

# The behavior and performance of individual investors in Japan

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## Abstract

We examine the behavior and performance of individual investors in Japan. In empirical tests using market level data, we find that Japanese individual investors own risky and high book-to-market stocks, trade frequently, make poor trading decisions, and buy recent winners. Further, these behaviors and characteristics appear to vary depending on the bull or bear market conditions. As such, we believe our results provide important additional insights into the behaviors of individual investors. Interestingly, we also observe that it is primarily during a bull market where individuals tend to hold high book-to-market stocks, as opposed to a bear market where they exhibit an inclination toward high beta stocks. Overall, the poor performance by individual investors can largely be explained by this tendency to hold value stocks during advancing markets and high risk stocks during declining stocks. Finally, the fact that these behaviors reveal themselves at the market level also represents an important finding.

*Key words:* Individual investors; Overconfidence

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# The behavior and performance of individual investors in Japan

## 1. Introduction

We study the behavior and performance of individual investors in Japan. The purpose of our study is to contribute to the expanding literature that argues, and finds, that individuals are overconfident and that their overconfidence causes them to make mistakes. For example, Barber and Odean (2000) and Odean (1998) argue that individual investors are overconfident and as a result, individuals will trade too much, hold risky stocks, and underreact to information. Similarly, Wang (2000) shows that overconfidence causes investors to trade aggressively, and have higher expected returns and experience higher price variance. There are also models that suggest that the degree of overconfidence will vary over time (Daniel, Hirshleifer, and Subrahmanyam (2001) and Gervais and Odean (2001)). These models contend that bull markets in particular can foster overconfidence. For example, Gervais and Odean (2001) posit that during bull markets, individual investors will attribute too much of their success to their own abilities, which makes them even more overconfident. In addition, Daniel, Hirshleifer, and Subrahmanyam (2001) predict that as a result of investor overconfidence, the tendency for mispricing fundamentals may be greater during bull markets.

The benefits of studying Japanese individual investors are twofold: First, we wish to study individual investor behavior from a culture that is entirely distinct from Western culture. That is, we investigate whether the overconfident behaviors identified for U.S. investors are also found in a non-U.S. setting. Culture can breed overconfidence at varying levels (e.g., see Yates, Zhu, Ronis, Wang, Shinotsuka, and Toda (1989)) and there is some evidence that suggests that people raised in Asian cultures exhibit more overconfidence than people from the U.S. (e.g., Yates, Lee, and Bush (1997)). This contention has useful implications for our purposes as

Barber and Odean (2001) specifically suggest identifying a category of people who are prone to overconfidence to identify overconfident behaviors (e.g., they study males). Therefore, a study on Japanese individual investors, in and of itself, potentially represents an excellent opportunity to assess and to identify the behavior of overconfident investors.

Second, the Japanese market experienced a long bull run from 1984 to 1989, which is characterized by double-digit growth in every year, and a long bear market after the 1990 market crash. These dramatically contrasting subperiods provide us with the unique opportunity to test Gervais and Odean's (2001) contention that bull markets especially encourage overconfident behaviors and Daniel, Hirshleifer, and Subrahmanyam's (2001) prediction that overconfidence effects are more prevalent during periods of high valuation.

In our paper, our empirical approach is as follows. First, we attempt to identify the behavior and performance of Japanese individual investors using our full sample time period. We use aggregate market data to conduct our tests. Specifically, we identify stocks with varying degrees of individual ownership to detect the behavior and preferences of individual investors. We find that stocks with the highest levels of individual investor ownership are riskier, as measured by systematic risk and firm size, have larger book-to-market ratios, and experience frequent trading. Curiously, we also find that these stocks with high individual investor ownership underperform those stocks with low individual ownership. This result is curious for two reasons. First, on average, stocks with high systematic risk should be expected to perform well over time. Second, stocks with high book-to-market ratios (i.e., value stocks) have been shown to outperform low book-to-market stocks. Individual ownership tilts toward both value stocks and stocks with higher systematic risk, yet they underperform.

Next, we also identify stocks with different degrees of year-to-year changes in the level of individual ownership. Here, we find that stocks that experience the greatest increase in individual ownership earn a negative 12% abnormal return during the year, while stocks that experience the greatest decrease in individual ownership earn a positive 19% abnormal return. That is, during the year that individuals buy and sell, we observe striking evidence that purchased stocks dramatically underperform sold stocks, suggesting that individual investors are making poor buying and selling decisions. To gain additional insight into their buying and selling behavior, we examine the past performance of these bought and sold stocks and we find that stocks that experience significant increases in individual ownership (purchased stocks) were past winners. This is consistent with individuals underreacting to ‘relevant’ information. However, stocks that experience significant decreases in individual ownership (sold stocks) were also past winners. This finding is not consistent with an underreaction explanation, but it is consistent with the disposition effect (see Shefrin and Statman (1985)), which causes investors to be pre-disposed to selling their winners and holding their losers.

Next, we test to see if these behaviors are stronger during a bull market where overconfidence is posited to flourish, as individuals have more opportunities and chances of being right and as valuations are high. Overall, we do find that their tendencies with regard to their preferences and actions, particularly with regard to trading activity, are especially manifested during the bull market period (1984-89).

Finally, because we can compare individual investor behavior during a bull market versus a bear market, we also take this opportunity to provide some empirical evidence for a recent theoretical model. Daniel, Hirshleifer, and Subrahmanyam (2001) describe overconfident investors as undervaluing fundamental information (e.g., earnings and dividends announcements)

in such a way that they can move prices away from fundamental value, thus affecting fundamental-to-price ratios (e.g., book-to-market is one such ratio). If such mispricing occurs, then stocks with low market valuations relative to their fundamental values are more likely to experience high returns. In contrast, when investors are not overconfident, the book-to-market (BM) effect may disappear allowing the predictive power of more systematic risk measures (such as beta) to play a larger role in predicting expected returns. In our investigation, we find a strong positive relation between individual ownership and BM during the bull market, but not during the bear market. In contrast, we find that individual ownership and beta have a strong positive relation in the bear market, but not during the bull market. Taken together, this evidence can be viewed as supporting Daniel, Hirshleifer, and Subrahmanyam (2001) that the existence of overconfident investors ‘causes’ the mispricing of fundamentals. Therefore, we believe our findings provide an important empirical link between investors and price ratios. In this regard, we add to the debate on the return predictability of beta and BM (e.g., see Daniel, Titman, and Wei (2001)). Furthermore, these behaviors solve the curious mystery previously identified. That is, how can investors tilt toward both value firms and stocks with high systematic risk and still underperform? We find here that individuals tilt toward value stocks during the bull market and toward higher systematic risk stocks during bear markets. In other words, Japanese individual investors take the opposite position of what a rational ‘market timer’ would do, which would be to take high systematic risks during a bull market and low risks during a bear market.

The rest of our paper proceeds as follows: In the next section, we discuss the behavior of individual investors. In section 3, we describe our data. Section 4 outlines our empirical approach and presents findings. Section 5 investigates the comparative behavior of individual

investors during a bull and bear market. Finally, the last section offers a summary and conclusion.

## **2. The behavior of individual investors**

### *2.1 Individual investors as being overconfident*

There is now an abundant literature that theoretically argues that individuals are overconfident and that this overconfidence will be exhibited in their investing behavior. For example, several researchers have formulated trading models where a type of trader is mistaken about either the precision of his knowledge and/or his assessment of the riskiness of the expected return. Although these models take different approaches in modeling overconfidence, they make similar predictions about how overconfident individuals behave. Specifically, individuals are posited to: (1) own riskier portfolios because they underestimate the risks (see Benos (1998), De Long et al. (1990a), Kyle and Wang (1997), Odean (1998), and Wang (1998)); (2) misprice fundamental information causing market prices to be different than their fundamental valuation (see Daniel, Hirshleifer, and Subrahmanyam (2001)); (3) trade frequently because they are certain of their abilities and they are not tentative (see Benos (1998), Kyle and Wang (1997), Odean (1998), and Wang (1998, 2000)); and (4) underreact to (or are slow to respond to) more relevant information, which leads to buying (selling) past winners (losers) (see De Long et al. (1990b), Daniel, Hirshleifer, and Subrahmanyam (1998), Hirshleifer, Subrahmanyam, and Titman (1994), and Odean (1998)).

Empirical tests on the behavior of individual investors have been done predominately on U.S. individual investor portfolios. The empirical evidence from individual investor portfolios supports the predictions of the overconfidence models. For example, using a sample of portfolio holdings of 78,000 U.S. households over the 1991-97 period, Barber and Odean (2000, 2001)

and Odean (1999) show that overconfident individual investors trade too much and hold high-risk portfolios. In an attempt to identify the prior performance of stocks that individual investors trade, Bange (2000) finds that individuals buy (sell) past winners (losers), which is also consistent with overconfident behavior. As argued by Barber and Odean (2001) and Odean (1998), overconfident investors believe too much in their ability to interpret anecdotal and ambiguous information so they will often be slow to acknowledge and process statistical and relevant information (such as corporate earnings) and the information of others (such as rational informed investors). As a result, overconfident investors will underreact to information, which is consistent with buying (selling) past winners (losers).

Although not directly linked to the overconfidence models, two other findings are applicable. In his examination of overconfident individual investors, Odean (1999) shows that excessive trading is especially problematic for traders because the stocks they purchased underperform the stocks they sold. Apparently, overconfident investors are not only harmed by trading costs, but also by poor choices. The other important finding is that investors are sometimes disposed to selling their winners and holding their losers—a behavior that Shefrin and Statman (1985) call the “disposition affect.” They suggest that investors may sell winners to realize gains because they want to experience pride, but that they will hold onto losers because they don’t want to feel regret.

Even though the overconfidence literature, and with it the individual investor literature, continues to grow, very little has been done in empirically assessing the behavior of overconfident individuals in non-U.S. settings, especially with regard to investing behavior. We feel that this neglect is significant, especially because out-of-sample tests usually yield the most compelling evidence in support of theoretical models and existing empirical evidence. We



believe that Japanese individuals, in particular, can provide important additional insight into the behavior of overconfident individuals.

## *2.2 Japanese individual investors as being overconfident*

Psychologists have found that different groups of people experience different levels of cognitive biases in different situations. For example, in masculine tasks such as investment decision-making, men are more overconfident than women (Lundeberg, Fox, and Puncochar (1994) and Barber and Odean (2001)). Additionally, overconfidence can be learned through successful actions (Wolosin, Sherman, and Till (1973) and Gervais and Odean (2001)). For example, Christoffersen and Sarkissian (2002) find that overconfidence characteristics are associated with high-performing U.S. mutual funds located in financial centers. Differences in cognitive biases between groups arise from the different environments in which their experiences occur.

The difference in environments can be quite dramatic between cultures. These differences are frequently expressed in cognitive studies as an individualism-collectivism continuum (Hofstede (1980)). Asian cultures tend to be based on a more socially collective paradigm than Western cultures. In Asian cultures, family or other group members will step in to help out any group member who encounters a large catastrophic loss. In the individualist Western cultures, a person making a risky decision will be expected to personally bear the adverse consequences of their decisions. Collective oriented societies allow for the social diversification of risky decisions in a similar manner to the purchase of an insurance policy. Therefore, since the impact of a catastrophic loss is different between the Asian and Western cultures, the perception of this type of risk may be different. Stulz and Williamson (2001) argue

that these cultural differences effect investor protection. Investors are likely to behave differently under different investor protection environments.

Additionally, since cognitive biases may be learned, the differences in cultural life experiences and education may cause differences in overconfidence. For example, according to Yates et al. (1989), the Chinese education system encourages students to follow traditions and precedents rather than to criticize them. The American education system encourages students to challenge others' and their own opinions. They suggest that this "critical" thinking style of Western cultures reduce the tendency to be overconfident.

Do differences in culture lead to differences in overconfidence? Initial indications from the psychology literature suggest that Asian cultures have a higher degree of overconfidence than Western cultures. However, the literature is sparse. In a recent review article Weber and Hsee (2000) conclude that... "The bottom line is that the topic of culture and decision making has not received a lot of attention from either decision researchers or cross-cultural psychologists, (page 34)." A few studies are applicable, however. In studies of general knowledge, Asians (China and Taiwan were studied) are found to be more overconfident than Americans (see Yates, Lee, and Shinotsuka (1996) and Yates, Lee, and Bush (1997)). Studies of risk perception also find that people in Asian cultures (China, Japan, and Hong Kong were test groups) are less risk adverse and more overconfident then people in Western cultures (United States, Germany, and Poland were test groups) (see Kleinhesselink and Rosa (1991), Weber and Hsee (1998), and Keown (1989)).<sup>1</sup> Based on these studies, therefore, it is not surprising that Ito (1990) observes overconfidence specifically for Japanese individuals. In Ito's (1990) study, Japanese individuals

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<sup>1</sup> There are also important implications of cultural differences in risk perceptions for finance. This study expands the overconfidence literature to an Asian culture, Japan. However, many other interesting questions arise. One function of a stock market is to spread the risk of equity ownership among market participants. How will the globalization of stock markets be affected by the differences in risk perception in different countries? How should

were surveyed about their predictions of the future yen/dollar exchange rate. Both importers and exporters made forecasts that reflected “wishful expectations.” Therefore, studying Japanese individual investors should prove useful to assess and to identify overconfident behaviors. As argued by Barber and Odean (2001), when studying overconfident behavior, it is important to study a group of people who are prone to overconfidence.

### *2.3 Overconfidence and market impact*

In contrast to prior empirical studies on individual investors, which primarily rely on individual portfolio data, we examine the behavior and performance of individual investors using aggregate market data. Recent models, such as those of Daniel, Hirshleifer, and Subrahmanyam (2001), Gervais and Odean (2001), Hirshleifer (2001), and Barberis and Huang (2001), make predictions of how cognitive biases can affect the aggregate market in terms of, for example, asset pricing and return predictability. Therefore, according to Odean (1998) and Daniel, Hirshleifer, and Subrahmanyam (2001), investor behavior should be observable in market level data. However, despite their contention, there has been very little research that examines the effect of cognitive biases on the aggregate market. We mention several notable exceptions. DeBondt and Thaler (1985) investigate the notion that investors are poor Bayesian decision-makers. They find evidence that markets overreact in the long term, three to five years. A second paper is a study of overconfidence and aggregate market volume by Statman and Thorely (2001). Examining the U.S. stock market, they find that high trading volume follows high stock return periods. Their results are consistent with the predictions of Gervais and Odean (2001) and Odean (1998) overconfidence models. However, neither study empirically links investors (or one type of investor) with market level findings.

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global markets be designed to take advantage of one group’s ability to take more of one type of risk and less of another? How is risk sharing affected between groups of shareholders in international cross-listing?

The way we attempt to identify the behavior of overconfident individual investors, using aggregate market data, is as follows. We examine firms with different *levels*, and with different *changes*, of individual ownership to detect and to assess the behavior of individual investors. We will also repeat these tests by differentiating between bull and bear market periods to see if individual investors behave differently under different economic conditions.

### **3. Data**

Our monthly stock returns, annual individual share-ownership, and financial statement data for Japanese firms come from the Pacific-Basin Capital Markets (PACAP) Research Center. For each firm, annual ownership data is reported at the end of each fiscal year (usually March 31) for the years 1975-1997. The sample of firms with ownership data, monthly returns, market-capitalization, and book-to-market ratio varies from 826 (in 1975) to 1,758 (in 1997). The total sample comprises 33,877 firm-years of data. The PACAP ownership and returns data have been used in numerous other studies on the Japanese markets, with some studies specifically focusing on the interrelationship between ownership and returns. For example, Kim and Nofsinger (2002) use this data to investigate institutional herding while emphasizing the influence of conglomerate governance structures (i.e., the *keiretsu*). Kang and Stulz (1997) use this data to identify Japanese firms with high foreign ownership to study the home bias phenomenon.

In Japan, all shares are registered. According to Japan's Commercial Code, a firm must report their shareholder profile (i.e., the number of shares owned by different owner-types) in their formal annual report, *yuka-shoken hokokusho* or *yu-ho* (the U.S.'s 10-K equivalent), and in their annual corporate disclosure report, *tan-shin*, to the stock exchanges. The *yu-ho* and the *tan-shin* must be filed within three and two months after the fiscal-year end, respectively. There is also a semi-annual report, *chukan-kessan hokokusho*, but the shareholder profile data is *only* in

the annual report. If investors don't wish to go through each firm's *yu-ho*, then the most timely and easy way to obtain exhaustive corporate financial information is to subscribe to a database from an independent private firm. These database vendors claim that they can compile and store data into their online databases for client subscribers, usually brokerage firms, as soon as the data are released. Toyo Keizai and Nikkei are the two major Japanese firms that provide this service. The PACAP-Japan database used in our study is an academic database, and its ownership data was provided by Toyo Keizai.<sup>2</sup>

We define individual ownership as the fraction of total shares outstanding for the firm owned by individual investors.<sup>3</sup> The change in ownership for the year is the fraction of ownership at the end of the year less the fraction at the beginning of the year. Thus, if individuals owned 10% of a firm at the beginning of the year and 15% of the firm at the end of the year, we record the change for the year as 0.05.

Two methods of calculating abnormal returns are used. First, an abnormal return is computed as a market-adjusted return using the Japanese equal-weighted market index. The abnormal return for each month during the year is the firm's return less the return on the market index. Our second abnormal return is a size and book-to-market adjusted return. Here, we sort each firm, for each year, into ten portfolios by their book-to-market equity ratio. We then use these deciles, along with our capitalization deciles, to create 100 size and book-to-market portfolios. The abnormal return for each month is the firm's return less the return from one of

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<sup>2</sup> The details outlined here are based on extensive discussions with numerous officials from Toyo Keizai and the Japan Securities Research Institute.

<sup>3</sup> Specifically, we use data item JAF80 of the PACAP Database, which is entitled "Shares owned by Individuals & Others." In discussions with TSE officials, 'others' include unincorporated associations such as investment clubs (which are virtually still non-existent in Japan) or some non-profit organizations (a *zaidan* is one such example, they provide financial assistance to foreigners who wish to study in Japan and they operate on donations which are invested in stocks for the dividend income.) TSE officials contend that the ownership stake of 'others' is insignificant. In fact, using aggregate annual summary data from both the TSE Fact Book (1997) and Japan

the 100 portfolios for which the firm belongs. Annual abnormal returns are the compounded monthly abnormal returns.

We have five other firm-specific variables, which include three measures of risk (volatility, beta, and a market capitalization decile), a book-to-market ratio, and a trading volume measure. Volatility is calculated as the standard deviation of monthly returns measured over the year. Beta is calculated for each year from the market model where we regress each firm's 12 monthly returns onto the equal-weighted market return. Firms' market capitalization are measured at the beginning of the year and sorted into deciles, where decile 10 (1) denotes firms with the largest (smallest) market capitalization. The book-to-market ratio, measured each year, is the book value of equity divided by the market value of the shares outstanding. Finally, trading volume is defined as the number of shares traded during the month divided by the total shares outstanding for the firm. This standardized monthly volume is then averaged for the year and reported as mean monthly turnover.

## **4. Empirical results**

### *4.1 Levels of individual investor ownership*

All firms are sorted into 10 portfolios based on the fraction of individual ownership at the beginning of each fiscal year (which predominately begins in April). The characteristics of these portfolios are reported in Table 1. Individual investors own 11.5%, on average, of the firms in the portfolio with the smallest individual investor ownership (Decile 1). By design, ownership monotonically increases through Decile 10, which reports those individual investors own 60.6% of each of these firms, on average. The statistic in the second to the last column reports the  $F$ -value from a test that the mean level of ownership is equal across all ten portfolios. The statistic

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Securities Research Institute (1996), our own estimation is that over 99 percent of the investments in this category are held by individuals. Our database also specifies ownership by the government, institutions, and foreigners.

in the last column reports the  $F$ -value from a test that the mean level of ownership between Decile 1 and Decile 10 is equal. Because our sorting procedure groups firms by individual ownership, both  $F$ -statistics reject equality of ownership at the one percent level.

[Insert Table 1 Here]

The second row in the table reports the mean one year total return for each of the ten ownership level portfolios. The firms in the lowest ownership group earn 15.25%. The annual return estimate gradually declines to a minimum of 7.13% in the highest ownership group. Both  $F$ -statistics are significant, which indicates that the firms individual investors own earn significantly lower returns than the firms they do not own.

We also examine the level of risk preferred by individual investors. Two measures of systematic risk, mean monthly return volatility and beta, are used. Higher volatilities and beta are indicative of higher risk levels. A third measure of firm risk is proxied by firm size. Smaller firms are indicative of higher risk levels.

Mean monthly volatility in Decile 1 (the small individual ownership portfolio) is 10.0%, which is the smallest volatility among the ten portfolios. The mean monthly volatility in Decile 10 (the large individual ownership portfolio) is 10.7%, which is the highest volatility among the ten portfolios. The  $F$ -statistic in the last column is 19.20, which is significant at the one percent level and indicates a difference between the volatility in the low and high individual ownership portfolios. Results using beta are similar to the volatility results. Decile 1 stocks have a beta of 0.97, on average, which is the lowest among the ten portfolios. Decile 10 stocks have an average beta of 1.04. The difference between the Decile 1 and Decile 10 beta is statistically significant, as revealed by the  $F$ -statistic.

With regard to firm size, we report the mean market capitalization decile of firms in the individual ownership portfolios. That is, size-decile 1 contains the smallest firms while size-decile 10 represents the largest firms. We use this procedure to report firm size due to the large change in firm size during our sample period. From Table 1, we see that the mean size-decile in the smallest ownership portfolio is 7.05, on average. The mean size-decile monotonically declines from ownership Decile 1 to ownership Decile 10. The large individual ownership portfolio consists of firms with a mean size-decile of 3.50. The *F*-statistics indicate that mean size-deciles are not equal across the ten portfolios or between Decile 1 and 10, at the one percent level. These results indicate that individual investors prefer to own smaller firms, on average.

Overall, the risk results indicate that individuals hold risky stocks, which is consistent with the predictions of overconfidence models. Specifically, stocks with the highest levels of individual investors experience the highest levels of price variability, beta, and they are the smallest firms. Of course, overconfidence is not the only explanation for owning riskier stocks. Individual investors may simply be seeking higher expected returns. However, it is a bit of a puzzle that investors seem to own riskier stocks, yet realize a lower return - this is not consistent with the notion of a positive risk/return relationship.

We also examine a fundamental-to-price ratio for each of the individual ownership portfolios, i.e., a book-to-market ratio (BM). From Table 1, we see a strong relationship between BM and the stock's level of individual investor ownership. Specifically, the firms with little individual investor ownership have a BM of 0.442. This ratio increases nearly monotonically to the high ownership portfolio, which has a BM of 0.546. The differences in BM between the portfolios are statistically significant. One interpretation of this finding is that individuals do not believe in the market's high assessment of positive fundamental information, which is consistent



with the implications of a theoretical overconfidence model proposed by Daniel, Hirshleifer, and Subrahmanyam (2001). An alternative explanation is that individuals wish to own ‘value’ stocks.<sup>4</sup> Lakonishok, Shleifer, and Vishny (1994) show that value stocks outperform growth stocks. Value stocks can be defined as firms with high BM ratios. Fama and French (1998) and Daniel, Titman, and Wei (2001) show that value stocks (again defined by high BM) also outperform in Japan. Thus, it is another puzzle that individuals tend to own value stocks, and yet they underperform.

The last row of the table reports the mean monthly turnover. The smallest ownership portfolio (Decile 1) experiences a monthly volume that represents 3.6% of the shares outstanding. The monthly turnover estimates increase to Decile 4 and then decline to Decile 10. Decile 10 turnover is 3.3%. The *F*-statistic only rejects equality between Decile 1 turnover and Decile 10 turnover at the ten percent level. This finding is *not* consistent with existing studies that show individuals engage in active trading behavior. However, volume is highly correlated with both firm capitalization and return volatility (Karpoff (1987) and Tkac (1999)). Because individual ownership is also correlated with firm size and volatility, we may have a multicollinearity problem. Therefore, we re-examine volume using regression analysis to control for firm size and return volatility. Specifically we run an ordinary least squares regression of monthly turnover on investor ownership, size decile, and monthly volatility. The results are reported in Table 2.

[Insert Table 2 Here]

When regressing monthly turnover on individual investor ownership only, the ownership coefficient is negative, but not statistically significant, which is consistent with Table 1 findings. However, when including the capitalization decile in the regression, the investor ownership

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<sup>4</sup> Note that it is possible to be a value stock and have high systematic risk. For example, Lakonishok, Shleifer, and Vishny (1994) show in Panel 3 of their Table VIII that the highest decile of BM firms also have the highest beta and

coefficient becomes positive and significant at the one percent level. Lastly, we include monthly volatility to the regression and the investor ownership coefficient is still positive and significant at the one percent level.<sup>5</sup> The coefficients for the size decile and monthly volatility variables are also significantly positive. All of these results, including the positive relation between trading volume and individual ownership, suggest that Japanese individual investors do trade actively.

#### 4.2 *Changes in individual investor ownership*

To further investigate the actions of individual investors, and the outcome to their actions, we examine the firms they purchased and sold. All firms are sorted into 10 portfolios based on the percentage change of individual ownership during the year. In creating these individual ownership change portfolios, we control for a possible “starting point of individual ownership effect” and a “year effect.” The first effect is that firms that have low levels of individual ownership are biased to experience increases in individual ownership, and vice versa. With regard to the “year effect,” we are simply making sure that specific year(s) do not drive our results. Specifically, all firms are sorted into 10 portfolios based on the fraction of individual ownership at the beginning of each fiscal year (which predominately begins in April). Within each of these portfolios, firms are sorted into 10 more portfolios based on the change in individual ownership over the fiscal year, i.e., change is measured as the current year’s percent of individual ownership minus the previous year’s percent of individual ownership. This leaves ten individual *change* portfolios within each of the ten individual *level* portfolios. Next, we combine each of the ten lowest-decile of individual change portfolios from the individual level portfolios. We also do this for the second lowest decile change portfolios, and so forth, until we are left with ten portfolios, each year, which have similar individual ownership at the beginning

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largest standard deviation of return.

of the year but experience different changes in individual ownership over the year. Lastly, we combine the portfolios over the different years. The change in ownership and the annual returns around the ownership change are reported in Table 3.

Panel A of Table 3 reports the change in individual investor ownership for each ownership-change portfolio. The largest decrease-in-individual-ownership portfolio (Decile 1) experiences a decrease of individual investor ownership of  $-8.1\%$ . By design, the change in ownership monotonically increases to Decile 10. The large increase-in-individual-ownership portfolio (Decile 10) experiences an individual investor ownership increase of  $5.8\%$  during the year. The  $F$ -statistics in the last two columns reject that the mean changes in ownership are equal, at the one percent level.

[Insert Table 3 Here]

We begin by examining the performance of the firms Japanese individual investors purchase and those they sell. Panel B of Table 3 reports the stock returns during the year the individuals are trading. The returns of the firms most purchased, Decile 10, in the year that individual investors are purchasing the firms are an average  $-5.2\%$ . The size and BM-adjusted abnormal return is  $-12.1\%$ , which is significant at the one percent level. The average return for those firms that investors sell (Decile 1) is a surprisingly enormous  $44.3\%$ . The size and BM-adjusted abnormal return is  $19.4\%$ . The difference between the average returns for the firms being sold ( $19.4\%$ ) and the firms being purchased ( $-12.1\%$ ) is very large in magnitude ( $31.5\%$ ) and highly significant, as reported by the  $F$ -statistic in the last column. Conducting the analysis using market-adjusted abnormal returns yield similar, but stronger, results as the size and BM-adjusted abnormal returns. Using the market-adjusted returns, the difference between average

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<sup>5</sup> In additional regression analysis, when we replace monthly volatility with beta, the results remain qualitatively the same, so we do not report these additional results.

returns for the firms being sold and firms being purchased is 41.7%. Even though our two abnormal return measures yield consistent results, we do note a difference in their range, but this can be explained by the large BM effect that exists in the Japanese stock market (see Daniel, Titman, and Wei (2001)).

Due to the annual nature of the data, we cannot partition the data into smaller period increments. That is, we cannot tell when the investors traded during the year. However, we discuss the likelihood and outcome of three scenarios: trading at the beginning of the year, the end of the year, and throughout the year. First, if investors purchase at the beginning of the year, they would realize the  $-12.1\%$  abnormal return. Although this scenario would strongly suggest that individuals make poor choices (an overconfidence trait), we reject it to err on the side of being conservative. Second, if they all traded at the end of the year, then they would *not* have realized the  $-12.1\%$  abnormal return, but we feel this is unlikely because it would mean that Japanese individual investors are extreme contrarian traders. As there is no theoretical prediction or other empirical evidence of such unusual trading behavior, it is unlikely that this scenario explains the results (in addition, we will see later on, even if they did buy at the end of the year, then they still experience subsequent negative abnormal returns). We believe that it is most likely that investors trade throughout the year and realize part of the annual return of the stocks they trade. The point estimate of stocks sold outperforming stocks purchased by our documented  $31.4\%$  per year is therefore an upper bound. It is more likely that investors realize only about half, or  $15\%$ , of this effect. Note that this still means that Japanese individual investors make poor trading decisions. As a comparison, Odean (1999) also finds that U.S. individual investors make poor investment choices. Specifically, he reports that the stocks overconfident investors sell outperform the stocks they subsequently purchase by nearly  $6\%$  per year. Although our

results are in the same direction as those of Odean, we note that his findings are at the investor portfolio level while ours are at the aggregate market level. Thus our results add an important finding that individual investor behavior can be detected using market data.

In Panel C, we report the returns in the year *prior to* the change in ownership for the ownership-change portfolios. The firms that experienced the largest selling by individuals (Decile 1) had an annual return of 17.7% the year before the selling. The mean size and BM-adjusted abnormal return for these firms prior to the change in ownership is 2.9% and is significant at the one percent level. The prior year's return and abnormal return for the firms with the largest increase in investor ownership (Decile 10) are 18.1% and 1.2%, respectively. The abnormal return is significant at the five percent level. The *F*-statistic in the last column rejects that the abnormal returns for Decile 1 and Decile 10 are equal. The results are similar using market-adjusted returns instead of size and BM-adjusted returns. The stocks that individual investors purchase were past winners, on average, in the previous year, which is an attribute consistent with being overconfident. Specifically, individuals are slow to acknowledge (underreact to) relevant positive information signals. In contrast, the *selling* of past winners seems at odds with overconfident behavior. However, this might be expected because there are two competing behavioral theories for *selling* behavior. The under-reaction to information hypothesis in the overconfidence models predicts selling losers too late. Alternatively, the disposition effect (Shefrin and Statman (1985)) predicts the selling of past winners so that investors can realize gains and feel pride. Therefore, the selling of both past losers (underreaction) and past winners (disposition effect) will cancel each other in aggregate. We discuss these issues further in our analysis of the Japanese bull and bear markets.

Lastly, in Panel D of Table 3, we examine the returns of the firms *after* the change in ownership for the ten ownership-change portfolios. Both the portfolio of firms that experience the largest individual investor selling *and* the portfolio of firms that experience the largest individual investor buying subsequently have poor performance. The selling portfolio earns a – 5.6% (size and BM-adjusted) abnormal return while the buy portfolio earns –2.7%. Both estimates are significant at the one percent level and are significantly different from each other. However, two observations are noteworthy here. First, the negative 5.6% returns of the selling portfolio that we see here do not come close to offsetting the large positive 19.4% returns that these stocks experience during the ownership-change year. Second, the negative 2.7% returns of the buying portfolio are a continuation of the negative 12.1% returns that they experience during the ownership change year. This evidence further shows that overconfident individual investors make poor choices.

## **5. Individual investor behavior in bull and bear markets**

In the Gervais and Odean (2001) model, investors learn to be overconfident by attributing high returns in bull markets to their trading skill. Their model suggests that extended bull markets will foster overconfidence. Daniel, Hirshleifer, and Subrahmanyam (2001) predict that overconfidence will be stronger during times of high market valuations. In its recent history, Japan has experienced both a long bull market (during the 1980s) and a subsequent extended bear market (during the 1990s). As such, we will be able to examine and compare individual investor behavior during these two subperiods to gain additional insight into how individuals behave and perform under different market conditions.

Figure 1 illustrates the magnitude and duration of the extended Japanese bull market and the subsequent bear market. Specifically, the figure shows the monthly composite Tokyo Stock

Price Index (TOPIX) from January 1975 to December 1997. From the early 1980s to the end of the 1980s, the Japanese market experienced tremendous growth, a time period that is widely known as Japan's bubble economy (Kang and Stulz (1996, 2000)). From the beginning of 1984 to the end of 1989, the TOPIX grew 294%, with double digit growth every year and an average annual return of 26.3% (TSE Fact Book (1997)). In 1990, however, the market experienced an enormous crash (the TOPIX fell by 40%), and the Japanese economy has been bearish ever since (from 1991 to 1997, the TOPIX experienced an annual average rate of return of -5%). We use the years 1984-89 as the bull market period and 1990-97 as the bear market period.<sup>6</sup>

[Insert Figure 1 Here]

### 5.1 *Levels of individual ownership in bull and bear markets*

As before, all firms are sorted into 10 portfolios based on the fraction of individual ownership at the beginning of each fiscal year. The firm characteristics of these portfolios are reported in Table 4 for the bull and bear market periods.

The first panel reports the annual total return for the different ownership level portfolios. For the bull market, the mean returns vary from 33.8% in the lowest individual ownership firms to 26.2% in the eighth decile of individual ownership. However, the two return estimates in the lowest and highest ownership groups are not significantly different. For the bear market, the annual returns are all negative. The lowest individual ownership group earned -4.77% annually, with the returns generally worsening as individual ownership increases. The mean return in the highest ownership group, -11.8%, is significantly less than the return in the lowest ownership

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<sup>6</sup> An alternative way of looking at subperiods would be to examine 1985-89 and 1991-97, where both subperiods would follow a one-year bull and bear market, respectively. This post-assessment would reveal the 'learned' behavior of individuals *after* their experience. Indeed, in examining these particular subperiods, we find stronger results than our reported subperiod results, but we do not report them as they repeat the insights of our reported results.

group. In general, these results suggest that most of the underperformance of firms owned by individual investors is occurring during the bear market.

The next two panels of Table 4 examine the two systematic risk measures. Panel B reports the mean monthly return volatility. For the bull market results, the portfolio with the smallest individual investor ownership has a mean volatility of 11.1%. The volatility in the portfolios varies very little in the ten portfolios, with the large ownership portfolio reporting a volatility of 10.8%. The *F*-statistics in the last two columns show that volatility is not different between the ownership level portfolios. The results during the bear market are much different. Monthly volatility in the smallest ownership portfolio is 9.9% and monotonically increases with the ownership level to 12.6%. The *F*-statistics report that the differences in volatility between the portfolios are significant at the one percent level. These results show that Japanese individual investor ownership is related to return volatility during the bear market, but not during the bull market.

[Insert Table 4 Here]

The results for the other systematic risk measure are similar. Panel C reports the mean beta estimate for the ownership level portfolios in bull and bear markets. Again, ownership level and beta do not appear to be related during the bull market. The mean beta estimate for the low ownership portfolio is 1.002 while the estimate for the high ownership portfolio is 1.000. On the other hand, the relationship between beta and individual ownership is quite strong during the bear market. The beta estimate of 0.886 in the low ownership portfolio increases to 1.086 in the large ownership portfolio. The difference between the two estimates is significant at the one percent level. As with the return volatility, ownership and beta are related in the bear market period, but not in the bull market period.



Individual investors appear to favor riskier stocks during the bear markets than during the bull markets. At first, these results surprised us. Indeed, market timers would want to have a high level of systematic risk during bull markets and low risk (like value stocks) during bear markets. Japanese individual investors appear to do the opposite. This observation helps explain the curious return pattern in Panel A. However, the model of Daniel, Hirshleifer, and Subrahmanyam (2001) provides some theoretical insight. Their model suggests that less confident investors will use systematic risk measures as a signal for expected return. However, when investors' overconfidence becomes encouraged (during a bull market), they may focus less on relevant or statistically-oriented information such as systematic risk measures. The evidence in Panels B and C illustrate the shift away from the use of systematic risk measures during periods that foster overconfidence, like a bull market. The next two panels investigate whether investors shift to firm size and/or to book-to-market preferences during bull markets.

Panel D reports the mean market capitalization decile of the firms in each portfolio. There is a relationship between firm size and investor ownership in both the bull and bear markets. Both periods show that individual investors strongly prefer small firms.

A fundamental-to-price ratio (i.e., book-to-market (BM)) is examined in Panel E. The mean book-to-market ratio is reported for the ownership level portfolios during bull and bear market periods. The relationship between BM and individual ownership is strong during the bull market. Specifically, the firms in the low individual ownership portfolio average a BM ratio of 0.285. The BM ratio monotonically increases to a high of 0.419 in the high ownership portfolio. The difference between the BM estimate in the low and high ownership portfolios is significant at the one percent level. More generally stated, investors appear to prefer value stocks during bull markets. BM is not well related to individual ownership levels in the bear market. The

mean BM ratio estimate of 0.546 in the low individual ownership portfolio (Decile 1) increases as we move up to Decile 7, but then it declines to 0.555 in the high ownership portfolio (Decile 10). The difference between the low and high portfolios is not significant. A possible interpretation of these findings, given by Daniel, Hirshleifer, and Subrahmanyam (2001), is that when overconfidence is fostered, individuals switch from focusing on risk measures to focusing on measures of perceived mispricing. One potential mispricing measure is the BM ratio. Our ownership findings suggest that individuals focus more on BM during the bull market (a period of potential overconfidence) and on systematic risk during the bear market.

For investor trading activity, we examine trading volume and ownership levels in Table 5. As before, we investigate volume by OLS regressions to control for the multi-collinearity between volume, capitalization, and volatility. Specifically, monthly turnover is regressed on: individual investor ownership during the bull market, individual ownership during the bear market, the size decile of the firm, and the return volatility. The regression is estimated during the combined bull and bear market period, 1984-1997. An *F*-statistic is reported which tests for equality between the coefficients of bull and bear market ownership variables. A more positive coefficient for the ownership variable during the bull market compared to the bear market, indicating higher trading activity during the bull market, is consistent with the notion that overconfident individual investors will trade more during a period that encourages their overconfidence.

[Insert Table 5 Here]

From Table 5, we see that the coefficient for the bull market individual ownership is positive and significant at the one percent level. The coefficient for the bear market ownership variable is negative and significant. The *F*-statistics indicate that the bull market ownership

estimate is significantly larger than the bear market coefficient. This pattern is consistent for the regression of the ownership variables alone, and for regressions with the capitalization and volatility control variables.

Overall, we believe that the ownership level analysis (Tables 4 and 5) provides evidence that individual investors exhibit an even greater tendency for overconfidence during a bull market. Individuals seem to ignore statistical or relevant information such as systematic risk measures during a bull market. Instead, they exhibit a tendency to hold high book-to-market stocks, possibly indicating a neglect of market consensus during a bull period. We also observe a higher monthly turnover in stocks held by individual investors during the bull market. This observation suggests greater trading activity during the bull market, another telltale indication of overconfidence. Because of these two findings, we believe our results reveal that individual investors are even more overconfident during bull markets. We conduct additional tests by examining changes in ownership in the next section, where we assess the decision-making of the individual investors.

## *5.2 Changes in individual ownership in bull and bear markets*

We begin the tests in the change of ownership portfolios in bull and bear markets by sorting, each year, the firms by their change in ownership over the year into ten ownership-change portfolios. The mean changes in ownership for the portfolios during the bull market are reported in the first row of Panel A, Table 6. The mean changes in ownership during the bear market are reported in the second row. For the decrease in ownership portfolio (Decile 1), individual ownership changes by  $-10.8\%$  and  $-4.8\%$  during the bull and bear market, respectively. Using an  $F$ -test, we find the difference to be significant at the one percent level. The large increase in ownership portfolio (Decile 10) experiences a change in ownership of  $5.9\%$

and 5.7% in the bull and bear markets, respectively. The difference is not statistically significant. That is, buying and selling activities of individuals is greater during the bull market. These results suggest that individual investors, as a group, are more active during the bull market than the bear market, consistent with our regression findings discussed earlier that individual investors trade more during a bull market. However, the results are stronger for selling behavior than for buying behavior.

[Insert Table 6 Here]

We next examine the performance of the firms traded during the two subperiods. Our previously reported Table 3 and findings by Odean (1999) show that the stocks sold by individual investors outperform the stocks purchased. If this pattern is consistent with overconfidence, then the pattern should be more pronounced in the bull market than in the bear market. We examine the performance of the firms being traded in Panel B. The abnormal returns for the year during the change in ownership are reported for each ownership-change portfolio. The abnormal returns for stocks sold (Decile 1) are 26.7% and 13.2% during the bull and bear market periods, respectively. The difference is statistically significant. The abnormal returns for stocks purchased (Decile 10) are -17.4% and -9.7% in the bull and bear markets, respectively. Stocks being sold outperform stocks being purchased by 44.0% in the bull market and 22.9% in the bear market. As before, we believe it is most likely these estimates are an upper bound of the poor performance of individual investors. However, the effect is much stronger in the bull market than in the bear market.

We report returns during the year *prior to* the change-in-ownership for the ten ownership-change portfolios in Panel C. The firms that investors sold (Decile 1) during the bull market earned a -0.7% abnormal return during the prior year. The firms that individuals purchased

(Decile 10) during the bull market were previous winners, earning a significant 2.5% abnormal return. The difference in the prior year returns between Deciles 1 and 10 is 3.2%, which is significant at the five percent level. When we used the entire sample period in our earlier tests, we found only evidence of buying past winners, while we could not find evidence of selling past losers. In our subperiod analyses, we find that the buying of past winners are actually stronger during the bull market period (in fact, it even appears that individuals sell past losers during the bull market, albeit the  $-0.71$  percent return of the sell portfolio is not statistically significant), and that this behavior does *not* occur in the bear market period. Instead, individual investors appear to be buying (selling) past losers (winners) during the bear market. The prior year's abnormal returns for the firms sold and purchased (Deciles 1 and 10) by individuals are 6.3% and  $-3.3\%$ , respectively.

Lastly, we report the abnormal returns for the year *after* the change in ownership for each ownership-change portfolio in Panel D. The abnormal returns for stocks sold (Decile 1) are  $-6.5\%$  and  $-3.6\%$  during the bull and bear market periods, respectively. Both estimates are significant at the one percent level and the difference is significant at the five percent level. The stocks that individuals purchased (Decile 10) subsequently earned  $-2.1\%$  and  $-3.1\%$  in the bull and bear markets. Both estimates are significantly different from zero, but the difference between them is not significant. As these results are not much different, they are similar to those of Table 3.

Overall, the level of trading activity and buying past winners are higher during Japan's extended bull market compared to the protracted bear market. Additionally, the pattern of the poor performance by the firms individuals purchased and the good performance of the firms sold is more pronounced during the bull market.

## **6. Summary and conclusions**

We study the behavior and performance of individual investors in Japan. Our investigation should prove insightful because psychology research suggests that Asian cultures foster overconfidence to a greater degree than Western cultures. As such, we believe our study provides additional, and out-of-sample, insights into the behavior of overconfident individuals.

We find that Japanese individual investors own stocks with high risk, large book-to-market (BM) ratios, high trading volume, and earn low returns. Given the hypothesized positive risk/return relationship and the documented success of value firms, it seems curious that investors could hold higher systematic risk firms and value firms and yet still underperform. Further, in our full sample period, we also find that individual investors make poor trading choices (i.e., individuals sell (buy) stocks that do well (poorly)), and that they buy and sell past winners. Our findings are consistent the predictions of overconfidence models.

When we differentiate our sample into separate bull and bear market subperiods, we find that individuals prefer stocks with high systematic risk (beta) during the bear market, but not during the bull market. In contrast, during the bull market we find a strong relationship between individual investor ownership and BM, but no relationship between individual ownership and beta. Consequently, Japanese individual investors hold value stocks during a market advance and risky stocks during a market decline. That is, they tilt toward value and risk at the wrong times. The behavior is opposite of what a market timer would try to do. This explains how the appearance of holding higher risk stocks and value stocks, in aggregate, can still result in lower performance. These findings, while somewhat perplexing, may be consistent with a model by Daniel, Hirshleifer, and Subrahmanyam (2001) that suggests that overconfident investors may

ignore systematic indicators (e.g., beta) of expected returns during bull markets. Instead, overconfident investors rely on their own misguided convictions of mispricing measures during high valuation periods.

We also find that individual investor trading activity is greater during the bull market. Additionally, some of the mixed results from the full sample become clearer in the subperiod tests. The buying behavior of past winners is stronger during the bull market, but individual investors appear to do the opposite (i.e., they buy losers and sell winners) during the bear market. Finally, our finding that individual investors are experiencing poor portfolio performance from their trades is even more pronounced during the bull market period.

Overall, our evidence indicates that Japanese individual investors own risky and high book-to-market stocks, trade frequently, make poor trading decisions, and buy recent winners. These behaviors differ between bull and bear markets. As such, while studying Japanese individuals and using financial market-level data, we believe we have provided additional evidence into the tendencies of overconfident investors.

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**Figure 1**

This figure shows the monthly composite Tokyo Stock Price Index (TOPIX) from January 1975 to December 1997.



**Table 1**  
**Levels of individual investor ownership, risk, book-to-market, and monthly trading turnover**

Each year (1975-1997), all non-financial TSE firms are sorted into 10 portfolios based on the fraction of shares held by individual investors. Individual Ownership is the average fraction of the firm owned by individual investors. Annual Return is the mean raw annual return for each decile. Monthly Volatility is the mean standard deviation of monthly returns. Mkt. Cap. Decile denotes the mean decile that is based on the firm's market capitalization, where decile 1 (10) represents the smallest (largest) market capitalization firms. Beta is the mean beta measure from a market model where for each year the firm's 12 monthly returns are regressed onto the equal-weighted market return. Book-to-Market is the book value of equity divided by the market value of the shares outstanding. Monthly turnover is the number of shares traded during the month divided by the number of shares outstanding for the firm. The first *F*-statistic tests the null hypothesis that the mean estimates do not differ across ownership-level portfolios. The second *F*-statistic tests for differences between the large and small ownership portfolios. \*\*\*, \*\*, and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

	Small Ownership	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Large Ownership	<i>F</i> -stat. (all equal)	<i>F</i> -stat. (small=large)
Individual Ownership	0.115	0.169	0.206	0.242	0.276	0.312	0.354	0.403	0.467	0.606	16770***	91,661***
Annual Return	0.1525	0.1253	0.1218	0.1143	0.0893	0.0962	0.0824	0.0744	0.0889	0.0713	9.77***	45.54***
Monthly Volatility	0.100	0.102	0.101	0.103	0.103	0.105	0.105	0.105	0.106	0.107	4.31***	19.20***
Beta	0.966	1.006	1.008	1.036	1.052	1.066	1.086	1.080	1.080	1.039	34.06***	56.26***
Mkt. Cap. Decile	7.05	6.34	5.95	5.72	5.52	5.10	4.86	4.60	3.92	3.50	278.84***	1450.98***
Book-to-Market	0.442	0.463	0.485	0.504	0.506	0.513	0.535	0.553	0.559	0.546	38.18***	129.17***
Monthly Turnover	0.0358	0.0414	0.0450	0.0442	0.0432	0.0433	0.0417	0.0380	0.0377	0.0333	18.22***	3.54*

**Table 2**  
**Individual investor ownership and monthly volume**

The table displays the results of pooled ordinary least squares regressions for mean monthly turnover, the dependent variable. Monthly turnover is the number of shares traded during the month divided by the number of shares outstanding for the firm. Individual Ownership is the fraction of the firm's shares owned by individual investors. Capitalization Decile is the integer designation, 1 to 10, for the size of the firm, where 1 is the smallest decile of firms. Monthly Volatility is the standard deviation of monthly returns over the year. *t*-statistics are reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

<b>Intercept</b>	<b>Individual Ownership</b>	<b>Capitalization Decile</b>	<b>Monthly Volatility</b>
0.041 (60.21)***	-0.0010 (-0.50)		
0.034 (31.61)***	0.0064 (2.96)***	0.0009 (8.28)***	
-0.013 (-10.13)***	0.0197 (9.62)***	0.0027 (24.18)***	0.323 (63.76)***

**Table 3**  
**Returns of the individual investor ownership change portfolios**

Each year (1976-1997) firms are sorted into 10 portfolios based on the change in the fraction of shares held by individual investors. The mean ownership change is reported in Panel A. Abnormal returns are calculated as both capitalization-decile and book-to-market-decile adjusted returns and compounded-monthly-market-adjusted returns. Panel B reports the return for the year during the change in ownership year, Panel C reports the return for the year prior to the change in ownership, and Panel D reports the returns for the year after the ownership change year. *t*-statistics are reported in parentheses. The first *F*-statistic tests the null hypothesis that the mean estimates do not differ across ownership-level portfolios. The second *F*-statistic tests for differences between the large and small ownership portfolios. \*\*\*, \*\*, and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

(see table on next page)

	Small Ownership	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Large Ownership	F-stat. (all equal)	F-stat. (small=large)
Panel A: Change in Individual Investor Ownership												
Ownership Change	-0.081	-0.035	-0.021	-0.012	-0.006	-0.000	0.005	0.012	0.023	0.058	8,361***	59,784***
Panel B: Returns during Change in Ownership Year												
Annual Return	0.4425	0.2465	0.1630	0.1284	0.0776	0.0401	0.0092	-0.0050	-0.0377	-0.0522	365.01***	1920.65***
Abnormal Return (size & BM adjusted)	0.1943 (41.63)***	0.0777 (16.69)***	0.0247 (5.31)***	0.0051 (1.10)	-0.0267 (-5.72)***	-0.0529 (-11.38)***	-0.0756 (-16.22)***	-0.0810 (-17.39)***	-0.1033 (-22.19)***	-0.1205 (-25.84)***	423.60***	2276.07***
Abnormal Return (market adjusted)	0.2806 (49.90)***	0.1137 (20.27)***	0.0437 (7.79)***	0.0133 (2.37)**	-0.0312 (-5.56)***	-0.0629 (-11.23)***	-0.0872 (-15.55)***	-0.0977 (-17.41)***	-0.1258 (-22.43)***	-0.1364 (-24.27)***	526.06***	2750.78***
Panel C: Returns for Year Prior to Change in Ownership Year												
Annual Return	0.1768	0.1429	0.1478	0.1142	0.0906	0.0787	0.0634	0.0944	0.1011	0.1810	25.03***	0.13
Abnormal Return (size & BM adjusted)	0.0291 (6.00)***	0.0126 (2.60)***	0.0108 (2.23)**	-0.0113 (-2.34)**	-0.0304 (-6.27)***	-0.0391 (-8.07)***	-0.0539 (-11.12)***	-0.0331 (-6.83)***	-0.0329 (-6.79)***	0.0115 (2.37)**	33.30***	6.59**
Abnormal Return (market adjusted)	0.0513 (8.69)***	0.0224 (3.81)***	0.0205 (3.48)***	-0.0123 (-2.08)**	-0.0331 (-5.62)***	-0.0431 (-7.32)***	-0.0550 (-9.34)***	-0.0329 (-5.58)***	-0.0229 (-3.90)***	0.0414 (7.20)***	40.27***	1.42
Panel D: Returns for Year After Change in Ownership												
Annual Return	0.0618	0.0726	0.0739	0.0859	0.0954	0.1029	0.1118	0.0907	0.0795	0.0595	4.42***	0.04
Abnormal Return (size & BM adjusted)	-0.0558 (-11.63)***	-0.0317 (-6.62)***	-0.0203 (-4.25)***	-0.0093 (-1.94)*	-0.0073 (-1.52)	-0.0036 (-0.74)	0.0038 (0.80)	-0.0062 (-1.30)	-0.0056 (-1.18)	-0.0266 (-5.55)***	13.71***	18.55***
Abnormal Return (market adjusted)	-0.0304 (-5.19)***	-0.0203 (-3.48)***	-0.0191 (-3.27)***	-0.0077 (-1.31)	-0.0002 (-0.04)	0.0049 (0.84)	0.0126 (2.15)**	-0.0033 (-0.57)	-0.0093 (-1.59)	-0.0245 (-4.19)***	5.50***	0.50



**Table 4**  
**Levels of individual investor ownership during bull and bear markets**

Each year (1975-1997), all non-financial TSE firms are sorted into 10 portfolios based on the fraction of shares held by individual investors. Individual Ownership is the average fraction of the firm owned by individual investors. For each portfolio, Panel A reports annual raw returns. Panel B reports the monthly volatility, which is the mean standard deviation of monthly returns. Panel C reports the mean beta measure from a market model where for each year the firm's 12 monthly returns are regressed onto the equal-weighted market return. The mean Mkt. Cap. Decile reported in Panel D denotes the mean firm's market capitalization decile, where decile 1 (10) represents the smallest (largest) market capitalization firms. Panel E reports the Book-to-Market, which is the book value of equity divided by the market value of the shares outstanding. The first  $F$ -statistic tests the null hypothesis that the mean estimates do not differ across ownership-level portfolios. The second  $F$ -statistic tests for differences between the large and small ownership portfolios. \*\*\*, \*\*, and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

(see table on next page)

	Small Ownership	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Large Ownership	<i>F</i> -stat. (all equal)	<i>F</i> -stat. (small=large)
Panel A: Annual Return												
Bull Market	0.3382	0.3264	0.3190	0.3154	0.2836	0.2931	0.2749	0.2618	0.3362	0.3001	1.86*	1.83
Bear Market	-0.0477	-0.0736	-0.0846	-0.0888	-0.1039	-0.1049	-0.1082	-0.1123	-0.1306	-0.1176	7.70***	30.88***
<i>F</i> -statistic	341.41***										349.54***	
Panel B: Monthly Return Volatility												
Bull Market	0.111	0.111	0.109	0.111	0.108	0.108	0.108	0.105	0.109	0.108	0.75	0.81
Bear Market	0.099	0.104	0.104	0.112	0.112	0.115	0.118	0.120	0.121	0.126	26.57***	127.08***
<i>F</i> -statistic	4.07**										10.11***	
Panel C: Beta												
Bull Market	1.002	1.025	1.038	1.058	1.045	1.064	1.096	1.079	1.052	1.000	6.36***	0.02
Bear Market	0.886	0.954	0.9621	1.011	1.044	1.052	1.074	1.090	1.101	1.086	63.65***	238.86***
<i>F</i> -statistic	6.12**										3.03*	
Panel D: Market Capitalization Decile												
Bull Market	6.85	6.14	5.97	5.81	5.62	5.09	4.88	4.68	3.97	3.66	95.34***	469.73***
Bear Market	7.41	6.63	6.10	5.61	5.45	4.96	4.76	4.39	3.77	3.37	264.58***	1309.70***
<i>F</i> -statistic	4.95**										1.02	
Panel E: Book-to-Market Ratio												
Bull Market	0.285	0.301	0.305	0.314	0.324	0.328	0.341	0.380	0.392	0.419	34.76***	158.77***
Bear Market	0.546	0.589	0.609	0.615	0.606	0.617	0.639	0.628	0.642	0.555	7.21***	0.29
<i>F</i> -statistic	91.67***										22.09***	

**Table 5**  
**Monthly turnover in long bull and bear markets**

Ordinary least squares regressions of mean monthly turnover on individual investor ownership, firm capitalization, and return volatility. Monthly turnover is the number of shares traded during the month divided by the number of shares outstanding for the firm. Investor Ownership during the Bull and Bear market periods (1984-89 bull market and 1990-97 bear market) is the fraction of the firm's shares owned by individual investors. Capitalization Decile is the integer designation, 1 to 10, for the size of the firm, where 1 is the smallest decile of firms. Monthly Volatility is the standard deviation of monthly returns over the year. The *F*-statistics in the last column test the null hypothesis that the Bull Market Ownership and Bear Market Ownership estimates are equal. *t*-statistics are reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Intercept	Bull Market Ownership	Bear Market Ownership	Capitalization Decile	Monthly Volatility	<i>F</i> -Statistic Bull=Bear Ownership
0.041 (57.46)***	0.034 (13.47)***	-0.043 (-16.59)***			1440.8***
0.036 (30.90)***	0.042 (15.30)***	-0.036 (-12.56)***	0.0008 (6.55)***		1395.8***
0.000 (0.39)	0.044 (17.12)***	-0.040 (-14.90)***	0.0019 (17.22)***	0.262 (52.07)***	1840.1***

**Table 6**  
**Abnormal returns of individual investor ownership change portfolios during long bull and bear markets**

Each year, for two different subperiods (1984-89 bull market and 1990-97 bear market), firms are sorted into 10 portfolios based on the change in the fraction of shares held by individual investors. Abnormal returns are raw returns less the return of one of 100 portfolios based on capitalization deciles and book-to-market deciles. Abnormal returns are reported for each of the ownership change portfolios in the bull and bear market subperiods. The mean ownership change is reported in Panel A for the bull and bear market periods. Panel B reports the abnormal returns for the year during the change in ownership, Panel C reports the abnormal returns for the year prior to the change in ownership year, and Panel D reports the returns for the year after the ownership change year. *t*-statistics are reported in parentheses. The *F*-statistic in the second to last column tests the null hypothesis that the mean estimates do not differ across ownership-level portfolios. The *F*-statistic in the last column tests for differences between the large and small ownership portfolios. The *F*-statistic in the last row of each Panel tests for differences between bull and bear market abnormal returns. \*\*\*, \*\*, and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

(see table on next page)

	Small Ownership	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Large Ownership	<i>F</i> -stat. (all equal)	<i>F</i> -stat. (small=large)
Panel A: Change in Individual Investor Ownership												
Bull Market	-0.108	-0.053	-0.034	-0.022	-0.013	-0.005	0.001	0.010	0.024	0.059	5132.9***	34,846***
Bear Market	-0.048	-0.016	-0.008	-0.003	0.001	0.005	0.010	0.016	0.026	0.057	2518.0***	18469***
<i>F</i> -statistic	1764.79***									1.42		
Panel B: Abnormal Returns for Year During Change in Ownership Year												
Bull Market	0.2665 (24.95)***	0.1109 (10.40)***	0.0379 (3.56)***	0.0256 (2.40)**	-0.0115 (-1.08)	-0.0570 (-5.35)***	-0.1098 (-10.31)***	-0.1151 (-10.79)***	-0.1502 (-14.09)***	-0.1739 (-16.28)***	159.69***	849.66***
Bear Market	0.1315 (21.36)***	0.0558 (9.09)***	0.0211 (3.43)***	-0.0039 (-0.64)	-0.0283 (-4.60)***	-0.0549 (-8.95)***	-0.0663 (-10.77)***	-0.0682 (-11.10)***	-0.0809 (-13.16)***	-0.0970 (-15.76)***	135.19***	689.26***
<i>F</i> -statistic	125.64***									39.61***		
Panel C: Abnormal Returns for Year Prior to Change in Ownership Year												
Bull Market	-0.0071 (-0.61)	-0.0262 (-2.25)**	0.0135 (1.16)	-0.0199 (-1.72)*	-0.0230 (-1.97)**	-0.0429 (-3.69)***	-0.0625 (-5.38)***	-0.0013 (-0.11)	-0.0191 (-1.65)*	0.0252 (2.16)**	4.86***	3.85**
Bear Market	0.0628 (9.68)***	0.0344 (5.32)***	0.0158 (2.44)**	0.0022 (0.33)	-0.0266 (-4.11)***	-0.0362 (-5.61)***	-0.0529 (-8.17)***	-0.0571 (-8.83)***	-0.0640 (-9.91)***	-0.0332 (-5.13)***	43.13***	109.72***
<i>F</i> -statistic	31.22***									21.77***		
Panel D: Abnormal Returns for Year After Change in Ownership Year												
Bull Market	-0.0650 (-5.81)***	-0.0285 (-2.56)**	-0.0386 (-3.46)***	-0.0099 (-0.89)	-0.0173 (-1.55)	-0.0008 (-0.07)	0.0122 (1.54)	0.0041 (0.37)	-0.0036 (-0.32)	-0.0209 (-1.87)*	4.47***	7.76***
Bear Market	-0.0359 (-5.53)***	-0.0254 (-3.92)***	-0.0163 (2.52)**	-0.0147 (-2.26)**	-0.0102 (-1.58)	-0.0156 (-2.41)**	-0.0008 (-0.12)	-0.0157 (-2.43)**	-0.0151 (-2.33)**	-0.0312 (-4.82)***	2.48***	0.26
<i>F</i> -statistic	5.75**									0.72		