

The Behavior of Japanese Individual Investors During Bull and Bear Markets

Kenneth A. Kim and John R. Nofsinger

We study Japanese individual investors by contrasting their behavior during a long bull market (1984-1989) to a long bear market (1990-1999). Our main objective is to test whether individuals' attitudes and preferences toward stock risk, book-to-market valuation, and past returns, are different between market conditions. We also assess individuals' investing performance. Overall, we identify some striking differences in investing behavior between the bull and the bear market. These behaviors are associated with poor investment performance. Some of our findings are consistent with existing behavioral theories, but some of our findings are not.

keywords: overconfidence, individual investor behavior, bull and bear markets, Japan

Recent theoretical research suggests that psychological biases affect individual investors, causing them to make non-optimal decisions. In particular, researchers have modeled the effect of the overconfidence bias on investor behaviors and on stock market reactions. When an investor believes he has a higher ability than he actually has, he is said to suffer from overconfidence. Daniel et al. [1998] describe overconfident investors as overreacting to private signals. Odean [1998] argues that individual investors are overconfident, and that overconfidence can impact financial markets. Recent empirical research confirms these contentions. For example, using U.S. individual investor data, investors have been found to make poor trading decisions (Odean [1999]), to positive feedback trade (Bange [2000]), and to be overconfident (Barber and Odean [2000]). Many of these behaviors have been confirmed using a dataset of Finnish investors (Grinblatt and Keloharju [2000 and 2001]).

But empirical tests of overconfidence and other behaviors, while extremely insightful, suffer a significant limitation as they were primarily conducted in one kind of market environment—the generally rising stock market of the 1990s. The 1990s was a period of inflating stock prices all over the world. For example, the empirical studies of Barber and Odean [2000], Odean [1999], and Bange [2000] used U.S. data from the 1990s. The 16 Finnish firms used in the Grinblatt and Keloharju papers were also from a period (i.e.,

December 1994 to January 1997) generally rising in price, with an average 1.7% return per month.

While many behaviors have been identified in a rising stock price environment, henceforth a *bull market*, could these behaviors be exhibited in a declining price environment, i.e., a *bear market*? Would investors be overconfident during an extended period where they are losing money? Both Daniel et al. [2001] and Gervais and Odean [2001] present models where the degree of overconfidence can vary over time. 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 overconfident. Their theory implies that individual investor behavior is endogenous to market conditions, and that investing behavior will be different between bull and bear market conditions. For example, given that Odean [1999] finds that individual investors make “trading mistakes” because of their overconfidence, one could posit that individual investors might make more trading mistakes in a bull market (when investors are more prone to overconfidence) than in a bear market. In addition, given that overconfident investors overweigh their abilities and underweigh market information, and are thus posited to hold stocks *they* believe to be undervalued by the market (see Barber and Odean [2000], Daniel et al. [2001], Bloomfield and Michaely [2004]), perhaps individual investors' preference for, say, high book-to-market stocks is greater during bull markets.

In this paper, we contribute to the expanding overconfidence literature by conducting empirical tests to see whether or not individual investing behaviors (such as those pertaining to overconfidence) are related to market conditions. Specifically, we contrast the behavior of Japanese individual investors during a long bull market to a long bear market. The Japanese market

Kenneth A. Kim School of Management, State University of New York at Buffalo, Buffalo, NY 14260 and PACAP Research Center, 7 Lippitt Road, Kingston, RI 02881.

John R. Nofsinger College of Business, Washington State University, Pullman, WA 99164, Tel: 509-335-7200, E-mail: john.nofsinger@wsu.edu

experienced a long bull market from 1984 to 1989, characterized by double-digit growth in every year. Contrary to elsewhere in the world, the Japanese stock market suffered a long bear market in the 1990s following its 1990 market crash. These contrasting subperiods provide a unique opportunity to test whether investor behaviors differ between the two dissimilar market environments.

In our paper, we examine the correlation between individual investor ownership and (i) measures of stock risk, (ii) the book-to-market ratio, (iii) feedback trading, and (iv) investing performance. Specifically, we test for differences in these correlations between the bull and bear market periods. For our empirical approach, we rely on stock-level data. We first identify stocks with varying degrees of individual ownership to detect the risk and book-to-market preferences of individual investors. We implement both portfolio sorting and regression methods (which we will describe later). Second, we examine stocks where large changes of individual ownership occur in an attempt to identify whether or not individuals' trading patterns (in particular, feedback trading) and their buying/selling decisions are different between bull and bear markets.

Overall, we identify some striking differences between our two subperiods. In particular, investor attitudes toward risk, book-to-market valuation, and feedback trading appear to be different under dissimilar market conditions. With our examination of contrasting investing behavior in strong (bull) and weak (bear) market conditions, our paper provides much needed additional empirical evidence on overconfidence, in particular, and on investing behavior, in general.

The rest of our paper proceeds as follows. First, we briefly provide some background information about Japanese individual investors. Then, we discuss the role that overconfidence might have on individual investors and how it may be affected by market conditions; and, this section also presents our hypotheses. We then describe our data and address issues with regard to significance testing. A section then presents and discusses results for the analysis on *Levels* of individual investor ownership, followed by a section that reports results investigating *Changes* in individual investor ownership. The last section offers a conclusion.

Japanese Household Stock Ownership

It is fairly well-known that Japanese households do not invest in stock markets to the degree that households in the United States and other leading world economies do. Perhaps the primary reason for Japanese households' seeming lack of involvement in equities markets is due to the high cost of real estate in Japan, which is where most household wealth is allocated. Noland [1988] provides an illuminating contrast be-

tween Japanese household holdings to U.S. household holdings. In Japan, land and residential structures account for 65% of household holdings, compared to only 30% for U.S. households. In addition, the Japanese people are also anecdotally known to be savers. Most of these savings are put into time deposits and postal savings accounts (Noland [1988]). When households do hold securities, it is often in government bonds and bank bonds (also see Guiso, Haliassos, and Jappelli [2002]).

However, despite the above statistics, Japanese individuals are not insignificant or inactive stock investors. Many Japanese households do hold stocks. Iwaisako [2003] documents that about 25% of Japanese households directly own stocks, which is actually slightly higher than what is documented for U.S. households (e.g., see Amerkis and Zeldes [2004]). When looking at aggregate ownership statistics of stocks listed on the Tokyo Stock Exchange (TSE), we find that 28% of TSE stocks are directly owned by domestic individual investors (we subsequently show this in our Table 1). The TSE Fact Book [1997] reports comparable individual ownership statistics to what we report. In the United States, individuals own 36% of New York Stock Exchange stocks (NYSE Fact Book [2001]). So, while individual investors have a larger presence in U.S. equity markets than they do in the Japanese equity markets, individual investors in Japan still have a large equity ownership stake.

With our data, we also find that Japanese individual investors, in aggregate, are actively buying and selling stocks. For example, in any given year, approximately half the stocks listed on TSE experience a 5% net change in total individual investor ownership (we will show this in Table 4). While this makes Japanese individual investors about one-third less active than U.S. individual investors (comparable U.S. statistics are reported in Nofsinger and Sias [1999]), one could still view Japanese individuals as being active investors.

As a group, Japanese individuals are significant owners of shares and are active traders. Our study sheds light on how Japanese individuals invest in the stock markets, with particular emphasis on their investing behavior in different market conditions. The next section discusses investor behavior in general. Additional institutional details about the Japanese stock market are presented in the data section.

Overconfidence

General Model Predictions

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 to modeling overconfidence,

Table 1. *Descriptive Statistics of Individual Investor Ownership and Stock Characteristics, 1984–1999*

	Mean	Median	Standard Deviation	10 percentile	90 percentile
Panel A. Complete Sample					
1984–1999 (n = 22,906)					
Individual Ownership Fraction	0.28	0.26	0.13	0.13	0.46
Change in Ownership	−0.000	0.001	0.040	−0.039	0.039
Annual Return	0.06	−0.03	0.48	−0.36	0.55
Monthly Volatility	0.11	0.10	0.06	0.06	0.18
Beta	1.03	1.00	0.88	0.23	1.84
Book-to-Market	0.59	0.46	0.54	0.17	1.11
Panel B. Bull Market Period					
1984–1989 (n = 7,860)					
Individual Ownership Fraction	0.29	0.26	0.14	0.14	0.47
Change in Ownership	−0.014	−0.008	0.046	−0.067	0.033
Annual Return	0.31	0.19	0.54	−0.17	0.87
Monthly Volatility	0.11	0.10	0.06	0.06	0.17
Beta	1.02	1.00	1.23	−0.05	2.17
Book-to-Market	0.34	0.30	0.21	0.12	0.60
Panel C. Bear Market Period					
1990–1999 (n = 15,049)					
Individual Ownership Fraction	0.28	0.26	0.13	0.12	0.45
Change in Ownership	0.007	0.004	0.035	−0.021	0.041
Annual Return	−0.07	−0.13	0.39	−0.41	0.30
Monthly Volatility	0.12	0.10	0.06	0.06	0.19
Beta	1.03	1.00	0.59	0.36	1.71
Book-to-Market	0.72	0.58	0.60	0.24	1.36

they make similar predictions about how overconfident traders behave. The most common model predictions are that overconfident investors take greater risks, trade more frequently, underreact to new information, and misprice fundamentals.

Specifically, overconfident investors are associated with riskier portfolios because they underestimate the investment risks (see DeLong et al. [1990], Kyle and Wang [1997], Odean, [1998]). Higher portfolio risk can manifest itself through low diversification and/or ownership of higher risk stocks. Overconfidence also leads to a high degree of trading activity because they are certain of their abilities and they are not tentative (see Kyle and Wang [1997], Odean, [1998]). In addition, overconfident investors underreact to (or are slow to respond to) more relevant information in the short-term (see DeLong et al. [1990], Daniel et al. [1998], Hirshleifer et al. [1994], Odean [1998]). An outcome of this under reaction is that it leads to positive feedback trading, or the buying of past winners and selling of past losers (see Nofsinger and Sias [1999]). Alternatively, selling winners and buying losers is referred to as negative feedback trading. Negative feedback trading is consistent with contrarian investment strategies while momentum strategies lead to positive feedback trading.

Lastly, because overconfident investors overweigh their abilities and underweigh market information, they are posited to misprice fundamentals. (see Daniel et al. [2001], Bloomfield and Michaely [2004]). Stocks owned by overconfident individuals are mispriced be-

cause these investors overreact (underreact) to bad (good) news, which makes observed prices lower than their fundamental valuation. As such, overconfident investors have fundamental-to-price tilted portfolios, i.e., they might own stocks with high book-to-market ratios.

Overconfidence and Market Conditions

Some models of investor behavior predict that investment decisions will depend on market conditions (see Nofsinger [2005]). That is, bull markets will be associated with some investor characteristics and bear markets associated with others. 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. As a consequence, overconfident behaviors will be more pronounced in bull markets than in bear markets. Similarly, Daniel et al. [2001] predict that as a result of investors attributing too much of their success to their own abilities, they have a tendency to underweight fundamental information. This seems more likely to occur during bull markets.

It is surprising that empirical research studying investor behavior in bull versus bear markets is scant.¹ One possible reason for the lack of research on the link between overconfidence and market conditions is the fact that most research is conducted on U.S. investors. Extensive datasets on U.S. individual investors have become available for study, but they primarily

encompass the bull market period of the 1980s and 1990s. For example, the papers by Odean use data during the 1990s. The feedback tests of Bange [2000] use data from 1987 to 1994. In a series of papers using Finland data, Grinblatt and Keloharju [2000, 2001] identify many investor behaviors. However, their dataset (December 1994 to January 1997) encompasses only bull market years.

Our Empirical Investigation and Hypotheses

The goal of our paper is to contribute much-needed additional empirical evidence on individual investor behavior. Specifically, we will use Japanese data to compare individual investor behavior during a bull market to their behavior during a bear market. The advantage of using Japanese data is that Japan experienced a tremendous long and steady bull market in the 1980s, followed by a powerful and long bear market throughout the 1990s. Most stock markets of Western cultures have only recently experienced such a protracted bear market. With Japanese data, we can examine the behavior of individual investors in both bull and bear markets to see how behaviors relate to market conditions.

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 stock-level data, similar to Nofsinger and Sias [1999]. Our empirical approach is as follows. We will examine Japanese stocks with different levels, and with different changes, of individual ownership to detect and to assess the behavior of individual investors. The nature of our data allows us to investigate the correlation of investor stock ownership and measures of risk and the book-to-market (BM) ratio. In addition, we can measure positive feedback trading by observing whether ownership and changes in ownership are related to past stock returns. In addition to risk, BM, and positive feedback trading, we also examine individual investor performance. Odean [1999] claims that overconfidence is a psychological bias that is purported to harm investment performance through poor choices.

We ask whether or not market conditions cause individual investors to behave differently. The null hypothesis is that individuals will behave similarly across both market conditions, but existing overconfidence theories suggest that the null will be rejected. In particular, if the overconfidence bias is stronger during a bull market than during a non-bull market, and if we relied on the general model predictions of the overconfidence bias, then we might observe individuals holding riskier and higher book-to-market stocks primarily during the bull market. In addition, the tendency for individual investors to positive feedback trade and to make trading mistakes (ex post) might also be greater during the

bull market. Such findings would suggest that trading behaviors (particularly those associated to the overconfidence bias) are related to market conditions. Finally, despite the fact we present and test specific hypotheses, we also position our paper as being exploratory, as an empirical investigation comparing individual investing behavior between bull and bear markets has yet to be done.

Data and Significance Tests

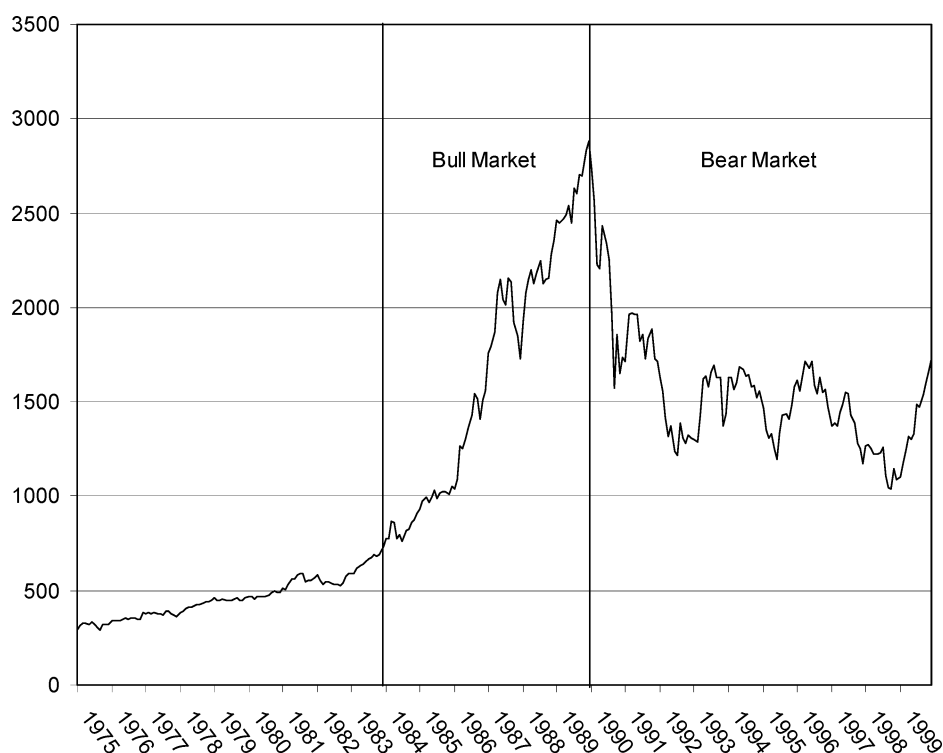
Data

Our monthly stock returns, annual individual investor share-ownership, and financial statement data for Japanese stocks come from the Pacific-Basin Capital Markets (PACAP) Research Center. Because we are interested in isolating a bull market period and a bear market period, we confine our study to the years 1984–1999. Figure 1 illustrates the magnitude and duration of the extended Japanese bull market of 1984–89 and the subsequent bear market of 1990–99. Specifically, the figure shows the monthly composite Tokyo Stock Price Index (TOPIX) from January 1975 to December 1999. 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 [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 stock market has been bearish ever since (from 1991 to 1999, the TOPIX experienced an annual average rate of return of –5%). We use the years 1984–89 as the bull market period and 1990–99 as the bear market period.

The stocks in our database are those listed on either the First Section or Second Section of the Tokyo Stock Exchange. For each stock in our database, annual ownership data are reported at the end of each fiscal year (usually March 31).² The sample of stocks with ownership data, monthly returns, market-capitalization, and book-to-market ratios varies from 1,281 (in 1984) to 1,593 (in 1999). The total sample comprises 22,906 stock-years of data. 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.

At this point, we should mention that our database reports ownership by the following owner categories: domestic individuals, other corporations, financial institutions, government, and foreigners. Because foreigners can be either individuals or institutions, and because our focus is on Japanese individual investors

FIGURE 1
Monthly Composite Tokyo Stock Price Index from January 1975 to December 1999.



and their behavior during Japanese market conditions, we do not focus on foreign investors in our study (see Kang and Stulz [1997] and Richards [2005] for comprehensive studies on foreign investors in Japan and in Asian emerging markets, respectively).

We define the *level* of a stock's "individual ownership" as the fraction of the firm's total shares outstanding that is owned by individual investors. The *change* in individual ownership for the year is the fraction of individual ownership at the end of the year less the fraction at the beginning of the year. Thus, if individuals owned 10% of the stocks of a firm at the beginning of the year and 15% of the stocks of that same firm at the end of the year, we record the change for the year as 0.05.

We initially report on four stock-specific variables, including annual return, two measures of risk (stock return volatility, and Beta), and a book-to-market ratio. The stock's annual return is computed by compounding the monthly returns. 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 stock's 12 monthly returns during the year onto the equally-weighted PACAP market return during the same year (i.e., we use one year of monthly data to calculate the stock's Beta for that year). The book-to-market ratio (BM), measured each year, is the book value of equity

divided by the market value of the shares outstanding. Table 1 presents descriptive statistics for these variables. Statistics for the bull and bear markets are also reported separately.

Over the entire sample, there is little change in individual ownership. This is due to an average decrease of -1.4% per year during the six years of the bull market that is offset by the increase of 0.7% per year during the ten-year bear market. The risk measures, volatility and Beta, are similar in the bull and bear markets. By design, the annual return for the bull market (31%) is large and positive and the bear market return (-7%) is negative. The mean book-to-market ratio is much lower in the bull market period, which is probably due to the higher valuations of the bull period.

Issues with Significance Testing

In subsequent sections, we will compare individual investor ownership with various risk, return, and value characteristics using both sorting and regression analysis. Although we have 22,906 stock-years of data, it is uncertain whether they represent truly independent observations. An alternative view is that because we use annual data variables, we may only have 16 time-series (i.e., from 1984 to 1999) independent observations. The true number of independent draws from the distribution probably lies somewhere in between.

When all the stock-years are assumed to be independent, the probability estimates would likely be biased too low (too much power). On the other hand, the low power of using only 16 independent observations bias the probability values too high (too little power).

To address the situation mentioned above, we report the p -values using both a pooled (cross-section and time-series) method and a time-series method in order to create a probability range. Specifically, we report an F -statistic that pools all the stock-year observations in the samples. We call this method the pooling approach. In an alternative and more conservative approach, we first compute yearly portfolios of the stocks and characteristics by averaging within the samples each year. This creates 16 time-series observations for which to test significance levels. We call this method the portfolio approach. To compute the p -values in this approach, we use (1) a paired t -test for testing differences in characteristics between low and high investor-ownership samples and (2) a difference in means test for testing characteristics between the bull and bear markets. We consider the p -values generated from the portfolio approach to be more conservative than those estimated using the pooled approach.

Levels of Individual Investor Ownership

All stocks are sorted into 5 portfolios based on the fraction of individual ownership at the beginning of each fiscal year (which predominately begins in April). Table 2 reports the mean stock characteristics in these ownership level portfolios. Panel A reports the mean individual investors ownership level for the five portfolios in the bull market period and the bear market period. By design, the level of ownership monotonically increases from 13% in the low ownership quintile portfolio to the 51% in the high ownership quintile portfolio during the bull market. The statistic in the second-to-last column reports the F -value from a test that the mean level of ownership between Quintile 1 and Quintile 5 is equal using the pooled approach. The t -statistic in the last column comes from a paired t -test using the portfolio approach and also tests for a difference between Quintile 1 and Quintile 5. Because our sorting procedure groups stocks by individual ownership, it's not surprising that both statistics reject equality of ownership at the one percent level.

The variation in ownership is 12% to 48% in Quintiles 1 and 5, respectively, in the bear market period. The F -statistic reported in the row below the bear market estimates, in Panel A, tests whether the level of ownership is the same between the bull and bear market periods using the pooled approach. The t -statistic in the next row comes from a difference in means test and also tests for a difference between bull and bear market ownership but uses the portfolio approach. For Quintile

1, the F -statistic is not significant, but the t -statistic is significant. For Quintile 5, the F -statistic is significant while the t -statistic is not. Overall, we conclude that individual ownership levels are not significantly different between the bull and bear market periods. The next two subsections report the characteristics of the stocks of firms largely held by individual investors.

Individual Investor Preferences and Performance in Bull and Bear Markets

We begin by examining the level of risk preferred by individual investors. We hypothesize that since the environment in bull and bear markets are different, investors may have different preferences for risk caused by changes in risk perception and risk aversion. Our tests report the stock-level correlation between the stock's individual ownership level and the stock's riskiness. The two measures of risk, mean monthly return volatility and Beta, are reported in Panels B and C, respectively. Higher volatilities and Beta are indicative of higher risk levels.

From Panel B of Table 2, we see that for the bull market, mean monthly volatility in Quintile 1 (the lowest level of individual ownership portfolio) is 11.1% and the mean monthly volatility in Quintile 5 (the high individual ownership portfolio) is 11.0%. Both the F -statistic and the t -statistic reported in the last two columns are not significant, indicating that there is no statistically significant difference between the volatility in the low and high individual ownership portfolios. However, for the bear market, a very distinct pattern emerges. Specifically, stocks largely held by individuals (Quintile 5) are riskier than other stocks. Further, as we go from Quintile 5 to Quintile 1, we see that the relationship between individual ownership and volatility is *monotonic*. Results using Beta (see Panel C) show a similar pattern. Specifically, during the bull market, Quintile 1 stocks have an average Beta of 1.028. The Beta estimates increase and then decrease again as individual ownership increases. The Beta of the Quintile 5 portfolio is 0.983, which is not different than the Quintile 1 Beta. However, in the bear market, Beta appears to be strongly related to individual ownership. The average Beta in the low ownership quintile is 0.835, whereas for the high ownership quintile the average Beta is a significantly larger 1.182.

Overall, the risk results show that individuals have a tendency to hold high-risk stocks, but these tendencies only appear during the bear market. The difference in results are quite striking, and the findings are consistent with our basic hypothesis that bull and bear market investors have different behaviors toward risk, perhaps caused by differences in risk perception and risk aversion in the two markets. However, we had expected individuals to hold high-risk stocks during the *bull* market, where overconfidence is supposedly fostered.³

Table 2. *Stock Characteristics by Levels of Investor Ownership in Bull and Bear Markets*

	Low Ownership (n = 4,142)	Quintile 2 (n = 4,624)	Quintile 3 (n = 4,749)	Quintile 4 (n = 4,728)	High Ownership (n = 4,682)	F-stat { p-value }	t-stat { p-value }
Panel A: Individual Investor Ownership							
Bull Market	0.133	0.205	0.270	0.353	0.513	45,219 { <.0001 }	31.62 { <.0001 }
Bear Market	0.122	0.200	0.268	0.340	0.479	67,788 { <.0001 }	25.31 { <.0001 }
F-statistic	1.27 {0.26}				19.89 { <.0001 }		
t-statistic	2.81 {0.014}				1.48 {0.16}		
Panel B: Monthly Return Volatility							
Bull Market	0.111	0.110	0.108	0.107	0.110	0.34 {0.56}	-0.36 {0.74}
Bear Market	0.105	0.112	0.117	0.123	0.129	232 { <.0001 }	3.66 {0.005}
F-statistic	2.66 {0.103}				25.00 { <.0001 }		
t-statistic	0.65 {0.53}				-1.53 {0.15}		
Panel C: Beta							
Bull Market	1.028	1.056	1.022	1.028	0.983	0.98 {0.32}	-0.31 {0.77}
Bear Market	0.835	0.972	1.048	1.119	1.182	519 { <.0001 }	4.33 {0.002}
F-statistic	23.85 { <.0001 }				23.12 { <.0001 }		
t-statistic	2.43 {0.029}				-2.44 {0.029}		
Panel D: Book-to-Market Ratio							
Bull Market	0.293	0.309	0.326	0.359	0.404	214 { <.0001 }	3.94 {0.011}
Bear Market	0.609	0.720	0.752	0.775	0.726	55.03 { <.0001 }	1.75 {0.11}
F-statistic	183 { <.0001 }				171 { <.0001 }		
t-statistic	-4.54 {0.0005}				-2.65 {0.02}		
Panel E: Abnormal Return							
Bull Market	0.012 (1.39)	-0.006 (-0.65)	-0.032 (-3.71)***	-0.042 (-4.78)***	-0.022 (-2.34)**	7.07 {0.008}	-1.82 {0.13}
Bear Market	0.006 (1.13)	-0.016 (-2.92)***	-0.029 (-5.45)***	-0.036 (-6.70)***	-0.031 (-8.07)***	22.59 { <.0001 }	-2.36 {0.04}
F-statistic	0.37 {0.54}				0.80 {0.37}		
t-statistic	0.39 {0.70}				0.62 {0.55}		

Each year (1984–1999), all non-financial TSE stocks are sorted into five portfolios based on the fraction of shares held by individual investors. Mean portfolio characteristics are reported for Bull and Bear market periods separately (1984–89 bull market and 1990–99 bear market). The mean individual investor ownership, monthly volatility, Beta, and Book-to-Market ratio, and abnormal returns are reported in Panels A through E. The F-statistic in the second to last column tests for differences between the low (Quintile 1) and high (Quintile 5) individual ownership samples using a pooled stock approach. The t-statistic in the last column also tests for differences between Quintiles 1 and 5 using a portfolio approach and a paired t-test. The F-statistic in the row of each Panel tests for differences between bull and bear market characteristics within Quintiles 1 and 5 by pooling stocks. The t-statistic in the following row tests for the difference using the portfolio approach and a difference in means test. The probability values for the difference tests are reported in {brackets}. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Our book-to-market (BM) results are reported in Panel D. Here, we see a strong and distinct relationship between BM and the stock's level of individual investor ownership, but only during the bull market. Specifically, during the bull market, stocks with little individual investor ownership have a BM of 0.293. This ratio increases *monotonically* to the high ownership portfolio, which has a BM of 0.404. The difference in BM between the Quintile 1 and Quintile 5 portfolios are statistically significant. Because overconfident investors overweigh their abilities and underweigh market information, they are posited to hold stocks *they* believe to be undervalued by the market (see Barber and Odean [2000], Daniel et al. [2001], Bloomfield and Michaely [2004]). The strong positive relationship between BM and individual ownership is consistent with the hypothesis that Japanese individual investors are overconfident during bull markets, and that their overconfidence can be measured in the aggregate market.

At this point, it is worth mentioning that the tendency to hold high book-to-market stocks during bull markets, and the tendency to hold high risk stocks during bear markets, could be viewed as being at odds with what a rational profit-maximizer would do. To maximize profits, one would hold riskier (safer) stocks during bull (bear) markets, *ex post*. As such, Japanese individual investors may suffer from poor investment decisions, especially if market assessments (e.g., the book-to-market ratio) are rational.

To assess investor success, we report the performance of stocks held by individual investors. We report abnormal returns, which are calculated as a size and book-to-market adjusted returns. We sort each stock, for each year, into ten portfolios by their market capitalization. For each year, we also create ten portfolios by their book-to-market equity ratio. We then use these deciles to create 100 size and book-to-market portfolios. The abnormal return for each month is the stock's return less the return from one of the 100 portfolios for which the stock belongs. The capitalization and BM portfolio return used is an equal-weighted return that does *not* include the stock for which the abnormal return is being measured. Annual abnormal returns are the compounded monthly abnormal returns.

From Panel E, we see that during the bull market, stocks with the lowest individual investor ownership averaged an insignificant abnormal return of 1.2% per year. The performance gets worse as individual ownership increases through Quintile 4 and then improves a bit to -2.2% in the quintile with the highest level of ownership. The difference between the Quintile 1 and 5 performances is significant using the pooling approach but only marginally significant (at the 13% level) using the portfolio approach. The relationship between individual ownership and stock performance is a little stronger in the bear market. The Quintile 1 (5) group

earned 0.6% (-3.1%) per year. These results suggest that the stocks individual investors hold tend to underperform in both bull and bear markets. Further, the relationship between individual ownership and stock performance is stronger during the bear market.

Regression Analysis of Individual Investor Preferences and Performance

While our sorting analysis provides some insights into individual investor preferences and performance in bull and bear markets, there may be some confounding effects between variables. We use regression analysis to address these potential effects. We estimate the following equation to examine the relationship between individual ownership and our independent variables in bull and bear markets:

$$\text{Level} = \alpha_1 + \delta_1 \times \text{Independent Variable} + \alpha_2 \times D_{\text{Bear}} + \delta_2 \times D_{\text{Bear}} \times \text{Independent Variable} \quad (1)$$

The variable *Level* measures the level of individual ownership of the firm's stock, D_{Bear} is a dummy variable that equals one when the observation is during the bear market, and Independent Variable represents either Volatility and/or Beta and/or BM and/or Abnormal Returns. That is, we run six variations of this regression model with different independent variables and with different combinations of independent variables. The equations are estimated using all data (pooled cross section and time series). The coefficients, α_1 and δ_1 , are interpreted as the relationship between Level and the independent variable of interest in the bull market. The coefficients, α_2 and δ_2 , are interpreted as the *change* in the relationship between bull and bear markets, so these latter two coefficients are testing if the bear market behavior is significantly different from the bull market behavior. For example, if δ_2 is positive and statistically significant, then it means that the relationship between individual ownership and the independent variable is strong and more positive during the bear market than during the bull market. Table 3 reports the estimation results.

The *t*-statistics reported in (parentheses) are from the pooled ordinary least squares regression and thus represent the pooled approach. The portfolio approach *t*-statistics are reported in the {brackets}.⁴ The coefficient for the relationship between ownership and volatility in the bull market is an insignificant -0.008. However, the strongly positive parameter estimates for the bear market and the volatility interaction variables suggest that individual investor ownership and stock volatility are positively correlated in the bear market. These results are consistent with those of the sorting analysis reported in Table 2. The other risk variable, Beta, is the independent variable in Model (2). The results suggest that investor ownership is not aligned with

Table 3. Regression Analysis of Stock Characteristics and Ownership in Bull and Bear Markets

Model	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.289 (94.20)*** {23.35}***	0.290 (150.98)*** {19.85}***	0.290 (92.45)*** {19.04}***	0.236 (85.48)*** {46.96}***	0.287 (191.92)*** {31.55}***	0.208 (45.01)*** {16.40}***
Volatility	−0.008 (−0.33) {−0.56}		−0.000 (−0.01) {−1.30}			0.223 (8.12)*** {2.45}*
Beta		−0.002 (−1.77)* {−0.65}	−0.002 (−1.74)* {−0.81}			−0.002 (−1.48) {−0.79}
BM				0.153 (21.99)*** {5.90}***		0.168 (23.56)*** {5.44}***
Abnormal Return					−0.016 (−3.75)*** {−2.60}**	−0.027 (−6.02)*** {−4.04}***
Bear Market Change in Estimates						
Intercept	−0.053 (−13.80)*** {−3.52}***	−0.058 (−20.15)*** {−3.14}***	−0.071 (−17.66)*** {−3.76}***	0.017 (5.41)*** {2.63}**	−0.010 (−5.48)*** {−0.92}	−0.012 (−2.30)** {−0.18}
Volatility	0.368 (12.20)*** {5.02}***		0.197 (6.19)*** {3.15}***			0.010 (0.30) {1.29}
Beta		0.047 (21.55)*** {4.14}***	0.037 (15.34)*** {2.59}**			0.033 (14.01)*** {3.02}***
BM				−0.119 (−16.64)*** {−5.20}***		−0.138 (−18.71)*** {−4.95}***
Abnormal Return					−0.004 (−0.66) {−0.71}	0.000 (0.02) {0.76}
Adj- R^2	0.020	0.027	0.031	0.037	0.003	0.070

We estimate the following equation to examine the relationship between ownership and the independent variable of interest in bull and bear markets: $\text{Level} = \alpha_1 + \delta_1 \times \text{Independent Variable} + \alpha_2 \times D_{\text{Bear}} + \delta_2 \times D_{\text{Bear}} \times \text{Independent Variable}$. *Level* measures the level of individual ownership in the stocks of the firm. The Independent Variable can be one or more of the following variables: Volatility, Beta, book-to-market (BM), and abnormal return. D_{Bear} is a dummy variable that equals one when the observation is during the bear market. The equation is estimated using all the data (pooled cross section and time series). The coefficients, α_1 and δ_1 , are interpreted as the relationship between *Level* and the Independent Variable in the bull market. The coefficients, α_2 and δ_2 , are interpreted as the *change* in the relationship between bull and bear markets. The t -statistic reported in (parentheses) are estimated using a pooled approach. The t -statistics reported in {brackets} are from the portfolio approach. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Beta in the bull market but the two variables are positively related to each other in the bear market. Given that results using volatility and Beta are similar, it may be that investors view these two risk measures as the same and thus use them interchangeably as measures of risk. We include both measures of risk in Model (3). The bull market coefficients for both variables are not significant. The estimates for both volatility and Beta indicate a significant and positive change for the bear market period. It appears that volatility and Beta risk are not used interchangeably by investors, as each risk measure has its own significant explanatory power.

Model (4) tests the relationship between individual ownership and the book-to-market ratio. The positive

coefficient illustrates that investors prefer value stocks during the bull market. The change in the relationship during the bear market is significantly *negative*, and the coefficient estimate is of a similar magnitude to the positive coefficient of the bull market estimate, which suggests that there is *no* correlation between ownership and the book-to-market characteristic during the bear market. These findings are consistent with the sorting analysis findings presented in Table 2.

Model (5) reports the relationship between ownership and stock performance. The negative estimate in the bull market indicates that investors underperform. That is, they tend to hold stocks that have negative abnormal returns. There does not appear to be any significant change in the estimates for the bear market

period. Investors hold poorly performing stocks in bear markets too.

Lastly, Model (6) reports the regression results using all the independent variables. After including all the variables, we find that there is a positive relationship between ownership and volatility in the bull market. This is a change from the previous regression results. All other results, including our Beta results, seem to hold.

Brief Summary of Results

From all of the sorting analysis and regression findings, we conclude that individual investors align with stocks with higher book-to-market ratios and lower performance in the bull market. Investors' preferences seem to be different in the bear market. Individual investors seem to prefer riskier stocks, without regard to book-to-market ratios, while still holding onto poorly performing stocks in the bear market. The risk and book-to-market results are consistent with the paper's general hypothesis—individual investors have different stock preferences under different market conditions. However, the risk findings are at odds with overconfidence theories (they would predict that individuals prefer riskier stocks during a bull market), while the book-to-market findings are consistent with overconfidence theories. Assessments on trading performance are further explored in the next section.

Changes in Individual Investor Ownership

To further investigate the actions of individual investors and the outcome to their actions, we examine the stocks they purchased and sold. All stocks are sorted into 5 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 stocks 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 stocks are sorted into 5 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, stocks are sorted into 5 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 five individual change portfolios within each of the five individual level portfolios. Next, we combine each of the five lowest-quintile of individual change portfolios from the individual level portfolios. We also do this for

the second lowest quintile change portfolios, and so forth, until we are left with five portfolios, each year, which have similar individual ownership at the beginning of the year but experience different changes in individual ownership over the year. Lastly, we combine the portfolios over the different years. In reporting the change in ownership, we use a standardized measure to eliminate noise associated with ‘trends’ that occur with individual ownership over time. Specifically, we deflate the change in ownership for each stock by the average change in ownership over all stocks for the year. This measure is the abnormal change in ownership.

The abnormal change in ownership and the annual abnormal returns around the ownership change are reported in Table 4. Panel A reports the abnormal change in individual investor ownership for each ownership-change portfolio. The largest decrease-in-individual-ownership portfolio, Quintile 1, experiences an abnormal decrease in individual ownership of -6.6% (-3.9%) during the bull (bear) market. By design, the change in individual ownership monotonically increases to Quintile 5. The large increase-in-individual-ownership portfolio, Quintile 5, experiences an individual investor ownership increase of 5.5% (4.0%) during the bull (bear) market year. The F -statistic and t -statistic in the last two columns reject that the mean changes in ownership are equal, at the one percent level. The statistics in the bottom two rows of Panel A also reject that the mean changes are equal between bull and bear market periods. The following subsections conduct tests on the trading activities of individual investors to assess their performance.

Returns Surrounding Abnormal Changes in Individual Ownership

Behavioral finance theories often implicate investors in the purchase and sale of the ‘wrong’ stocks. That is, they are biased toward making trading mistakes. We examine the performance of stocks being traded in Panel B of Table 4. The mean abnormal returns for the year during the change in ownership are reported for each ownership-change portfolio. We see that abnormal returns for stocks sold (Quintile 1) are 20.9% and 13.2% during the bull and bear market periods, respectively. The difference is statistically significant. The abnormal returns for stocks purchased (Quintile 5) are -17.3% and -10.1% in the bull and bear markets, respectively. Stocks being sold outperform stocks being purchased by 38.2% in the bull market and by 23.3% in the bear market. The results suggest that Japanese individual investors make poor trading decisions and that their poor relative performance is actually worse during a bull market. These findings are consistent with theories that contend that individual investors display overconfidence and

Table 4. *Abnormal Returns of Investor-Ownership-Change Portfolios by Bull and Bear Markets*

	Ownership Decrease	Quintile 2	Quintile 3	Quintile 4	Ownership Increase	F-stat {p-value}	t-stat {p-value}
Panel A: Abnormal Change in Individual Investor Ownership							
Bull Market	-0.066	-0.015	0.005	0.020	0.055	22,038 {<.0001}	39.05 {<.0001}
Bear Market	-0.039	-0.011	-0.001	0.009	0.040	19,302 {<.0001}	12.68 {<.0001}
F-statistic	791 {<.0001}				227 {<.0001}		
t-statistic	-6.38 {<.0001}				4.85 {0.0003}		
Panel B: Abnormal Returns for Year During Change in Ownership Year							
Bull Market	0.209 (25.37)***	0.038 (4.72)***	-0.036 (-4.44)***	-0.120 (-14.74)***	-0.173 (-21.25)***	1,088 {<.0001}	-10.82 {0.0001}
Bear Market	0.132 (24.92)***	-0.002 (-0.43)	-0.050 (-9.57)***	-0.079 (-15.21)***	-0.101 (-19.36)***	993 {<.0001}	-7.44 {<.0001}
F-statistic	62.16 {<.0001}				55.39 {<.0001}		
t-statistic	2.21 {0.04}				-4.25 {0.008}		
Panel C: Abnormal Returns for Year Prior to Change in Ownership Year							
Bull Market	-0.019 (-2.03)**	-0.004 (-0.45)	-0.036 (-3.96)***	-0.035 (-3.88)***	0.007 (0.81)	4.05 {0.04}	0.65 {0.54}
Bear Market	0.053 (11.27)***	-0.002 (-0.45)	-0.037 (-8.12)***	-0.063 (-13.71)***	-0.056 (-12.23)***	276 {<.0001}	-5.95 {0.002}
F-statistic	47.99 {<.0001}				40.57 {<.0001}		
t-statistic	-4.03 {0.001}				2.06 {0.08}		
Panel D: Abnormal Returns for Year After Change in Ownership Year							
Bull Market	-0.050 (-5.73)***	-0.030 (-3.48)***	-0.009 (-1.11)	0.008 (1.00)	-0.014 (-1.68)*	8.38 {0.004}	1.02 {0.35}
Bear Market	-0.055 (-10.15)***	-0.025 (-4.79)***	-0.020 (-3.73)***	0.003 (0.65)	-0.005 (-0.93)	43.43 {<.0001}	2.32 {0.05}
F-statistic	0.30 {0.58}				0.94 {0.33}		
t-statistic	0.15 {0.88}				-0.39 {0.70}		

Each year, for two different subperiods (1984–89 bull market and 1990–99 bear market), stocks are sorted into 5 portfolios based on the annual *change* in the fraction of shares held by individual investors. Abnormal returns are capitalization-decile and book-to-market-decile adjusted returns. Abnormal returns are reported for each of the ownership-change portfolio during the bull and bear market subperiods. The mean abnormal ownership change (here, we standardize the ownership change measure where the change in ownership for each stock of the firm is deflated by the average change in ownership over all stocks for the year) 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 for these estimates are reported in parentheses. The *F*-statistic in the second to last column tests for differences between the largest individual ownership decrease (Quintile 1) and increase (Quintile 5) samples using a pooled approach. The *t*-statistic in the last column also tests for differences between Quintiles 1 and 5 using a portfolio approach and a paired *t*-test. The *F*-statistic in the second to last row of each Panel tests for differences between bull and bear market abnormal returns within Quintiles 1 and 5 by pooling stocks of firms. The *t*-statistic in the last row tests for the difference using the portfolio approach and a difference in means test. The probability values for the difference tests are reported in {brackets}. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

optimism in their trading decisions, and with theories that relate those behaviors to bull markets.

Another behavioral prediction is the buying (selling) of past winners (losers), as overconfident investors tend to neglect ‘relevant’ information, i.e., they under-react, which results in positive feedback trading. We examine whether Japanese individual investors exhibit this trading behavior in Panel C of Table 4. This panel reports the abnormal returns in the year *prior* to the change in ownership for the ownership-change portfolios. From this Panel, we see that the stocks that investors sold (Quintile 1) during the bull market earned

a -1.9% abnormal return during the prior year. In contrast, the stocks that individuals purchased (Quintile 5) during the bull market were previously neither winners nor losers, earning a 0.7% abnormal return. While it seems that individuals are positive feedback trading during the bull market, the results are rather weak statistically. For the bear market, individual investors appear to be buying (selling) past losers (winners). The prior year’s abnormal returns for the stocks sold and purchased (Quintiles 1 and 5) by individuals are 5.3% and -5.6%, respectively. This can be characterized as negative feedback trading, or as contrarian trading.

Overall, Panel C's results can only indicate a *greater* tendency to buy past winners and sell past losers during the bull market than during the bear market. Note that this finding is consistent with the prediction that overconfidence tendencies are greater during a bull market. However, because the results are not strong, we will conduct additional tests shortly.

Panel D reports abnormal returns for the year *after* the change in ownership for each ownership-change portfolio. The abnormal returns for stocks sold (Quintile 1) are -5.0% and -5.5% during the bull and bear market periods, respectively. The stocks that individuals purchased (Quintile 5) subsequently earned -1.4% and -0.5% in the bull and bear markets, respectively. The differences between these bull and bear results, however, are not significant.

Regression Analyses of Returns

We repeat the sorting analysis shown in Table 4 by using regression analysis. Similar to the regression analysis presented in Table 3, we estimate variations of the following equation:

$$\begin{aligned} \text{Abnormal Change} = & \alpha_1 + \delta_1 \times \text{Abnormal Return} \\ & + \alpha_2 \times D_{\text{Bear}} + \delta_2 \times D_{\text{Bear}} \\ & \times \text{Abnormal Return} \end{aligned} \quad (2)$$

Abnormal change in individual ownership is the dependent variable. The regression coefficients are interpreted the same as for equation (1). The regression results for variations of equation (2) are all reported in Table 5. Model (1) shows the relationship between individual ownership change and the abnormal return in the ownership change year. The coefficient is significantly negative in the bull market, suggesting that the stocks individual investors are purchasing (selling) are doing poorly (well). The change in behavior during the bull market is significantly positive, but smaller in magnitude than the bull market estimate (-0.050 in the bull market compared with 0.019 in the bear market). These results indicate that the stocks individual investors are purchasing (selling) in the bear market are also doing poorly (well), but the effect is significantly weaker than in the bull market. Overall, these results are consistent with those presented in the sorting analysis of Table 4, individual investors fare relatively worse in a bull market.

Model (2) reports results using the abnormal return in the year *prior* to the ownership change year. The coefficient in the bull market period is not significantly different from zero. The coefficient is significantly negative in the bear market period. These findings suggest that there is no feedback trading in the bull market period, but investors tend to be negative feedback traders in the bear market. Model (3) reports results using the

abnormal return in the *following* year as the independent variable. The positive coefficient in the bull market period indicates that the stocks investors purchase do well and the stocks they sell do poorly in the year following the change in ownership. This coefficient is not significantly different in the bear market.

An Additional Test on Feedback Trading

Our final set of analyses proposes an alternative method to identifying feedback-trading behaviors. We first sort portfolios based on past performance and then observe the subsequent change in individual ownership that occurs for these portfolios. For example, if stocks with the highest returns do experience a subsequent increase in individual ownership, then this would reveal that individuals are positive feedback purchasers. These results are reported in Table 6.

Panel A of Table 6 reports bull market results. We see that stocks that experience the highest past returns (i.e., Quintile 5) do subsequently experience statistically significant abnormal increases in individual ownership. Furthermore, the subsequent returns of past winners are -13.0% during the year of the ownership change, and -10.4% during the year after. Thus, those stocks with high past performance (Quintile 5) are purchased by individuals and then subsequently underperform, on average. However, past losers (i.e., Quintile 1) do not seem to be experiencing a decline in individual ownership.

Panel B reports bear market results. Here, we see that individuals are *not* positive feedback trading during the bear market, consistent with our earlier findings in Tables 4 and 5. In fact, they appear to be negative feedback trading, as those stocks that do well (poorly) subsequently experience a decline (an increase) in individual ownership. Furthermore, these buying/selling decisions seem to be good ones, as we see that past winners (losers) subsequently experience poor (good) performance. During the year when ownership changes are measured, past winners (losers) experience a -4.3% (1.6%) abnormal return. That is, stocks that individuals sell (buy) experience negative (positive) subsequent returns.

To this point, we have investigated individual investor behavior in long bull and bear markets. While it is clear, *ex post*, that these two distinct periods occurred in the Japanese stock market, it may not have been as clear, *ex ante*, where the market was going *during* each year of each market condition. When the bubble started to burst, many investors must have wondered whether the decline was a correction within an ongoing bull market, or the start of a protracted bear market. Investors may ask similar questions during market increases during the long bull market. An important question to ask is, "when do investors switch between their bull market investing style/strategy and bear

Table 5. *Regression Analysis of Ownership Change and Abnormal Returns in Bull and Bear Markets*

Model	(1)	(2)	(3)
Intercept	-0.0009 (-2.15)** {-3.05}**	0.0000 (0.00) {0.66}	0.0001 (0.28) {1.04}
Abnormal Return in Change Year	-0.0504 (-42.61)*** {-21.02}***		
Abnormal Return in Year Prior to Change		0.0001 (0.08) {0.34}	
Abnormal Return in Year After Change			0.0065 (5.02)*** {1.48}
Bear Market Change in Estimates			
Intercept	0.0002 (0.45) {0.85}	-0.0003 (-0.57) {-0.37}	0.0000 (0.04) {0.01}
Abnormal Return in Change Year *D _{Bear}	0.0195 (12.62)*** {4.97}***		
Abnormal Return in Year Prior to Change *D _{Bear}		-0.0141 (-8.16)*** {-2.78}**	
Abnormal Return in Year After Change *D _{Bear}			0.007 (0.42) {0.19}
Adj-R ²	0.109	0.006	0.003

We estimate the following equation to examine the relationship between ownership and abnormal return in bull and bear markets:

$$\text{Abnormal Change} = \alpha_1 + \delta_1 \times \text{Abnormal Return} + \alpha_2 \times D_{\text{Bear}} + \delta_2 \times D_{\text{Bear}} \times \text{Abnormal Return}$$

Abnormal Change is the ownership change where the change in ownership is standardized for each stock of the firm by deflating it by the average change in ownership over all stocks for the year. D_{Bear} is a dummy variable that equals one when the observation is during the bear market. Abnormal returns are capitalization-decile and book-to-market-decile adjusted returns. The equation is estimated using all the data (pooled cross section and time series). The coefficients, α_1 and δ_1 , are interpreted as the relationship between Change and Abnormal Return in the bull market. The coefficients, α_2 and δ_2 , are interpreted as the *change* in the relationship between bull and bear markets. Models (1) through (3) differ by using the abnormal return in the ownership change year, prior to the change year, and following the change year, respectively. The t -statistic reported in (parentheses) are estimated using a pooled approach. The t -statistics reported in {brackets} are from the portfolio approach. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

market investing style/strategy?” As investors appear to have a tendency to positive feedback trade during the bull market and negative feedback trade during the bear market, we compute and graph a simple feedback trading statistic, on an annual basis, in Figure 2. The figure shows the Tokyo Stock Price Index from Figure 1 for the bull and bear market periods only. To create a simple feedback trading measure, we use the portfolios sorted on past performance from Table 6. Each year, the mean changes in individual investor ownership for each of the winner-stock and loser-stock quintiles are computed. The change in loser stock’s individual ownership is subtracted from winner stock’s individual ownership. Note that a positive number indicates that individual investors buy winners more than

losers (or sell losers more than winners), which is positive feedback trading. A negative number indicates negative feedback trading. This feedback trading measure is shown in the figure.

From Figure 2, note that that during the bull market, the feedback measure is generally positive. It is highest during the last year of the bull market. Therefore, individuals become stronger positive feedback traders as the bull market continues. When the bubble burst, investors appear to react quite quickly and switch to negative feedback trading. Of course, the crash period is short. Investors slowly transitioned back toward positive feedback trading during the generally stagnant market from 1993 to 1996. Beginning in 1996, the market started to decline gradually, and it appears

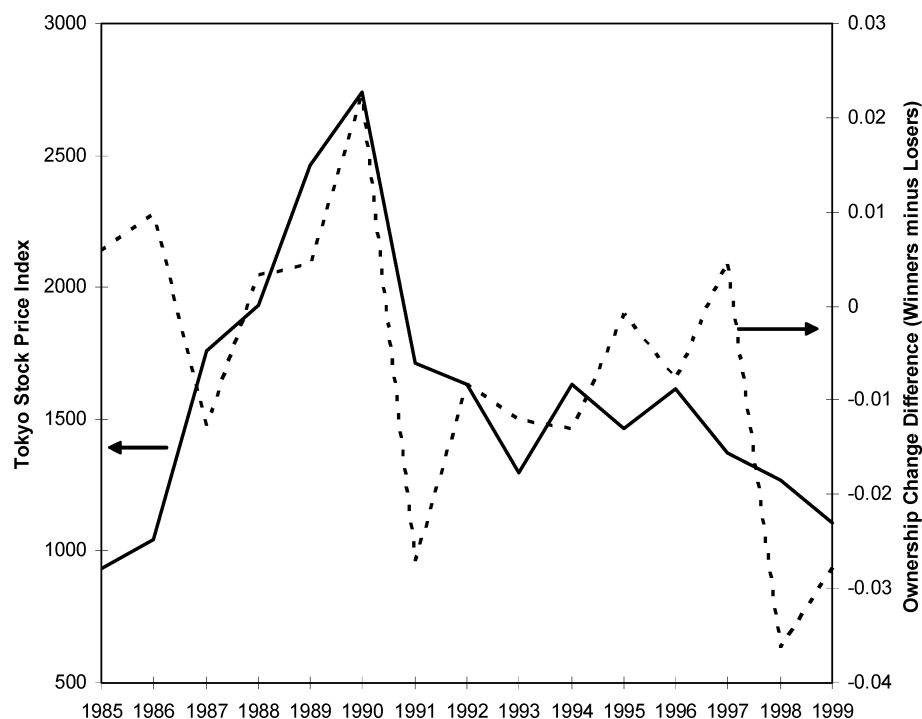
Table 6. *Investor-Ownership-Changes in Winner and Loser Stocks*

	Loser Stocks	Quintile 2	Quintile 3	Quintile 4	Winner Stocks	F-stat {p-value}	t-stat {p-value}
Panel A: Bull Market Period							
Past Annual Return	-0.164	0.043	0.211	0.437	1.150		
Abnormal Change in Ownership	0.0015 (1.33)	-0.0037 (-3.13)***	-0.0029 (-2.44)**	-0.0000 (-0.04)	0.0049 (4.20)***	4.15 {0.042}	0.55 {0.61}
Abnormal Return in Change of Ownership Year	0.004 (0.50)	0.029 (3.33)***	0.033 (3.77)***	-0.020 (-2.28)**	-0.130 (-15.24)***	123 {<.0001}	-1.99 {0.10}
Abnormal Return After Change of Ownership Year	0.008 (0.95)	0.034 (4.07)***	-0.000 (-0.04)	-0.028 (-3.36)***	-0.104 (-12.51)***	89.99 {<.0001}	-2.04 {0.098}
Panel B: Bear Market Period							
Past Annual Return	-0.363	-0.207	-0.097	0.029	0.357		
Abnormal Change in Ownership	0.0080 (13.07)***	0.0021 (3.57)***	-0.0008 (-1.26)	-0.0027 (-4.48)***	-0.0067 (-10.95)***	288 {<.0001}	-3.58 {0.006}
Abnormal Return in Change of Ownership Year	0.016 (2.88)***	-0.014 (-2.65)***	-0.027 (-5.04)***	-0.036 (-6.64)***	-0.043 (-7.90)***	58.13 {<.0001}	-3.61 {0.006}
Abnormal Return After Change of Ownership Year	-0.002 (-0.39)	-0.018 (-3.45)***	-0.016 (-3.15)***	-0.018 (-3.36)***	-0.047 (-8.66)***	34.25 {<.0001}	-5.02 {0.001}

Each year, for two different subperiods (1984–89 bull market and 1990–99 bear market), stocks are sorted into 5 portfolios based on the previous year return. Loser Stocks (Winner Stocks) are the quintile of stocks for which the previous year's performance was the worst (best) among the five return-quintile-portfolios. For each quintile, we report the mean past returns, the mean abnormal change in ownership, the mean abnormal return during the year of abnormal ownership change, and the subsequent year's mean abnormal return. Abnormal returns are capitalization-decile and book-to-market-decile adjusted returns. *t*-statistics are reported in parentheses. The *F*-statistic in the second to last column tests for differences between the Loser and Winner portfolios using a pooled approach. The *t*-statistic in the last column also tests for differences between Quintiles 1 and 5 using a portfolio approach and a paired *t*-test. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

FIGURE 2**Feedback Trading Over Time**

The dashed line shows the annual difference in the mean change of individual investor ownership for the previous year's winner stocks and the mean change in ownership for the prior losers. Winners (losers) are determined by the top (bottom) quintile of stock returns in the previous year. Positive numbers indicate that investors tend to use a positive feedback, or momentum strategy (buy prior winners and sell prior losers), while a negative number indicates a tendency toward negative feedback, or contrarian trading (i.e., selling winners and buying losers). The Tokyo Stock Price Index is also shown (solid line).



that individual investors reacted gradually and transitioned into their negative feedback strategy over the next couple of years. These results show some indications that investing patterns change as bull and bear markets continue. With each continuing bullish (bearish) year, investors tend to positive (negative) feedback trade more than they did in the prior year. However, we consider this investigation to be only exploratory and caution against over-interpreting the results. The annual nature of our data means that this analysis is very coarse. However, because the results are so interesting, we recommend this topic as a future area of research.

Brief Summary of Results

Overall, the results in this section show a greater tendency of individuals buying past winners during a bull market (but not sell past losers) as compared to the bear market. The evidence also shows that individuals make poor trading decisions, especially during a bull market. Both of these observations are consistent with the paper's general hypothesis that individuals' trading behavior and performance will be different between dissimilar market conditions. In addition, both of these findings are also consistent with the hypothesis that individuals suffer more from an overconfidence bias during bull markets. Overconfidence theories predict positive feedback trading and poor performance. Finally, there is some evidence that with each *continuing* bullish (bearish) year, investors tend to positive (negative) feedback trade more than they did in the prior year, but these findings are highly tenuous.

Conclusions

We study Japanese individual investors and contrast their behavior during a bull market (1984–1989) to a bear market (1990–1999). We provide empirical evidence to contribute to our understanding on how market conditions might affect investing behavior. Given the overconfidence theory's attention on individual investors' risk attitudes, book-to-market valuations, feedback trading, and investing performance, we confine our empirical investigation to these variables.

We use market-level data to conduct our study. Specifically, we observe correlations between the stock's individual ownership levels and the stock's risk and book-to-market ratios. We also identify changes in the stock's individual ownership levels to observe the individual investor's trading patterns and performance. Overall, we document several important and striking investing behavior differences between the bull and the bear market. Our main findings are as follows: Japanese individual investors (1) seem to prefer riskier stocks during a bear market and (??) prefer high book-to-market stocks during a bull market. The first find-

ing is not consistent with overconfidence theories, as they would have predicted that individuals prefer risky stocks during a bull market, while the second finding is consistent with overconfidence theories. In addition, we find that Japanese individual investors are (3) not "beating the market" (and in fact, they seem to actually perform relatively worse during a bull market), and (4) that their tendency to positive (negative) feedback trade seems more prevalent during a bull (bear) market. In general, the third and fourth findings are consistent with overconfidence theories, though we would have expected stronger results for the feedback trading tests, especially during the bull market. Overall, however, the most important insight of our paper is that individual investors do seem to behave differently in different market conditions. Thus, investing behaviors appear to be related to market conditions.

Acknowledgement

We thank an anonymous referee, Rob Bloomfield, Kee Chung, Rachel Croson, Akiyoshi Horiuchi, Maureen O'Hara, Sergei Sarkissian, Qinghai Wang, Martin Webber, Yishay Yafeh, seminar participants at George Washington University, Hong Kong Polytechnic University, SUNY-Buffalo, University of Tokyo, University of Wisconsin-Milwaukee, the Financial Management Association meeting, the Midwest Finance Association meeting, and the RFS Conference on Experimental and Behavioral Finance for comments and discussions on earlier drafts of this paper. The usual disclaimer applies.

Notes

1. Kim and Nofsinger [2005] study how institutional trading differs between bull and bear markets, but their study is not about behavioral or cognitive biases.
2. We also conduct analyses using only firms whose fiscal year begin in April (69% of our firms fit this criteria), but the results remain the same.
3. The model of Daniel et al. [2001] provides a possible explanation for our risk findings. Their model suggests that *less* confident investors will use systematic risk measures as a signal for expected return. When investors become overconfident, like during a bull market, they may focus less on relevant or statistically-oriented information such as systematic risk measures. This might explain why Japanese individuals hold risky stocks primarily during a bear market instead of a bull market. However, we admit that we are merely applying a behavioral explanation to a result *ex post*, which is easy to do.
4. To report portfolio *t*-statistics we estimate the following equation *by year*: $\text{Level} = \alpha + \delta \times \text{Volatility}$. We use these annual estimates of α and δ during the 6 bull market years to compute *t*-statistics to test whether the coefficients are different from zero and report them in [brackets] in the top half of the table. As the bottom half of the table tests the difference between bull and bear market behavior, we conduct a difference in means test of the annual α and δ estimates between the 6 bull market

observations and the 10 bear market estimates. The resulting *t*-statistics are reported in [brackets] in the bottom half of the table.

References

- Amerkis, J., and S.P. Zeldes, "How Do Household Portfolio Shares Vary with Age?" Columbia University working paper, (2004).
- Bange, M. "Do the Portfolios of Small Investors Reflect Positive Feedback Trading?" *Journal of Financial and Quantitative Analysis*, 35, (2000), pp. 239–255.
- Barber, B.M., and T. Odean, "Trading is Hazardous to Your Wealth: The Common Stock Investment Performance of Individual Investors." *Journal of Finance*, 55, (2000), pp. 773–806.
- Barberis, N., and M. Huang, "Mental Accounting, Loss Aversion, and Individual Stock Returns." *Journal of Finance*, 56, (2001), pp. 1247–1295.
- Bloomfield, R., and R. Michaely, "Risk or Mispricing? From the Mouths of Professionals." *Financial Management*, 33, (2004), pp. 61–81.
- Daniel, K., D. Hirshleifer, and A. Subrahmanyam, "Investor Psychology and Security Market Under- and Overreactions." *Journal of Finance*, 53, (1998), pp. 1839–1885.
- Daniel, K., D. Hirshleifer, and A. Subrahmanyam, "Overconfidence, Arbitrage, and Equilibrium Asset Pricing." *Journal of Finance*, 56, (2001), pp. 921–965.
- DeLong, J.B., A. Shleifer, L.H. Summers, and R. J. Waldmann, "Noise Trader Risk in Financial Markets." *Journal of Political Economy*, 98, (1990), pp. 703–738.
- Fama, E.F. and K.R. French, "Common Risk Factors in the Returns on Stocks and Bonds." *Journal of Financial Economics*, 33, (1993), pp. 3–56.
- Gervais, S. and T. Odean, "Learning to be Overconfident." *Review of Financial Studies*, 14, (2001), pp. 1–27.
- Grinblatt, M., and M. Keloharju, "The Investment Behavior and Performance of Various Investor Types: A Study of Finland's Unique Data Set." *Journal of Financial Economics*, 55, (2000), pp. 43–67.
- Grinblatt, M., and M. Keloharju, "What Makes Investors Trade?" *Journal of Finance*, 56, (2001), pp. 589–616.
- Guisso, L., M. Haliassos, and T. Jappelli, *Household Portfolios*, (2002), MIT Press.
- Hirshleifer, D. "Investor Psychology and Asset Pricing." *Journal of Finance* 56, (2001), pp. 1533–1597.
- Hirshleifer, D., A. Subrahmanyam, and S. Titman, "Security Analysis and Trading Patterns When Some Investors Receive Information Before Others." *Journal of Finance*, 49, (1994), pp. 1665–1698.
- Iwaisako, T. "Household Portfolios in Japan." NBER working paper, (2003).
- Kang, J.-K. and R.M. Stulz, "Why is there a Home Bias? An Analysis of Foreign Portfolio Equity Ownership in Japan." *Journal of Financial Economics*, 46, (1997), pp. 3–28.
- Kang, J.-K. and R.M. Stulz, "Do Banking Shocks Affect Borrowing Firm Performance? An Analysis of the Japanese Experience." *Journal of Business*, 73, (2000), pp. 1–23.
- Kim, K.A., and J.R. Nofsinger, "Institutional Herding, Business Groups, and Economic Regimes: Evidence from Japan." *Journal of Business*, 78, (2005), pp. 213–242.
- Kyle, A.S., and F.A. Wang, "Speculation Duopoly with Agreement to Disagree: Can Overconfidence Survive the Market Test?" *Journal of Finance*, 52, (1997), pp. 2073–2090.
- New York Stock Exchange. *New York Stock Exchange Fact Book*. New York Stock Exchange: New York, (2001).
- Nofsinger, J., and R. Sias, "Herding and Feedback Trading by Institutional and Individual Investors." *Journal of Finance*, 54, (1999), pp. 2263–2295.
- Nofsinger, J. "Social Mood and Financial Economics." *Journal of Behavioral Finance*, 6, (2005), pp. 144–160.
- Noland, M. "Japanese Household Portfolio Allocation Behavior." *Review of Economics and Statistics*, 70, (1988), pp. 135–139.
- Odean, T. "Volume, Volatility, Price, and Profit when all Traders are above Average." *Journal of Finance*, 53, (1998), pp. 1887–1934.
- Odean, T. "Do Investors Trade too Much?" *American Economic Review*, 89, (1999), pp. 1279–1298.
- Richards, A.J. "Big Fish in Small Ponds: The Trading Behavior and Price Impacts of Foreign Investors in Asian Emerging Markets." *Journal of Financial and Quantitative Analysis*, 40, (2005), pp. 1–27.
- Tokyo Stock Exchange. *Tokyo Stock Exchange Fact Book*. Tokyo Stock Exchange: Tokyo, Japan, (1997).

Copyright of Journal of Behavioral Finance is the property of Lawrence Erlbaum Associates and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.