The Association between Non-professional Investors’ Information Choices and Their Portfolio Returns: The Importance of Investing Experience

W. Brooke Elliott (corresponding author)
University of Illinois at Urbana-Champaign
1206 S. Sixth Street
Champaign, IL 61820
T: 217.333.9247
Email: wbe@uiuc.edu

Frank Hodge
University of Washington

Kevin E. Jackson
University of Illinois at Urbana-Champaign

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Abstract: In this paper we investigate the relationship between non-professional investors’ information choices and their portfolio returns. We also investigate the role investing experience plays in this relationship. We find that less-experienced non-professional investors earn lower returns as their use of unfiltered information (e.g., SEC filings) increases relative to their use of filtered information (e.g., Value Line analysts reports). For more-experienced investors the opposite is true; they earn higher returns as their relative use of unfiltered information increases. Our results suggest that this effect is driven by investors’ ability to understand and use unfiltered information as they gain investing experience, not by a shift in their relative use of unfiltered and filtered information.

Keywords: non-professional investors; unfiltered information; investing experience; information choice.

JEL Classifications: M4, M40, M41
1. Introduction

An important objective of accounting information is to provide useful information to investors so that they can make informed investment decisions (FASB 1978; Johnson 2005). We explore this objective by examining the relationship between non-professional investors’ financial information choices and their portfolio returns. We also explore whether investing experience influences this relationship. To conduct our analysis, we classify financial information into one of two types: unfiltered and filtered. We define “unfiltered” information as information disclosed by management and unaltered by professional intermediaries (e.g., a firm’s 10-K). We define “filtered” information as information packaged by a professional intermediary for consumption by investors (e.g., a Value Line analyst report).¹

Over forty-one million non-professional investors (hereafter “investors”) invest directly in the stock market (Securities Industry Association 2002). Prior research suggests that these individuals use a combination of unfiltered and filtered financial information when making investment decisions (Chang and Most 1985; Hodge 2001; Hodge and Pronk 2006). For this reason, we examine investors’ relative use of unfiltered and filtered information rather than their absolute use of each type of information.

Unfiltered information is often rule-based (i.e., created according to Generally Accepted Accounting Principles) and detail-oriented. It facilitates investors conducting their own thorough analysis of a firm’s operations to meet their specific investment needs. If investors, however, do not possess the requisite skills to conduct such analysis, using unfiltered information is likely to hamper their decision-making abilities. In such cases, some argue that investors would be better off using a professional intermediary’s
analysis and interpretation of the firm’s performance (Securities Industry Association 2001; Byrnes 2002). Prior research suggests that when investors use unfiltered information they have difficulties identifying relevant information and incorporating this information into their decision-making processes (Payne, Bettman, and Johnson 1993). Filtered information that is packaged to highlight key metrics, however, is more readily understood and incorporated (Russo 1977). Based on this evidence, we hypothesize a negative relationship between investors’ use of unfiltered relative to filtered information and their portfolio returns.

Further, while one might expect investors’ experience to affect their portfolio returns, it is less clear whether experience influences the relationship between investors’ information choices and their returns. We therefore also investigate whether investing experience affects the relationship between investors’ portfolio returns and their information choices. It is well-established that there are differences in how well professional investors (e.g., analysts) and non-professional investors acquire, analyze and integrate relevant financial information (Bouwman 1982; Bouwman, Frishkoff, and Frishkoff 1987; Maines and McDaniel 2000; Frederickson and Miller 2004; Elliott 2006). However, it is not well-known if there are differences among users within an investor class. In fact, prior research in accounting (e.g., Maines and McDaniel 2000; Hirst, Jackson, and Koonce 2003; Hodge, Kennedy, and Maines 2004; Hodge, Martin, and Pratt 2006) and finance (e.g., Barber and Odean 2000a, b, 2001; Barber, Heath, and Odean 2003; Glaser 2003; Glaser and Weber 2005a, b; Ivkovic and Weisbenner 2005) treat non-professional investors as a homogenous class of investors, ignoring any potential impact of investing experience on performance. We hypothesize that investing experience
weakens the negative relationship between investors’ relative use of unfiltered information and their portfolio returns because investors’ ability to comprehend and effectively use unfiltered information improves as they gain investing experience.

Investigating the relationship between investor portfolio returns and their information choices, and examining the moderating role of experience, is important for at least two reasons. First, evidence suggests that the number of investors in the U.S. marketplace has grown in recent years (Securities and Exchange Commission 2004). The Securities Industry Association (2002) reports that in 1983 only 19 percent of U.S. households (42.4 million individuals) owned either mutual funds or individual stocks, whereas by 2002 this percentage had grown to 50 percent (84.3 million individuals).\(^4\)

Second, recent legislation (e.g., Sarbanes-Oxley Act of 2002) requires firms to disclose additional detailed financial information to investors and in many cases, this information is difficult to understand because it is “riddled with jargon that’s hard to fathom and numbers that don’t track” (Henry 2004). Some regulators have expressed concern that the “sheer volume of often-complicated financial information that companies report is already swamping investors” (Emshwiller 2005). This deluge of complex accounting information comes at a time when more investors are in the marketplace, and technology advances and the proliferation of online brokerages have made it easier for investors to make investment decisions without professional assistance. Since many of these investors use both unfiltered and filtered financial information to make investment decisions, our results have the potential to help them better understand the consequences of choosing accounting information that is inconsistent with their financial statement analysis skills.
To test our research questions, we surveyed 414 individual investors who are members of the National Association of Investors Corporation (NAIC). In the survey, investors provide information about their portfolio returns, the types of information they typically use when making investment decisions, and their investment experience. This information allows us to address a research question that cannot easily be addressed using traditional archival or experimental methodologies. Using a traditional archival approach would require data regarding the types of information investors use when making investment decisions. Such databases are simply not available. Experiments, on the other hand, are excellent for isolating effects, but typically lack returns data to determine whether an effect is financially detrimental to the individual.

For relatively less-experienced investors, we find a negative relationship between their portfolio returns and their relative use of unfiltered financial information. For relatively more-experienced investors, we find that this negative relationship is not only mitigated, but actually reverses. Importantly, our results are not explained by investors with different levels of experience choosing to use a different mix of unfiltered and filtered information. Specifically, investor use of unfiltered relative to filtered information does not statistically differ across levels of experience. Rather, our findings suggest that investing experience increases investors’ ability to effectively use unfiltered information.

Our study makes several contributions to prior research in accounting and finance. First, by examining how investors’ information choices affect their portfolio returns we extend existing findings that simply document the types of information investors choose to examine (e.g., Hodge and Pronk 2006). Second, prior experimental research in
financial accounting considers investor behavior in environments where investors observe simplified accounting information created by researchers (e.g., Maines and McDaniel 2000; Hirst et al. 2003; Hodge et al. 2004; Elliott 2006). Our paper compliments this line of research by examining investors’ information choices in their natural environment, and by documenting how these choices affect their portfolio returns.

Third, our findings concerning investing experience have implications for experimental studies in financial accounting. Most studies in this area use either analysts (e.g., Hopkins 1996; Hirst and Hopkins 1998; Sedor 2002) or non-professional financial statement users (e.g., Maines and McDaniel 2000; Hirst et al. 2003; Hodge et al. 2004), and treat members within a user class as homogeneous. Consistent with Hunton and McEwen’s (1997) finding of experience differences among analysts, our results suggest that investing experience plays an important role in determining how well non-professional investors use unfiltered and filtered financial information.

Finally, research in finance has examined the investing behavior of non-professional investors (e.g., Barber and Odean 2000a, b, 2001; Barber et al. 2003; Glaser 2003; Glaser and Weber 2005a, b; Ivkovic and Weisbenner 2005), but to our knowledge this research has not linked investors’ information choices to their portfolio returns. Our ability to do so extends this literature by considering an important input to investor behavior: the information they use when making investment decisions. In addition, our study extends this line of research by demonstrating that investing experience is an important moderating variable in the relationship between the information investors choose to use when making investment decisions and their portfolio returns.
Our study also speaks to other NAIC investors, cautioning them to be realistic about their financial statement analysis abilities, especially early in their investment careers. To the extent that our sample is representative of other NAIC investors, our results suggest that these investors with little investing experience are likely to become overwhelmed when analyzing unfiltered financial information to the point that it negatively affects their portfolio returns.

The remainder of our paper is organized as follows. Section 2 discusses prior research and develops our hypotheses. In Section 3, we describe our data and discuss our methodology. We present our results in Section 4 and additional analyses in Section 5. We conclude in Section 6.

2. Background and hypothesis development

Investors’ financial information choices

Using data from an actual firm’s investor relation’s website, Hodge and Pronk (2006) find that non-professional investors tend to rely more on information filtered by management (e.g., management’s discussion of results) than unfiltered accounting data when making investment decisions. We extend this line of inquiry by examining the link between investors’ information choices and their portfolio returns.

We argue that unfiltered information provides investors with large, and at times, overwhelming amounts of data making it difficult for them to effectively isolate and analyze relevant information.\(^6\) Prior research has shown that non-professional investors possess little knowledge about the importance of specific financial statement items or the relations among financial statement items (SRI International 1987; Maines and McDaniel 2000). Filtered information, however, typically highlights and often interprets the most
relevant information for investors. As a result, we contend that investors’ portfolio returns will decrease as their relative use of unfiltered information increases.

Moreover, prior research indicates that individuals can improve their decisions by using information displayed in a simplified format (Payne et al. 1993; Magat, Payne, and Brucato 1986; Russo 1977). A classic example of this notion is an experiment conducted by Russo (1977). Grocery shoppers were exposed to unit price information in one of two formats: either on individual shelf tags or on a summary page. Russo showed that shoppers exposed to the summary page saved money on their overall purchases compared to shoppers who were exposed to the shelf tags. Thus, individuals were more likely to use unit price information effectively (i.e., to lower their grocery bill) when it was displayed in a ranked format that facilitated unit price comparisons.

We argue that these findings are likely relevant to an investing context where investors are exposed to unfiltered information that is seldom displayed in an easy-to-use format. As pointed out by Penman (2001), unfiltered information, such as that provided in a firm’s 10-K, does not provide a “picture we want to draw for valuation” (i.e., relevant financial information is not highlighted or organized in an easy-to-use manner). Conversely, filtered information organizes accounting data for the purpose of using the information for investing decisions and often displays information in a simplified, “ready-to-use” format. The above arguments suggest that investors’ portfolio returns will be negatively influenced by their use of unfiltered relative to filtered financial information.

HYPOTHESIS 1. Investors earn lower portfolio returns as their relative use of unfiltered information increases.
The moderating role of investing experience

The above prediction does not consider the role of investor experience in using unfiltered relative to filtered information. Although investing experience is not synonymous with investing expertise, research in psychology provides a basis for assuming that more experienced investors develop more expert-like investment processes (Sternberg, Wagner, and Williams 1995; Payne et al. 1993). Prior research suggests that individuals with greater amounts of task-specific experience tend to be better at isolating and analyzing relevant information (Bonner and Lewis 1990; Libby and Luft 1993; Libby 1995; Bonner 2005).

In an investing context, prior research suggests that more experienced investors tend to predefine their information needs, execute focused searches to acquire relevant information, and integrate financial statement information to a greater degree than do less experienced investors (Bouwman et al. 1987; SRI International 1987; Frederickson and Miller 2004; Maines and McDaniel 2000). In addition, as they gain experience, investors tend to develop financial templates that help them organize information (Jacoby, Morrin, Johar, Gurhan, Kuss, and Mazusky 2001). These templates allow experienced investors to self-filter and organize data in ways that facilitate making informed decisions.

The above discussion suggests that investing experience will weaken the negative relationship between investors’ relative use of unfiltered information and their portfolio returns.

HYPOTHESIS 2. The negative association between investors’ portfolio returns and their relative use of unfiltered information decreases as investing experience increases.
3. Research method

Sample

We drew our sample from the membership base of a regional chapter of the NAIC. The NAIC consists of over 220,000 individual and investment club members with a total portfolio value greater than $117 billion (National Association of Investors Corporation 2004). Nine out of ten NAIC members buy securities for their own accounts in addition to making investment club investments (O’Hare and Janke 1998). NAIC investors are encouraged to utilize a fundamental approach to investment analysis, one that focuses heavily on earnings, and to analyze multiple sources of information to determine if a firm’s stock has the right combination of growth, value, and risk properties at its given price.

Design and Response Rate

The survey was three pages long and consisted of 102 questions. In this paper we focus on the survey questions related to accounting information choice, investing experience, and portfolio returns. We distributed the survey to 13,250 investors by inserting it in the regional chapter's Spring 2001 quarterly newsletter. Members were encouraged to complete the survey by filling it out and returning it postage free, or by completing the survey online. We placed a reminder in the Summer 2001 newsletter and announced that we would randomly draw one name from the pool of returned surveys to receive a $200 cash payment. In order to be eligible for the random drawing, members had to complete and submit the survey by the July deadline.

Four hundred and four investors completed the survey for a response rate of just over three percent. Given the length (three pages) and detail (102 questions) of our
survey, we expected a low response rate (Rea and Parker 1997, 12). Rea and Parker (1997) suggest that a sample size that allows for 95 percent confidence with a margin of error, or confidence interval, of approximately five percent is adequate for most types of survey research. Our sample size exceeds these minimums. In the following sections, we perform several tests to investigate whether non-response bias might affect our results.

**Early versus Late Responders**

To test for non-response bias, Wallace and Mellor (1988) and Oppenheim (1992) suggest comparing the responses of early and late responders. We refer to the 287 investors who returned the survey prior to the $200 random drawing announcement as “early” responders and the 127 investor who returned the survey after the announcement as “late” responders. The late responders proxy for the non-response group, in the sense that they did not return the survey until offered a financial incentive to do so. Of the 102 questions investors answered, 75 are sub-questions of nine general topic areas. We therefore calculate multivariate test statistics for each set of sub-questions within each topic area. These tests examine whether the patterns of means for sub-questions within a given topic area differ between early and late responders. Test results indicate that none of the nine chi-square statistics comparing the responses of early and late responders significantly differ (all \(p\)-values > 0.10), suggesting that non-response bias is not likely a major concern (Wallace and Mellor 1988).

**Our Sample versus the NAIC National Membership Base**

As suggested by Wallace and Mellor (1988) and Moore and Reichert (1983), we compare characteristics of our sample to characteristics of the population at large. If the
characteristics match, then our sample can be thought of as representing the population. While we do not have data for the population of all individual investors in the marketplace, we do have data on several demographic characteristics for the approximately 220,000 NAIC members nationwide.

The membership base of the NAIC as a whole is 66 percent female, the median age is 56 years, and 72 percent report having a college education (NAIC 2004). Within our sample, 68 percent are female, the median age is between 50 and 59 years (age was divided into ten-year increments on the survey), and 75 percent of respondents have a college education (see Table 1). Our sample mirrors the NAIC membership base on gender composition ($\chi^2 = 0.77, p = 0.38$), education ($\chi^2 = 1.58, p = 0.21$) and median age.$^{10}$

**Our Sample versus a Market Performance Metric and Prior Archival Findings**

In this section we compare our investors’ self-reported one-year returns to the average return on the New York Stock Exchange (NYSE). The NAIC reports that of the top 100 stocks held by NAIC investors, 80 percent are traded on the NYSE (National Association of Investors Corporation 2001), making the NYSE average a good comparative market-level metric. Investors filled out the survey between March 2001 and the end of July 2001. For the 18 months between March 2000 and July 2001, the average return for the NYSE was 2.8 percent.$^{11}$ Excluding one extreme observation with a self-reported return of -800 percent, the average self-reported return for our sample is -0.70 percent, slightly lower than the NYSE average from March 2000 to the end of July 2001. This evidence provides some assurance that investors did not optimistically bias their self-reported returns.
Finally, Barber and Odean (2001) use data from a large discount brokerage firm and find that males exhibit significantly lower returns on average than do females and that males trade significantly more often than do females.¹² For the 35,000 accounts they examine, male investors on average trade 45 percent more often than do female investors. Excluding the -800 percent extreme observation, our results are consistent with those of Barber and Odean (2001). Female investors in our sample report significantly higher returns than do male investors (1.66 percent versus -4.56 percent; \( t = 2.53, p = 0.01 \), two-tailed), and male investors in our sample trade significantly more times per year (46 percent more often) than do female investors (10.22 times per year versus 7.00 times per year; \( t = 2.62, p < 0.01 \)).

**Other Concerns with Survey Data**

To limit other concerns with survey data (e.g., misunderstood questions, individuals submitting more than one survey, or respondents not answering truthfully) we took the following steps. First, we attempted to limit any ambiguity in the questions by submitting early drafts of the questionnaire to academics familiar with survey research, NAIC members, and NAIC officers for review. The NAIC’s regional chapter’s board of directors approved the final draft of the survey. Second, we screened the data for duplicate responses using responders’ names, mailing addresses, and email addresses. We found six duplicate responders; all six submitted an initial survey in the spring and later submitted another survey after the summer reminder. Only the earliest responses of these six investors remain in the data set. We cannot directly assess whether respondents answered truthfully, but conversations with NAIC members who completed the survey...
suggest that investors would not take the time to fill out the survey if their intent was to be untruthful.

**Our Regression Models**

We hypothesize that investors earn lower portfolio returns as their relative use of unfiltered information increases (H1), and that investing experience weakens this negative relationship (H2). To test these predictions we estimate the following regressions:

\[
RET = \beta_0 + \beta_{1i}UFI/FI + \beta_{2i}EXP + \beta_{4i}TRADES + \\
\beta_{5i}GENDER + \beta_{6i}STRATEGY + \beta_{7i}AGE + \beta_{8i}EDU + \beta_{9i}TRAIN + \epsilon 
\]

(1)

\[
RET = \beta_0 + \beta_{1i}UFI/FI + \beta_{2i}EXP + \beta_{3i}UFI/FI \times EXP + \beta_{4i}TRADES + \\
\beta_{5i}GENDER + \beta_{6i}STRATEGY + \beta_{7i}AGE + \beta_{8i}EDU + \beta_{9i}TRAIN + \epsilon 
\]

(2)

**RET** is investor\(i\)’s self-reported portfolio percent return over the 12-month period preceding the survey. **UFI/FI** is a ratio defined as investor\(i\)’s use of unfiltered information relative to filtered information.\(^{13} \) **UFI** is a combined measure of investor\(i\)’s use of unfiltered information based on her response to five survey questions. The first four survey questions ask how often she uses the balance sheet, income statement, cash flow statement and changes in owners’ equity statement for investing purposes. The fifth survey question asks how often she uses SEC filings to obtain investment information. **UFI** is created by averaging investor\(i\)’s responses to how often she uses each of the four financial statements for investing purposes and how often she uses SEC filings to obtain investment information.
FI is a combined measure of investor’s use of filtered information based on her response to survey questions that asks how often she uses Market Guide, Value Line, Standard and Poor’s, Better Investing magazine, a broker or an analyst to obtain investment information. Investor’s survey responses to these information source questions are on a scale from one to five with endpoints labeled seldom and often, respectively. By design, a higher value for the ratio \( UFI/FI \) indicates a greater use of unfiltered relative to filtered information. H1 is supported if the coefficient on \( UFI/FI, \beta_{U} \), is significantly negative. \( EXP \) is investor’s self-reported years of investing experience. H2 is supported if the coefficient on the interaction term, \( UFI/FI * EXP, \beta_{3i} \), is significantly positive.

The regression also includes several control variables that prior research suggests influence investor returns. \( TRADES \) is investor’s self-reported number of trades executed over the 12-month period preceding the survey. \( GENDER \) is a dummy variable equal to zero (one) if the investor is male (female). Consistent with Barber and Odean (2001), we predict a negative sign on \( \beta_{4i} \) and a positive sign on \( \beta_{5i} \), respectively.

\( STRATEGY \) is a ratio defined as investor’s use of a low risk (LOW RISK) relative to a high risk (HIGH RISK) investment strategy. We include \( STRATEGY \) to control for the risk associated with investors’ trading behavior. \( AGE \) is investor’s self-reported age on a scale from one to eight with categories labeled: under 20, 20-29, 30-39, 40-49, 50-59, 60-69, 70-79, and 80 and above. We include \( AGE \) to control for changes in investment behavior (e.g., risk preferences, diversification strategies and trading frequency) as investors approach retirement (Korniotis and Kumar 2005). Given that we only look at returns over a short period of time, and that the relationship between a given
investment strategy and returns likely fluctuates over time, we do not make directional predictions for $\beta_6$ or $\beta_7$.

$EDU$ is investor $i$’s self-reported highest level of general education on a scale from one to five with categories labeled: high school, some college, undergraduate degree, graduate degree, or doctoral degree. $TRAIN$ is investor $i$’s level of investment training represented by the self-reported number of NAIC sponsored classes she has completed.\textsuperscript{16} We include $EDU$ and $TRAIN$ to control for prior findings that general education (Bertaut 1998; Masters 1989) and investment-specific education (Masters 1989) are associated with investment-related behaviors such as when to enter and exit markets, risk preferences, and diversification strategies. Since prior research does not specify a relationship between general or investment-specific education and portfolio returns, we do not make directional predictions for $\beta_8$ or $\beta_9$.

4. Results

In this section we report descriptive statistics for our regression variables and our primary tests of H1 and H2. In Section 5 we conduct additional analyses to investigate whether investors’ use of unfiltered or filtered information is driving our results, as well as investigate the robustness of our results to alternate measures of $UFI/FI$.

Descriptive Statistics

Table 1 provides descriptive statistics for our regression variables. Excluding one outlier with a self-reported return of -800 percent, the average self-reported return for our sample is -0.68 percent. A mean value of 0.88 for the $UFI/FI$ ratio indicates that non-professional investors in our sample use filtered information more often than unfiltered information. In addition, our sample of investors has, on average, ten years of investing
experience, trades eight times per year, 68 percent are female, the median age is between 50 and 59, and 75 percent of respondents have a college education. A mean value of 0.86 for the STRATEGY ratio indicates that the investors in our sample tend to use relatively high-risk investment strategies more often than relatively low risk investment strategies.\textsuperscript{17} Finally, our sample of investors has completed an average of two NAIC sponsored classes.

\begin{table}[h]
\centering
\caption{Results for Hypotheses Tests}
\begin{tabular}{|l|l|}
\hline
Investors’ financial information choices (H1) & \\
\hline
H1 predicts that investors will earn lower portfolio returns as their relative use of unfiltered information increases. By design, a higher value for the ratio $UFI/FI$ indicates a greater use of unfiltered relative to filtered information. Thus, our hypothesis is supported if the ratio $UFI/FI$ is negatively associated with investor returns. Table 2 presents results from estimating regression equation (1). The coefficient on $UFI/FI$ is insignificant ($\beta_1 = 2.53$, $p = 0.44$, two-tailed), inconsistent with H1. & \\
\hline
\end{tabular}
\end{table}

\begin{table}[h]
\centering
\caption{The moderating effect of investing experience (H2)}
\begin{tabular}{|l|l|}
\hline
Hypothesis 2 predicts that as investing experience increases, the negative association between investors’ portfolio returns and their relative use of unfiltered information decreases. To test H2, we estimate equation (2) and examine the coefficient on the interaction term, $UFI/FI*EXP$. We report these results in Table 2. Consistent with H2, the coefficient on $UFI/FI*EXP$ is significantly positive ($\beta_3 = 1.05$, $p < 0.01$,}
one-tailed) indicating that as investment experience increases, portfolio returns are less negatively associated with the relative use of unfiltered information.¹⁸

**Interpretation of significant control variables**

The other significant variables in equations (1) and (2) are TRADES, GENDER, and STRATEGY. The negative coefficient on TRADES indicates that investors who traded more often tended to report lower portfolio returns. The positive coefficient on GENDER indicates that female investors in our sample reported higher portfolio returns than did male investors. We did not make directional predictions with respect to STRATEGY. Our results indicate that during our sample period, following a low-risk strategy resulted in higher portfolio returns. The coefficient on EXP is positive and insignificant in equation (1), but negative and significant in equation (2). The latter result indicates that during our sample period, investors with more investing experience reported lower portfolio returns.

**5. Additional analyses**

In this section we conduct three additional analyses. First, we investigate an explanation for our non-significant H1 results. Second, we analyze whether investors’ use of unfiltered or filtered information is driving our results, and third, we analyze the robustness of our results to alternate measures of UFI/FI.

**Additional Analysis of H1**

One possible explanation for why we fail to support H1is that the hypothesized negative association between investors’ portfolio returns and their relative use of unfiltered information actually reverses as opposed to simply weakening as investor
experience increases. If the association between investors’ portfolio returns and their relative use of unfiltered information is negative for relatively less-experienced investors, but positive for relatively more-experienced investors, we would expect to see an insignificant coefficient on $UFI/FI$ in regression equation (1).

To investigate this potential explanation, we partition our data at the median based on years of investing experience and re-estimate regression equation (1) for relatively less- and relatively more-experienced investors.\textsuperscript{19} If the above explanation accounts for our non-significant H1 results, we expect the portfolio returns of relatively less-experienced investors to be negatively associated with their relative use of unfiltered information, and we expect the portfolio returns of relatively more-experienced investors to be positively associated with their relative use of unfiltered information.

Table 3 presents descriptive statistics for our regression variables by relative experience level, \textit{Low} and \textit{High}. It is important to note that the use of unfiltered relative to filtered information does not differ across experience levels ($p$-value > 0.41). This finding suggests that the mix of unfiltered and filtered information investors use does not change as they gain investing experience.\textsuperscript{20} It also suggest that our H2 results, and the results we report below, are driven by a change in investors’ ability to understand and use unfiltered information as they gain investing experience rather than a shift in their information choices.

[Insert Table 3 Here]

We present our additional regression results in Table 4.\textsuperscript{21} For investors with relatively less investing experience, the coefficient on $UFI/FI$ is significantly negative ($\beta_1 = -6.99$, $p = 0.07$, one-tailed), indicating that portfolio returns decrease as their
relative use of unfiltered information increases. In contrast, for relatively more-
experienced investors the coefficient on $UFI/FI$ is significantly positive ($\beta_1 = 11.85, p < 0.01$, one-tailed) indicating that portfolio returns increase as their relative use of
unfiltered information increases. Thus, the negative relationship between investors’
portfolio returns and their relative use of unfiltered information observed for relatively
less-experienced investors is not only moderated (as predicted in H2), but actually
reverses for relatively more-experienced investors. The fact that the relationship
between portfolio returns and the relative use of unfiltered information is negative for
less-experienced investors but positive for more-experienced investors provides a
reasonable explanation for why our primary results do not support H1.

[Insert Table 4 Here]

Additional Analysis of the Use of Unfiltered and Filtered Information

To investigate whether it is investors’ use of unfiltered or filtered information that
drives the association between $UFI/FI$, experience, and returns, we enter $UFI$ and $FI$ into
regression equation (2) as well as $UFI*EXP$ and $FI*EXP$.

$$
RET = \alpha_0 + \alpha_{1i}UFI + \alpha_{2i}FI + \alpha_{3i}EXP + \alpha_{4i}UFI * EXP + \alpha_{5i}FI * EXP + \alpha_{6i}TRADES + \\
\alpha_{7i}GENDER + \alpha_{8i}STRATEGY + \alpha_{9i}AGE + \alpha_{10i}EDU + \alpha_{11i}TRAIN + \epsilon
$$

We present the results of running regression equation (3) in Table 5. The
coefficient on $UFI*EXP$ is significantly positive ($\alpha_4 = 0.38, p < 0.01$, two-tailed), while
the coefficient on $FI*EXP$ is not significantly different from zero ($\alpha_5 = 0.05, p = 0.86$,
two-tailed). Together, these results indicate that investors’ use of unfiltered information is
associated with higher portfolio returns as they gain investing experience, while no association exists for filtered information.

To further explore these findings, we again partition our data at the median based on years of investing experience and re-estimate regression equation (3), excluding the interaction terms, $UFI*EXP$ and $FI*EXP$ (results not tabulated). Based on our initial analysis above, we expect the relation between investors’ use of unfiltered information and returns to be different for relatively less- and more-experienced investors. Results reveal that for relatively less-experienced investors the association between the use of unfiltered information and portfolio returns is negative but not significant at conventional levels ($p$-value < 0.30, two-tailed), while for relatively more-experienced investors the association is significantly positive ($p$-values < 0.01, two-tailed). Consistent with our theory for the main hypotheses, these findings suggest that the association between investors’ information choices, investing experience and portfolio returns is mainly driven by a shift in their ability to understand and use unfiltered information as they gain investing experience.

[Insert Table 5 Here]

Overall, our results indicate that relatively less-experienced investors earn lower portfolio returns as their relative use of unfiltered information increases, while relatively more-experienced investors earn higher portfolio returns as their relative use of unfiltered information increases. In addition, our supplemental analyses suggest that this effect is driven by investors’ ability to understand and use unfiltered information as they gain investing experience, not by a shift in their relative use of unfiltered and filtered information.
Analyzing Alternate Measures of Unfiltered Information

Our current measure of unfiltered information, \( UFI \), is a combined measure of investor_i’s use of unfiltered information based on her response to five survey questions. The first four survey questions ask how often she uses the balance sheet, income statement, cash flow statement and changes in owners’ equity statement for investing purposes. The fifth survey question asks how often she uses SEC filings to obtain investment information. \( UFI \) is a simple average of investor_i’s responses to how often she uses each of the four financial statements for investing purposes and how often she uses SEC filings to obtain investment information. To investigate the sensitivity of our results to our definition of unfiltered information, we construct two alternate measures of unfiltered information: \( UFI \text{ ALT 1} \) and \( UFI \text{ ALT 2} \).

In addition to asking how often the investor uses the four financial statements and SEC filings for investing purposes, we asked investors how often they use historical price/earnings ratios, historical sales trends, and historical earnings trends for investing purposes. Our relatively broader measure of unfiltered information, \( UFI \text{ ALT 1} \), adds investor_i’s responses to each of these questions to her responses to how often she uses each of the four financial statements as well as SEC filings (our initial \( UFI \) measure). Our relatively narrower measure of unfiltered information, \( UFI \text{ ALT 2} \), is a weighted average of investors’ responses to the same five questions that we used to create our initial measure of \( UFI \). Specifically, we assign a weight of 0.125 to each of the four financial statement questions and a weight of 0.5 to SEC filings. This weighting reflects that the four financial statements are a component of a firm’s quarterly and annual SEC filings.
Using these measures in place of our initial $UFI$ variable, we re-run our primary and additional analyses. Table 6 presents descriptive statistics and our re-estimated primary and additional analyses for each measure of unfiltered information.\textsuperscript{24} In general, the results are slightly weaker using the relatively broader measure of unfiltered information, $UFI\ ALT\ 1$, and slightly stronger using the relatively narrower measure of unfiltered information, $UFI\ ALT\ 2$. Overall, our conclusions remain the same regardless of how we measure unfiltered information.

[Insert Table 6 Here]

6. Discussion and conclusions

In this paper we investigate the relationship between non-professional investors’ information choices and their portfolio returns. We also investigate the role investment experience plays in this relationship. We find that less-experienced non-professional investors earn lower returns as their use of unfiltered information increases relative to their use of filtered information. For more-experienced investors the opposite is true; they earn higher returns as their relative use of unfiltered information increases. Additional analyses reveals that this reversal appears to be driven by investors’ ability to better understand and use unfiltered information as they gain investing experience, not by a shift in their relative use of unfiltered and filtered information. Our findings are particularly relevant given the recent influx of relatively inexperienced equity investors and recent legislation requiring firms to disclose additional, often complex, financial information to market participants.

Our findings extend prior research in accounting and finance in several ways. First, by examining investors’ information choices in their natural environment, and by
documenting how these choices affect their portfolio returns, we go beyond archival
findings regarding the information preferences of nonprofessional investors and
experimental research in financial accounting that examines investor behavior in the
laboratory. Second, our finding that investing experience plays a key role in investors’
ability to use unfiltered financial information has implications for researchers examining
how individuals react to financial disclosures. Most studies in this area use as participants
either analysts or non-professional financial statement users, and treat members within a
user class as homogeneous. Our results show that investing experience differences within
a particular user class can play an important role in how individuals use unfiltered
financial information when making investment decisions. Third, we extend research in
finance that examines non-professional investor behavior by linking investors’
information choices to their portfolio returns. To our knowledge we are the first to
empirically test this link, and show that investing experience plays a key role in the
relationship.

Our findings also have implications for NAIC investors, and perhaps the broader
pool of all non-professional investors. Our results suggest that investors with little
investing experience are likely to become overwhelmed when analyzing unfiltered
financial information to the point that it negatively affects their portfolio returns. Our
results caution investors with little experience to be realistic about their financial
statement analysis abilities, especially early in their investment careers.

Like all research, our study is subject to certain limitations. First, our survey
includes only investors that have self-selected as members into the NAIC. Though we
present evidence that our sample of investors is representative of the 220,000 investor
who comprise the NAIC, our respondents may reflect a narrower distribution of
investment behavior than that of the population of all non-professional investors. Second,
our data are self-reported. Although it is difficult to imagine a scenario whereby
respondents would bias their self-reported returns and information choice disclosures in a
manner consistent with our findings, our data-gathering technique cannot completely rule
out this possibility. Third, our survey questions did not list every possible unfiltered and
filtered information choice available to investors. The extent to which we excluded
information choices that are associated with investors’ returns limits the generalizability
of our findings. Finally, we note the time period that we conducted our study as a
potential limitation. Though returns during this period were both positive and negative,
we are unable to rule out the possibility that our results might differ during a different
time period. Despite these limitations, we believe our study offers unique and important
insights into non-professional investors’ information choices, and how these choices
relate to their portfolio returns.
Endnotes:

1. A standard definition of unfiltered or filtered information does not exist in the literature. For example, Hodge and Pronk (2006), who examine quarterly financial information for one firm, define unfiltered information as the raw financial statements provided in quarterly reports and filtered information as management’s interpretation of those financial statements. Given our dataset, our definitions of unfiltered and filtered information are broader than their definitions. In Section 5 we examine the robustness of our results using alternate measures of unfiltered and filtered information.

2. We realize that reporting incentives play a key role in both unfiltered and filtered information environments. Prior research suggests that investors are aware of the reporting incentives management (Hodge 2003) and analysts (Elliott, Hodge, Kennedy, and Pronk 2006) face in today’s marketplace.

3. We assume that investors’ information choices directly influence the portfolio of stocks investors hold (which then affects investors’ portfolio returns). In this study, we do not observe the specific composition of each investor’s portfolio, but we do observe investors’ information choices and their resulting portfolio returns.

4. The growth in individual investors from 1983 to 2002 reflects a growth in the number of individuals investing directly in the stock market as well as a growth in the number of individuals investing through mutual funds (Securities Industry Association 2002).

5. We acknowledge the possibility that investors may have optimistically biased their self-reported returns. Although doing so would inflate the overall level of reported returns across our sample, it should not influence inferences about the relationships between investors’ information choices, investing experience, and returns. In order for bias to explain our findings, investors who rely more on unfiltered information would have to report less optimistically biased returns than investors who rely more on filtered information, and this pattern would have to disappear or reverse as investors gain experience. We believe this is highly unlikely. In addition, subsequent analysis reported in Section 3 reveals that our sample’s average return is consistent with the average return of the New York Stock Exchange during the time period we analyze.

6. For example, Xerox’s 2005 Annual Report runs 100 pages while Value Line’s analyst report for Xerox is limited to a single page.

7. Sternberg et al. (1995) identify “tacit knowledge” as a form of learning by doing. As individuals gain tacit knowledge, they likely develop procedural knowledge that standardizes the process of performing the task.

8. The complete survey is available upon request. Survey questions from our dataset related to earnings quality, auditor independence, and the reliability and relevance of audited financial statements are examined in Hodge (2003).

9. According to Rea and Parker (1997, 119, Table 7.1), the minimum sample size required for 95 percent confidence with a confidence interval (margin of error) of 5 percent is 385 respondents.

10. We are unable to statistically compare the average age of our sample to that of the NAIC because age was divided into ten-year increments on our survey, whereas the NAIC discloses age as a single number.

11. For the 12-month periods ending March 1, April 1, May 1, June 1, July 1 and August 1, 2001, the NYSE average changed 7.8 percent, -6.4 percent, 0.5 percent, 2.0 percent, -1.2 percent, and -1.8 percent, respectively. For the time period we study, the average return for the Dow Jones Industrial Average was -0.8 percent. Although the period from 2000-2001 was a unique time in market history, examining the month-by-month returns for the time period for which we collected returns data reveals that market returns were neither extremely positive nor extremely negative. Thus, it is unlikely that our results are time period dependent.

12. The authors suggest these findings are driven by male investors being more overconfident than female investors. Thus, we control for both the number of trades that an investor executes over a 12-month period and the gender of the investor in our hypotheses tests.

13. Two alternate ways to test our hypotheses are to examine (1) the difference score between investor’s use of unfiltered and filtered information or (2) the ratio of investor’s use of unfiltered information relative to investor’s use of unfiltered plus filtered information. Using either of these alternate measures in regression equations (1) and (2) yields inferentially identical results.
14. The NAIC describes Value Line, Standard and Poor’s, and Better Investing magazine as useful sources for investing information. We include “Market Guide”, “broker”, and “analysts” as information sources because they fit our definition of filtered information (i.e., information packaged by a professional intermediary for consumption by investors) and result in a more comprehensive measure. Using only Value Line, Standard and Poor’s, and Better Investing magazine as proxies for filtered information yields inferentially identical results.

15. Investors reported how often they use each of eight potential investment strategies on a five-point scale with endpoints labeled seldom and often, respectively. We asked 12 researchers at two universities to independently classify each of the strategies as either “low risk” or “high risk.” LOW RISK is a simple average of the two strategies that the researchers unanimously classified as low risk. These strategies are: emphasize low risk stocks (e.g., stocks with betas less than one) or emphasize high yield stocks (e.g., stocks with high dividend/price ratios). HIGH RISK is a simple average of the two strategies that the researchers unanimously classified as high risk. These strategies are: use momentum strategies (e.g., invest in stocks that have recently experienced sharp price increases relative to the market) or emphasize growth stocks (e.g., stocks that have high projected earnings growth). Categorizing each of the eight strategies as low risk or high risk based on a simple majority produces inferentially identical results.

16. The NAIC typically offers a basic investing class, three stock analysis classes, as well as several supplemental, topics-oriented classes. The basic investing classes covers topics such as what is the stock market, basic investing terminology (e.g., P/E ratio, yield), and what is Value Line. The stock analysis classes cover topics such as how to use a stock selection guide (the NAIC worksheet for analyzing firms), how to compare stocks, how to manage your portfolio, when to sell, how to analyze the annual report, and how to analyze specific types of institutions.

17. The results we report in the next section are inferentially identical if we include LOW RISK and HIGH RISK as separate variables in our regressions. We use a ratio because we believe it better captures our construct of interest: an investor’s overall investment strategy.

18. Several of the independent variables are significantly related (all r-values < 0.40). To assess the potential impact of multicollinearity, we compute variance inflation factors (VIFs) for each of our independent variables. Belsley, Kuh, and Welsch (1980) and Myers (1990) suggest that if any VIF exceeds 10, there is at least some reason for concern – our highest VIF is 5.5. To further address the potential impact of multicollinearity, we transformed all of our control variables into dichotomous variables and re-estimated regression equations (1) and (2). Using this approach produces inferentially identical conclusions.

19. The median years of investing experience in our sample is six years. We classify those investors with less than six years of investing experience as relatively less-experienced and those with greater than six years as relatively more-experienced. Twenty-seven of our investors have exactly six years of investing experience. We classify these participants as relatively less- (more-) experienced based on the number of NAIC sponsored class they have taken. The number of classes investors have taken is significantly related to their investing experience (p-value < 0.01). The median number of classes taken in our sample is two. We therefore classify those participants who reported taking two or fewer classes (more than two classes) as relatively less-experienced (more-experienced). This classification scheme results in an equal distribution of participants at the median into the relatively less- and more-experienced groups. Specifically, 13 of the 27 participants are classified as relatively less-experienced, while the remaining 14 participants are classified as relatively more-experienced.

20. To further investigate any association between information choice and investing experience, we regressed $UFI/FI$ on $EXP$ controlling for $GENDER$, $AGE$, $EDUCATION$, $STRATEGY$ and $TRAIN$. Consistent with our univariate results, we find no association between information choice and investing experience ($p$-value > 0.69).

21. Theory does not guide us as to the direction of the interaction between any of the control variables and experience. Thus, we did not make directional predictions for any of the control variables when estimating regression equation (1) based on investor experience. The control variables that are significant, however, are consistent with our expectations described in Section 3.

22. Identifying the cause of the reversal is beyond the scope of the current paper. We discuss exploring the cause of the reversal and other opportunities for future research in the discussion and conclusions section.
23. A possible concern is that filtered information contains more information than unfiltered information (e.g., an analyst’s investment recommendation) and this is the underlying reason why we observe a negative association between relatively less-experienced investors’ portfolio returns and their relative use of unfiltered information. Such an interpretation, however, is inconsistent with the non-significant association we observe between their use of filtered information and returns ($p$-value $> 0.41$, two-tailed, results not tabulated).

24. We only tabulate results for the main variables of interest. The interpretation of the control variables is inferentially identical regardless of the measure of unfiltered information entered into the regression equation. The adjusted $r$-squared is reported for the complete regression model.
References


Barber, B., and T. Odean. 2000a. Too many cooks spoil the profits: The performance of

Barber, B., and T. Odean. 2000b. Trading is hazardous to your wealth: The common
773-806.

Barber, B., and T. Odean. 2001. Boys will be boys: Gender, overconfidence, and

among group and individual investors in the stock market. Management Science 49

Influential Data and Sources of Collinearity. New York: Wiley.

275.


Decision Making: An Interdisciplinary Inquiry, eds. G. Ungson and D. Braunstein,

decisions? A process model of the investment screening decision. Accounting,


Chang, L., and K. Most. 1985. The perceived usefulness of financial statements for

Elliott, W. B. 2006. Are investors influenced by pro forma emphasis and reconciliations

Emshwiller, J. R. 2005. Opening the Books: Corporate disclosure has come a long way over the decades; But it still has a ways to go. The Wall Street Journal, October 17, R6.


Hodge, F. D. 2001. Investor habits. Speech given at the Annual Meeting of the Puget Sound Chapter of the National Association of Investment Clubs, Women’s University Club, June 14, Seattle, WA.


National Association of Investors Corporation. 2001. Better investing top 100 index. Available at: http://old.better-investing.org/content/top100index.html.


### TABLE 1
Descriptive Statistics for Regression Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>25%</th>
<th>Median</th>
<th>75%</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>RET</td>
<td>339</td>
<td>-0.68</td>
<td>-13.00</td>
<td>5.00</td>
<td>12.00</td>
<td>20.95</td>
</tr>
<tr>
<td>UFI/FI</td>
<td>339</td>
<td>0.88</td>
<td>0.56</td>
<td>0.82</td>
<td>1.11</td>
<td>0.44</td>
</tr>
<tr>
<td>UFI</td>
<td>364</td>
<td>2.53</td>
<td>1.60</td>
<td>2.60</td>
<td>3.40</td>
<td>1.10</td>
</tr>
<tr>
<td>FI</td>
<td>354</td>
<td>2.99</td>
<td>2.50</td>
<td>3.00</td>
<td>3.33</td>
<td>0.64</td>
</tr>
<tr>
<td>EXP</td>
<td>404</td>
<td>9.92</td>
<td>4.00</td>
<td>6.00</td>
<td>15.00</td>
<td>9.06</td>
</tr>
<tr>
<td>TRADES</td>
<td>396</td>
<td>8.25</td>
<td>3.00</td>
<td>5.00</td>
<td>10.00</td>
<td>11.33</td>
</tr>
<tr>
<td>GENDER</td>
<td>404</td>
<td>0.68</td>
<td>0.00</td>
<td>1.00</td>
<td>1.00</td>
<td>0.47</td>
</tr>
<tr>
<td>STRATEGY</td>
<td>366</td>
<td>0.86</td>
<td>0.57</td>
<td>0.83</td>
<td>1.00</td>
<td>0.36</td>
</tr>
<tr>
<td>LOW RISK</td>
<td>373</td>
<td>2.41</td>
<td>1.50</td>
<td>2.50</td>
<td>3.00</td>
<td>0.93</td>
</tr>
<tr>
<td>HIGH RISK</td>
<td>376</td>
<td>2.95</td>
<td>2.50</td>
<td>3.00</td>
<td>3.50</td>
<td>0.82</td>
</tr>
<tr>
<td>AGE</td>
<td>405</td>
<td>5.13</td>
<td>4.00</td>
<td>5.00</td>
<td>6.00</td>
<td>1.24</td>
</tr>
<tr>
<td>EDU</td>
<td>406</td>
<td>3.10</td>
<td>3.00</td>
<td>3.00</td>
<td>4.00</td>
<td>0.89</td>
</tr>
<tr>
<td>TRAIN</td>
<td>386</td>
<td>2.39</td>
<td>1.00</td>
<td>2.00</td>
<td>3.00</td>
<td>1.95</td>
</tr>
</tbody>
</table>

- **RET** = investor’s self-reported portfolio percent returns over the 12-month period preceding the survey.
- **UFI/FI** = a ratio defined as investor’s use of unfiltered information (UFI) relative to filtered information (FI), based on survey responses.
- **UFI** = a combined measure of investor’s use of unfiltered information based on her response to five survey questions: how often she uses the balance sheet, income statement, cash flow statement and changes in owners’ equity statement for investing purposes and how often she uses SEC filings to obtain investment information. The survey questions use scales from 1 to 5 with endpoints labeled seldom and often, respectively.
- **FI** = a combined measure of investor’s use of filtered information based on her response to a survey questions that ask how often she uses Market Guide, Value Line, Standard and Poor’s, Better Investing magazine, a broker or an analyst to obtain investment information on a scale from 1 to 5 with endpoints labeled seldom and often, respectively.
- **EXP** = investor’s self-reported years of investing experience.
- **TRADES** = investor’s self-reported number of trades executed over the 12-month period preceding the survey.
- **GENDER** = a dummy variable equal to 0 if the investor is male; equal to 1 if the investor is female.
- **STRATEGY** = a ratio defined as investor’s use of a low risk (LOW RISK) relative to a high risk (HIGH RISK) investment strategy, based on survey responses.
- **LOW RISK** = a combined measure of investor’s use of a low risk investment strategy based on her response to a survey question that asks how often she emphasizes low risk stocks or high yield stocks on a scale from 1 to 5 with endpoints labeled seldom and often, respectively.
- **HIGH RISK** = a combined measure investor’s use of a high risk investment strategy based on her response to a survey question that asks how often she uses momentum strategies or emphasizes growth stocks on a scale from 1 to 5 with endpoints labeled seldom and often, respectively.
- **AGE** = investor’s self-reported age using an ordinal variable divided into ten-year increments on a scale from 1 to 8 with categories labeled: under 20, 20-29, 30-39, 40-49, 50-59, 60-69, 70-79, and 80 and above, respectively.
- **EDU** = investor’s self-reported highest level of education using an ordinal variable on a scale from 1 to 5 with categories labeled: high school, some college, undergraduate degree, graduate degree, or doctoral degree.
- **TRAIN** = investor’s level of investment training represented by the self-reported number of NAIC sponsored classes she has completed.
## TABLE 2
Results for Hypotheses Tests

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter</th>
<th>Predicted Sign</th>
<th>Regression Model[^1]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>INTERCEPT</strong></td>
<td>$\beta_0$</td>
<td>$-$</td>
<td>-1.004 (-0.11)</td>
</tr>
<tr>
<td><strong>UFI/FI</strong></td>
<td>$\beta_{1i}$</td>
<td>$-$</td>
<td>2.534 (0.78)</td>
</tr>
<tr>
<td><strong>EXP</strong></td>
<td>$\beta_{2i}$</td>
<td>$-$</td>
<td>0.172 (1.02)</td>
</tr>
<tr>
<td><strong>UFI/FI * EXP</strong></td>
<td>$\beta_{3i}$</td>
<td>$+$</td>
<td>1.053 (2.67)***</td>
</tr>
<tr>
<td><strong>Control Variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TRADES</strong></td>
<td>$\beta_{4i}$</td>
<td>$-$</td>
<td>-0.197 (1.35)*</td>
</tr>
<tr>
<td><strong>GENDER</strong></td>
<td>$\beta_{5i}$</td>
<td>$+$</td>
<td>6.644 (2.21)**</td>
</tr>
<tr>
<td><strong>STRATEGY</strong></td>
<td>$\beta_{6i}$</td>
<td>$-$</td>
<td>7.652 (1.95)**</td>
</tr>
<tr>
<td><strong>AGE</strong></td>
<td>$\beta_{7i}$</td>
<td>$-$</td>
<td>-1.674 (1.40)</td>
</tr>
<tr>
<td><strong>EDU</strong></td>
<td>$\beta_{8i}$</td>
<td>$-$</td>
<td>-1.780 (1.17)</td>
</tr>
<tr>
<td><strong>TRAIN</strong></td>
<td>$\beta_{9i}$</td>
<td>$-$</td>
<td>0.351 (0.55)</td>
</tr>
<tr>
<td>Adjusted r-squared</td>
<td></td>
<td></td>
<td>0.033</td>
</tr>
</tbody>
</table>

[^1]: T-statistics in parentheses. See variable descriptions in Table 1.

*significant at 10%; **significant at 5%; ***significant at 1%; one-tailed for variables for which we have directional predictions (UFI/FI, UFI/FI * EXP, TRADES, GENDER)
### Table 3
Descriptive Statistics by Experience Level

<table>
<thead>
<tr>
<th>Variable</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N</strong></td>
<td>Mean</td>
<td>25%</td>
</tr>
<tr>
<td><strong>RETURNS</strong></td>
<td>170</td>
<td>-0.47</td>
</tr>
<tr>
<td><strong>UFI/FI</strong></td>
<td>180</td>
<td>0.86</td>
</tr>
<tr>
<td><strong>UFI</strong></td>
<td>187</td>
<td>2.44</td>
</tr>
<tr>
<td><strong>FI</strong></td>
<td>186</td>
<td>2.93</td>
</tr>
<tr>
<td><strong>EXP</strong></td>
<td>207</td>
<td>3.73</td>
</tr>
<tr>
<td><strong>TRADES</strong></td>
<td>201</td>
<td>8.00</td>
</tr>
<tr>
<td><strong>GENDER</strong></td>
<td>201</td>
<td>0.79</td>
</tr>
<tr>
<td><strong>STRATEGY</strong></td>
<td>185</td>
<td>0.84</td>
</tr>
<tr>
<td><strong>LOW RISK</strong></td>
<td>190</td>
<td>2.31</td>
</tr>
<tr>
<td><strong>HIGH RISK</strong></td>
<td>191</td>
<td>2.91</td>
</tr>
<tr>
<td><strong>AGE</strong></td>
<td>203</td>
<td>4.72</td>
</tr>
<tr>
<td><strong>EDU</strong></td>
<td>205</td>
<td>3.03</td>
</tr>
<tr>
<td><strong>TRAIN</strong></td>
<td>195</td>
<td>2.04</td>
</tr>
</tbody>
</table>

See variable descriptions in Table 1.

We classify those investors with less than the median years of investing experience (six years) as relatively less-experienced (LOW) and those with greater than six years as relatively more-experienced (HIGH). Twenty-seven of our investors have exactly six years of investing experience. We classify these participants as relatively less- (more-) experienced based on the number of NAIC sponsored class they have taken. This classification scheme results in an equal distribution of participants at the median into the LOW and HIGH groups.
### TABLE 4
Additional Analysis of H1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter</th>
<th>Relative Experience Level$^1$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>( INTERCEPT )</td>
<td>( \beta_0 )</td>
<td>1.380(0.10)</td>
</tr>
<tr>
<td>( UFI/FI )</td>
<td>( \beta_{1i} )</td>
<td>-6.993(1.45)*</td>
</tr>
<tr>
<td>( EXP )</td>
<td>( \beta_{2i} )</td>
<td>1.174(0.85)</td>
</tr>
<tr>
<td>Control Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( TRADES )</td>
<td>( \beta_{4i} )</td>
<td>0.153(0.70)</td>
</tr>
<tr>
<td>( GENDER )</td>
<td>( \beta_{5i} )</td>
<td>15.661(3.49)***</td>
</tr>
<tr>
<td>( STRATEGY )</td>
<td>( \beta_{6i} )</td>
<td>5.317(0.99)</td>
</tr>
<tr>
<td>( AGE )</td>
<td>( \beta_{7i} )</td>
<td>-2.839(1.78)*</td>
</tr>
<tr>
<td>( EDU )</td>
<td>( \beta_{8i} )</td>
<td>-2.289(1.11)</td>
</tr>
<tr>
<td>( TRAIN )</td>
<td>( \beta_{9i} )</td>
<td>0.978(0.79)</td>
</tr>
</tbody>
</table>

Adjusted r-squared: 0.104 0.086

$^1$T-statistics in parentheses. See variable descriptions in Table 1.

*significant at 10%; **significant at 5%; ***significant at 1%; one-tailed for variables for which we have directional predictions (\( UFI/FI, TRADES, GENDER \)).

We classify those investors with less than the median years of investing experience (six years) as relatively less-experienced (\( \text{LOW} \)) and those with greater than six years as relatively more-experienced (\( \text{HIGH} \)). Twenty-seven of our investors have exactly six years of investing experience. We classify these participants as relatively less- (more-) experienced based on the number of NAIC sponsored class they have taken. This classification scheme results in an equal distribution of participants at the median into the \( \text{LOW} \) and \( \text{HIGH} \) groups.
 TABLE 5
Additional Analysis of the Use of Unfiltered and Filtered Information

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter</th>
<th>Predicted Sign</th>
<th>Regression Model&lt;sup&gt;1&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERCEPT</td>
<td>$\alpha_0$</td>
<td>$-$</td>
<td>-3.171 (0.25)</td>
</tr>
<tr>
<td>UFI</td>
<td>$\alpha_1$</td>
<td>$-$</td>
<td>-1.535 (0.83)</td>
</tr>
<tr>
<td>FI</td>
<td>$\alpha_2$</td>
<td>$+$</td>
<td>3.595 (1.12)</td>
</tr>
<tr>
<td>EXP</td>
<td>$\alpha_3$</td>
<td>$-$</td>
<td>-0.866 (1.13)</td>
</tr>
<tr>
<td>UFI * EXP</td>
<td>$\alpha_4$</td>
<td>$+$</td>
<td>0.378 (2.66)***</td>
</tr>
<tr>
<td>FI * EXP</td>
<td>$\alpha_5$</td>
<td>$-$</td>
<td>-0.046 (0.18)</td>
</tr>
<tr>
<td>Control Variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRADES</td>
<td>$\alpha_6$</td>
<td>$-$</td>
<td>-0.204 (1.43)*</td>
</tr>
<tr>
<td>GENDER</td>
<td>$\alpha_7$</td>
<td>$+$</td>
<td>7.503 (2.54)***</td>
</tr>
<tr>
<td>STRATEGY</td>
<td>$\alpha_8$</td>
<td>$-$</td>
<td>5.824 (1.49)</td>
</tr>
<tr>
<td>AGE</td>
<td>$\alpha_9$</td>
<td>$-$</td>
<td>-1.637 (1.40)</td>
</tr>
<tr>
<td>EDU</td>
<td>$\alpha_{10}$</td>
<td>$-$</td>
<td>-1.951 (1.29)</td>
</tr>
<tr>
<td>TRAIN</td>
<td>$\alpha_{11}$</td>
<td>$-$</td>
<td>0.353 (0.55)</td>
</tr>
<tr>
<td>Adjusted r-squared</td>
<td></td>
<td></td>
<td>0.072</td>
</tr>
</tbody>
</table>

<sup>1</sup>T-statistics in parentheses. See variable descriptions in Table 1.
*significant at 10%; **significant at 5%; ***significant at 1%; one-tailed for variables for which we have directional predictions (TRADES, GENDER)
### TABLE 6
Analyzing Alternate Measures of Unfiltered Information

Panel A: Descriptive Statistics for Alternative Measures of Unfiltered Information

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>25%</th>
<th>Median</th>
<th>75%</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>UFI</td>
<td>364</td>
<td>2.53</td>
<td>1.60</td>
<td>2.60</td>
<td>3.40</td>
<td>1.10</td>
</tr>
<tr>
<td>UFI ALT 1</td>
<td>362</td>
<td>3.28</td>
<td>2.75</td>
<td>3.25</td>
<td>3.87</td>
<td>0.82</td>
</tr>
<tr>
<td>UFI ALT 2</td>
<td>364</td>
<td>2.41</td>
<td>1.50</td>
<td>2.25</td>
<td>3.12</td>
<td>1.08</td>
</tr>
<tr>
<td>UFI/FI</td>
<td>339</td>
<td>0.88</td>
<td>0.56</td>
<td>0.82</td>
<td>1.11</td>
<td>0.44</td>
</tr>
<tr>
<td>UFI ALT 1/FI</td>
<td>338</td>
<td>1.14</td>
<td>0.89</td>
<td>1.09</td>
<td>1.32</td>
<td>0.37</td>
</tr>
<tr>
<td>UFI ALT 2/FI</td>
<td>339</td>
<td>0.84</td>
<td>0.54</td>
<td>0.75</td>
<td>1.07</td>
<td>0.44</td>
</tr>
</tbody>
</table>

Panel B: Results for Hypothesis 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter</th>
<th>Measure of Unfiltered Information</th>
<th>UFI ALT 1</th>
<th>UFI</th>
<th>UFI ALT 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERCEPT</td>
<td>β₀</td>
<td>11.814 (0.99)</td>
<td>10.395 (1.04)</td>
<td>11.580 (1.16)</td>
<td></td>
</tr>
<tr>
<td>UFI/FI</td>
<td>β₁₁</td>
<td>-8.396 (1.30)*</td>
<td>-8.359 (1.61)**</td>
<td>-10.279 (2.02)**</td>
<td></td>
</tr>
<tr>
<td>EXP</td>
<td>β₂₁</td>
<td>-1.093 (1.78)*</td>
<td>-0.882 (2.06)**</td>
<td>-0.891 (2.23)**</td>
<td></td>
</tr>
<tr>
<td>UFI/FI * EXP</td>
<td>β₃₁</td>
<td>1.065 (2.16)**</td>
<td>1.053 (2.67)***</td>
<td>1.156 (2.96)***</td>
<td></td>
</tr>
</tbody>
</table>

Control Variables

Adjusted r-squared | 0.046 | 0.057 | 0.062

Panel C: Results for Relatively Less- and More-experienced Investors

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter</th>
<th>Measure of Unfiltered Information</th>
<th>UFI ALT 1</th>
<th>UFI</th>
<th>UFI ALT 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERCEPT</td>
<td>β₀</td>
<td>3.849 (0.25)</td>
<td>-11.232 (0.81)</td>
<td>1.380 (0.10)</td>
<td>-7.304 (0.57)</td>
</tr>
<tr>
<td>UFI/FI</td>
<td>β₁₁</td>
<td>-7.512 (1.23)</td>
<td>12.299 (2.36)***</td>
<td>-6.993 (1.45)*</td>
<td>11.848 (2.80)***</td>
</tr>
<tr>
<td>EXP</td>
<td>β₂₁</td>
<td>1.066 (0.76)</td>
<td>0.011 (0.05)</td>
<td>1.174 (0.85)</td>
<td>-0.020 (0.09)</td>
</tr>
</tbody>
</table>

Control Variables

Adjusted r-squared | 0.096 | 0.067 | 0.104 | 0.086 | 0.119 | 0.083
### TABLE 6 CONTINUED
Panel D: Additional Analysis of the Use of Unfiltered and Filtered Information

<table>
<thead>
<tr>
<th>Measure of Unfiltered Information&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Parameter</th>
<th>( UFI ALT 1 )</th>
<th>( UFI )</th>
<th>( UFI ALT 2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable Parameter</td>
<td>( \alpha_0 )</td>
<td>(-1.570) (0.12)</td>
<td>(-3.171) (0.25)</td>
<td>(-1.967) (0.15)</td>
</tr>
<tr>
<td>( UFI )</td>
<td>( \alpha_{1i} )</td>
<td>(-1.944) (0.76)</td>
<td>(-1.535) (0.83)</td>
<td>(-2.481) (1.36)</td>
</tr>
<tr>
<td>( FI )</td>
<td>( \alpha_{2i} )</td>
<td>(3.719) (1.11)</td>
<td>(3.595) (1.12)</td>
<td>(3.584) (1.14)</td>
</tr>
<tr>
<td>( EXP )</td>
<td>( \alpha_{3i} )</td>
<td>(-1.442) (1.74)&lt;sup&gt;*&lt;/sup&gt;</td>
<td>(-0.866) (1.13)</td>
<td>(-0.979) (1.27)</td>
</tr>
<tr>
<td>( UFI \times EXP )</td>
<td>( \alpha_{4i} )</td>
<td>(0.548) (2.74)&lt;sup&gt;***&lt;/sup&gt;</td>
<td>(0.378) (2.66)&lt;sup&gt;***&lt;/sup&gt;</td>
<td>(0.430) (3.01)&lt;sup&gt;***&lt;/sup&gt;</td>
</tr>
<tr>
<td>( FI \times EXP )</td>
<td>( \alpha_{5i} )</td>
<td>(-0.124) (0.46)</td>
<td>(-0.046) (0.18)</td>
<td>(-0.020) (0.08)</td>
</tr>
<tr>
<td>Control Variables</td>
<td></td>
<td>0.075</td>
<td>0.072</td>
<td>0.075</td>
</tr>
<tr>
<td>Adjusted r-squared</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>1</sup>T-statistics in parentheses. See variable descriptions in Table 1.

*significant at 10%; **significant at 5%; ***significant at 1%; one-tailed for variables for which we have directional predictions.

We classify those investors with less than the median years of investing experience (six years) as relatively less-experienced (LOW) and those with greater than six years as relatively more-experienced (HIGH). Twenty-seven of our investors have exactly six years of investing experience. We classify these participants as relatively less- (more-) experienced based on the number of NAIC sponsored class they have taken. This classification scheme results in an equal distribution of participants at the median into the LOW and HIGH groups.