td>
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</table>

### Table II  Equity Funds & Turnover Statistics

<table>
<thead>
<tr>
<th>FUND TYPE</th>
<th>MEAN</th>
<th>ST. DEV.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggressive Growth</td>
<td>1.27</td>
<td>1.03</td>
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<tr>
<td>Balanced</td>
<td>.98</td>
<td>.55</td>
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<tr>
<td>Equity-Income</td>
<td>.57</td>
<td>.37</td>
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<tr>
<td>Growth</td>
<td>.77</td>
<td>.83</td>
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<tr>
<td>Growth &amp; Income</td>
<td>.70</td>
<td>.34</td>
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<tr>
<td>Small Cap</td>
<td>.39</td>
<td>.23</td>
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<tr>
<td>World Stock</td>
<td>.91</td>
<td>.66</td>
</tr>
<tr>
<td>Variable</td>
<td>Mean</td>
<td>Std. Deviation</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------</td>
<td>----------------</td>
</tr>
<tr>
<td>Turnover</td>
<td>1.89</td>
<td>2.04</td>
</tr>
<tr>
<td>Minority</td>
<td>0.20</td>
<td>0.26</td>
</tr>
<tr>
<td>Over65</td>
<td>0.14</td>
<td>0.09</td>
</tr>
<tr>
<td>Female</td>
<td>0.24</td>
<td>0.42</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower Income 1</td>
<td>0.53</td>
<td>0.50</td>
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<tr>
<td></td>
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</tr>
<tr>
<td>High Net Worth 1</td>
<td>0.16</td>
<td>0.37</td>
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<td></td>
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<tr>
<td>High Net Worth 2</td>
<td>0.060</td>
<td>0.22</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65 Years or Older * High Net Worth 1</td>
<td>0.030</td>
<td>0.08</td>
</tr>
<tr>
<td>Variable</td>
<td>Coefficient</td>
<td>Standard Error</td>
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<tr>
<td>------------------------------</td>
<td>-------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Lower Income</td>
<td>0.043</td>
<td>0.152</td>
</tr>
<tr>
<td>High Net Worth2</td>
<td>-0.811 **</td>
<td>0.409</td>
</tr>
<tr>
<td>Female</td>
<td>-0.297 **</td>
<td>0.142</td>
</tr>
<tr>
<td>Over 65</td>
<td>0.307</td>
<td>0.765</td>
</tr>
<tr>
<td>Over 65 * High Net Worth1</td>
<td>4.143 ***</td>
<td>1.321</td>
</tr>
<tr>
<td>Minority</td>
<td>0.540 *</td>
<td>0.277</td>
</tr>
</tbody>
</table>

Adjusted R² = .15

Number of Observations = 1027

***Indicates coefficient is significant at 1%; **coefficient is significant at 5%; Coefficient is significant at 10%
### Table V Logit Fixed Effects Regression for Probability of Account Turnover $\geq 3$

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>P-value</th>
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</thead>
<tbody>
<tr>
<td>Lower Income</td>
<td>-0.190</td>
<td>0.221</td>
</tr>
<tr>
<td>High Net Worth2</td>
<td>-1.062 *</td>
<td>0.592</td>
</tr>
<tr>
<td>Female</td>
<td>-0.622 ***</td>
<td>0.241</td>
</tr>
<tr>
<td>Over 65</td>
<td>0.714</td>
<td>0.989</td>
</tr>
<tr>
<td>Over 65 * High Net Worth1</td>
<td>5.029 ***</td>
<td>1.702</td>
</tr>
<tr>
<td>Minority</td>
<td>0.768 *</td>
<td>0.406</td>
</tr>
</tbody>
</table>

Number of Observations = 1027

***Indicates coefficient is significant at 1%; **coefficient is significant at 5%; Coefficient is significant at 10%
<table>
<thead>
<tr>
<th>Category</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Socioeconomic Male</td>
<td>11.0%</td>
</tr>
<tr>
<td>Higher Socioeconomic Elderly Female</td>
<td>6.8%</td>
</tr>
<tr>
<td>Higher Socioeconomic Elderly Male</td>
<td>10.1%</td>
</tr>
<tr>
<td>Higher Socioeconomic Younger Male</td>
<td>2.5%</td>
</tr>
</tbody>
</table>
ENDNOTES

1. See Malkiel (1977) for works in these areas.
2. Other earlier related studies include Badrinath and Lewellen (1991), Cohn, Lewellen, Lease and Schlarbaum (1975), and Lease, Lewellen, and Schlarbaum (1974), that focus on tax-selling portfolio composition, and investor attributes, respectively. Later related works include Barber and Odean (1999, 2000b), and Odean (1998a, b).
3. There have been no academic studies examining which types of clients are likely to be a target of stockbroker fraud although there is anecdotal evidence that the elderly are more often the victims of fraud. The AARP, for example, has published articles devoted to this topic (AARP, 2002).
4. The theory suggests that in markets characterized by asymmetric information, without any government intervention, inferior products will drive high quality products from the market. Without any mechanism to differentiate quality, low quality brokers have a greater incentive to trade in the market. Consumers are assumed to know the average quality in the market; so average wages or prices in the market fall. Transactions decline overall due to product quality uncertainty. High quality brokers have less incentive to be in the market because it’s costly or impossible to distinguish their product from the low quality producers. To mitigate these effects, institutions arise that help ensure product quality. In the financial services industry there are licensing agencies like NYSE, NASD, and SEC whose role is to ensure “broker quality”. They regulate training, licensing and procedures for arbitration when there is a dispute.
5. The responsibilities of the broker to both the naïve investor and to the risk-seeking investor are addressed in the NASD Manual under Rule 2310-2 -- Fair Dealing with Customers: “…sales efforts must be judged on the basis of whether they can be reasonable be said to represent fair treatment for the person to whom the sales efforts are directed, rather than the argument that they result in profits to customers…. (one sales effort) practice …that clearly violate this responsibility for fair dealing (is) … Excessive Trading Activity…."
6. For discussion of the historical work on the costs/benefit issue in economics, see Ekelund and Hebert (1999, p.41)
7. Portfolio commissions and market impact costs are not included.
8. However, others such as Bogel (2003) contend that fees exceed these amounts by upwards of 50%.
11. A subset of the data includes a representative sample of “hard copy” sheets which contain transaction data used to compute average commissions. In the data set at hand, the commission rate averages 2.7% per trade.
12. We estimated a random effects model for the “group” broker but found the fixed effects was the appropriate regression specification.
REFERENCES


