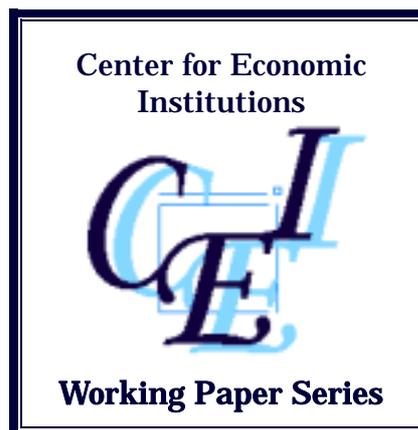


Center for Economic Institutions
Working Paper Series

CEI Working Paper Series, No. 2001-16

***Institutional Herding, Business Groups, and
Economic Regimes: Evidence from Japan***

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This paper was presented at the conference on *Designing Financial Systems in East Asia and Japan: Toward a Twenty-First Century Paradigm*. This two-day conference was co-organized by the International Monetary Fund and the CEI. It was held during September 24-25, 2001 at Hitotsubashi Memorial Hall in Tokyo, Japan. A select group of academics, researchers and policy makers from around the world gathered to examine the timely issue of how the financial systems and corporate governance in East Asia and Japan should be redesigned in order to achieve sustainable economic development. The conference included six sessions with 17 papers. All the presented papers were added to the CEI series of working papers. The series, as well as the contents of the conference, can be reached at <http://cei.ier.hit-u.ac.jp>.

Institutional Herding, Business Groups, and Economic Regimes: Evidence from Japan

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August 2001

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We thank Stu Gillan, Jay Hartzell, Woo-Chan Kim, Lilian Ng, Sarah Peck, Jonathan Sokobin, Masahiro Yoshikawa, and seminar participants at the SEC's Office of Economic Analysis, the 2000 Australian Banking and Finance conference, the 2001 Washington Area Finance Association meeting, and the 2001 PACAP/FMA conference in Seoul, Korea for comments on an earlier (and substantially different) version of this paper.

Institutional Herding, Business Groups, and Economic Regimes: Evidence from Japan

Abstract

To gain new and important insights into institutional herding, we study Japan for the following reasons: we can examine a market that is known for its active institutional investors, we can investigate the impacts of business grouping (i.e., the keiretsu), and we can see if herding and feedback trading behaviors differ under three distinct economic regimes (i.e., a regulated period, a bubble economy, and a bear market). We argue that the culture in Japan causes institutions to have both a long-term focus and close relationships with management. Consistent with the first view, we find that herding in Japan occurs on a lower level than it does in the U.S., and that the subsequent short-run returns to herding seem to be unimportant. Consistent with the second view, we find that when herding does occur, it has a large impact on price movements, and the use of past information (feedback trading) on herding behavior seems only marginally important. Much of these findings are more pronounced for keiretsu firms. Lastly, the effects and behavior of institutional herding is dependent on the economic environment.

Institutional Herding, Business Groups, and Economic Regimes: Evidence from Japan

Herding occurs when a group of investors trade on the same, or correlated, information signals. The recent literature empirically confirms that institutions herd, primarily as positive feedback (or momentum) traders, and that their herding moves prices. To date, these studies have investigated U.S. data (see Grinblatt, Titman, and Wermers (1995), Nofsinger and Sias (1999), and Wermers (1999)). While these studies have provided important insights on U.S. markets and U.S. institutional shareholders, the applicability of these findings to other markets is questionable. For example, institutional investors in some countries build a long-term relationship with the firms in which they own stock (e.g., see LaPorta, Lopez-DeSilanes, and Shleifer (1999)), which is unlike the U.S. Additionally, institutional shareholdings are often an integral component of a business group, which is often made up of numerous businesses and financial institutions. These kinds of organizational structures are prevalent in many countries around the world, especially in emerging countries (LaPorta, et. al. (1999)), but not in the U.S. Does herding exist in these environments? If so, then is it based on feedback trading and does it move prices in a permanent manner? To address these and other important questions, and to improve our overall understanding of institutional herding and feedback trading, we study Japan.

There are many important reasons for studying institutional herding and feedback trading in Japan. First, Japan represents a market that is known for its influential, active, and “aligned” institutional investors. Therefore, Japan is unlike the U.S., where many U.S. institutions seem to have a short-term focus often characterized by a “vote with their feet” mentality (i.e., sell poorly performing stock) or adversarial relationships with the firms in which they own. As such, Japanese institutions may have different herding characteristics than U.S. institutions.

Second, in Japan there exists an organizational form known as keiretsu, which are business groups of diverse firms that have close relationships with one another. These relationships are bonded through cross-shareholdings. Furthermore, financial institutions belonging to these groups are not only large stockholders of member firms, but are also important creditors to member firms. These close long-term relationships, therefore, allow for these institutions to have better private information about the firm than “outside” investors. Therefore, by contrasting keiretsu firms to non-keiretsu firms, we are able to provide insights on business group behavior.

Third, by studying Japan, we also have the opportunity to observe institutional herding and feedback trading under three distinct economic regimes. Prior to the early 1980s, the Japanese financial markets were heavily regulated. After mass deregulation that took place during the early 1980s, the Japanese market enjoyed tremendous growth (this era is commonly referred to as Japan’s “bubble” period), but at the beginning of the 1990s, the bubble burst and the economy has been bearish ever since. We will examine whether different economic environments lead to different institutional trading behaviors and outcomes, which represents an investigation that has yet to be done using U.S. data.

We find lower institutional herding for Japanese institutions relative to U.S. institutions. For example, the decile of firms that experience the largest decrease in institutional ownership change an average -5.8% in institutional ownership. This compares with a change in institutional ownership of -15.95% for U.S. firms (Nofsinger and Sias (1999)). For the decile of firms with the largest increase in institutional ownership, Japanese firms experience a 7.63% increase compared to the change of 18.30% for U.S. firms. The much lower herding level in

Japan is also associated with a lower price impact during the herding, as we would expect. But at the same time, we still find the price impact to be quite large in relation to the level of herding.

We also examine the abnormal returns in the year after the herding. The firms that institutions sell experience an average -2.56% abnormal return in the year after the herding. The firms that institutions buy experience a -4.73% abnormal return. Taken together, this finding is in stark contrast to U.S. results. Nofsinger and Sias (1999) find positive (negative) post-herd year returns for the herd bought (sold) stocks, suggesting that U.S. institutions know when to herd. There are two possible explanations for our Japanese results. First, it could be that Japanese institutional investors do not have private information (or that they don't know how to use it) or that they don't care about short-run profits. We believe the latter explanation is more likely, as we will argue later in the paper.

When we examine the prior performance of firms that Japanese institutions buy and sell, we find that Japanese institutional investors are positive feedback traders in their buying behavior (i.e., they buy past winners), but that they are negative feedback traders in their selling behavior (i.e., they sell past winners). From the U.S. literature, we note that, on average, U.S. institutional investors are positive feedback traders in both their buying and selling behaviors (Grinblatt, Titman, and Wermers (1995), Nofsinger and Sias (1999), and Wermers (1999)). Thus, our results reveal additional differences in herding behaviors between U.S. and Japanese institutional investors.

When we conduct further investigations by contrasting keiretsu firms and independent firms, we gain additional insight. For example, we find that the relationship between herding and price movements to be even stronger for keiretsu firms. These results may be viewed as

unsurprising because of the tighter inter-relationships that exist for keiretsu networks. That is, their herding behaviors are probably stronger signals of future firm performance.

Finally, when we examine subperiods to see if different economic regimes lead to different kinds of herding and feedback trading, we see that institutional herding occurs more in their purchases (sales) during a bull (bear) market. We also observe several other interesting trading behavior differences among the different subperiods. For example, the impact of herding is greater during a bull market and it appears that different feedback trading strategies are used during different economic periods. Overall, all of our findings provide important new insights into herding and feedback trading.

The next section outlines some of the key differences between Japanese institutional investors and U.S. institutional investors that are relevant to our study. In section II, we present our general findings on herding and feedback trading in Japan. In section III, we investigate the relationship between herding and business groups. Section IV examines subperiods characterized by different economic regimes. Finally, the last section offers a summary and a conclusion.

I. Japanese Institutions versus U.S. Institutions

Institutional investors in the United States frequently do not participate in corporate governance. That is, when firms are not acting in the best interests of shareholders, many institutions do the "Wall Street Walk" and simply sell their shares (Lowenstein (1988)). For example, Parrino, Sias, and Starks (2000) find that institutions generally abandon a firm before a forced CEO turnover. U.S. institutions also appear to consider other factors in investment choice, such as "prudence characteristics" that help in the avoidance of being named in a legal action

(see Del Guercio (1996)). Similarly, Roe (1990) argues that the U.S. political and legal environment restricts U.S. institutional investors from exerting effective control.

Those U.S. institutions that do wish to participate in governance activities often do so in a manner that causes an adversarial relationship with the management of the firms they own. That is, some institutions (such as some public pension funds) actively and publicly try to change the governance of firms (see Del Guercio and Hawkins (1999)). Activism is frequently done by voting against management on proxy issues such as antitakeover amendments (Brickley, Lease, and Smith (1988)), tender offer bids (Byrd and Hickman (1992)), and other proposals (Gillan and Starks (2000)). Whether institutions are passive investors who are quick to vote with their feet, or active adversarial investors, it is likely that U.S. institutions are not, as a group, going to develop long standing positive relationships with management.

Prowse (1990, 1992) relates how the corporate governance structure is different in Japan compared to the U.S. Institutions in Japan are given more latitude to own shares and exert control over firms. Roe (1990) makes a similar observation in his comparison between the Japanese and U.S. environment. Additionally, there exists an industrial organization in Japan characterized by many firms grouped into an affiliation (called a keiretsu) through the cross-ownership of stock, business ties and bank lending. Indeed, Hoshi, Kashyap, and Scharfstein (1990), Kester (1986), and Prowse (1990), among others, show that large Japanese institutional shareholders are also creditors of the firm. This close relationship is the source of a “teamwork” approach between the members of a keiretsu. For example, corporate cross-shareholders actively monitor each other, member banks often work closely with member firms, and these banks provide financial assistance to troubled firms (Berglöf and Perotti (1994); Hoshi, Kashyap, and Scharfstein (1990); Kester (1986); Morck and Nakamura (1999); Sheard (1989)). Additionally,

Hoshi, Kashyap, and Scharfstein (1991) and Kang, Shivdasani, and Yamada (1999) find that a Japanese firm's investment decisions are better when a close bank relationship is present. However, even when firms do not belong to a keiretsu, they will still have a close relationship with financial institutions who serve as influential and active shareholders (Prowse (1992)) and as important creditors (Hoshi, Kashyap, and Scharfstein (1990)). As a consequence, many institutional investors have private information about many Japanese firms. That is, on average, Japanese institutional investors suffer less from the asymmetric information problem than U.S. institutions (Hoshi, Kashyap, Scharfstein (1990, 1991), Prowse (1990), and Berglöf and Perotti (1994)).

Overall, because Japanese institutions have close relationships with firms in which they own shares, Japanese institutional shareholders may be characterized as “aligned” and well-informed shareholders rather than as adversarial or passive shareholders who merely vote with their feet. Furthermore, the fact that an active takeover market is virtually non-existent in Japan also suggests that institutional shareholders are non-hostile (Kester (1991)). Finally, many of the top managers of these firms are actually former employees of their institutional shareholders (Hoshi, Kashyap, and Scharfstein (1990); Kester (1986)), which is another reason why relationships between firms and their institutional shareholders are cordial and positive. In fact, Kang and Stulz (1996) specifically argue that Japanese managers are different from American managers because Japanese managers primarily care about their long-term shareholders.

II. Herding and Feedback Trading

Several herding models posit that herding and positive feedback trading is the result of a group of investors trading on the same (or correlated) information signals (see Froot, Scharfstein, and Stein (1992), Bikhchandani, Hirshleifer, and Welch (1992), and Hirshleifer, Subrahmanyam,

and Titman (1994)). To examine herding, we study the relationship between changes in institutional ownership and abnormal returns. We define institutional ownership as the fraction of outstanding shares owned by Japanese institutional investors. First, the level of herding is indicated by the amount of average ownership change. Second, the sign and magnitude of the concurrent abnormal return determine the impact of the herding.

Next, by examining the abnormal returns prior to the herding period, we can examine the extent to which investors positive (or negative) feedback trade (see Grinblatt, Titman, and Wermers (1995)). That is, if institutions are buying firms in the herding period that had positive (negative) abnormal returns in the previous year, they are positive (negative) feedback trading. Positive feedback traders can be viewed as momentum traders and negative feedback traders can be considered contrarian traders.

Lastly, we examine the post herding year abnormal returns. We examine abnormal returns one year after the herding period to identify whether prices experience subsequent momentum or reversals. Nofsinger and Sias (1999) argue that price momentum after herding is consistent with herding moving prices toward equilibrium and is thus stabilizing.¹

A. Data and Methods

Our monthly stock returns, annual institutional ownership, and firm capitalization data for Japanese firms come from the Pacific-Basin Capital Markets (PACAP) Research Center which obtains stock price data from the Daiwa Institute of Research Ltd. and ownership data from Toyo Kezai Inc. For each firm, annual ownership data is reported at the end of each fiscal

¹ This contention is also consistent with Froot, Scharfstein, and Stein (1992), Bikhchandi, Hirshleifer, and Welch (1992) and Hirshleifer, Subrahmanyam, and Titman (1994). However, DeLong, Shleifer, Summers, and Waldmann (1990) suggest an alternative interpretation. In their model, “rational” speculators take advantage of irrational positive feedback traders, which implies that price momentum following positive feedback trading could be destabilizing.

year (usually March 31) for the years 1975-1997.² The sample of firms with ownership data, monthly returns, and market-capitalization varies from 1,232 (in 1975) to 1,669 (in 1997). The total sample comprises 33,987 firm-years of data. The abnormal returns reported in this study are capitalization-adjusted returns. To compute abnormal returns, we sort each firm (each year) into ten portfolios by their beginning of year market-capitalization. The abnormal return for each month during the year is the firm's return less the return on the capitalization portfolio for which the firm belongs. This procedure controls for the size bias in returns.

We define institutions as (Japanese) domestic financial institutions, securities companies, and business companies.³ In 1975, these institutional investors owned approximately 58% of the outstanding shares while individual investors owned 40%.⁴ By 1997, institutional ownership had increased to 63% while individual investor ownership declined to 30%. This change in the ownership structure of Japanese companies is similar to the change experienced in the United States.

To test for herding and feedback trading we follow the methods of Nofsinger and Sias (1999). Their procedure is designed to create 10 portfolios, each year, that have similar institutional ownership at the beginning of each year and large differences in the change in institutional ownership over the year. We summarize their procedure as follows. All firms are sorted into 10 portfolios based on the fraction of institutional 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 institutional ownership over the fiscal year.

² In Japan, all institutional investors must report their holdings to the Ministry of Finance (MOF). Furthermore, if an institutional shareholder holds 5% or more of a firm's outstanding shares, then they must file a 'large shareholdings report' with the MOF, the stock exchange, and the firm. Subsequent changes in ownership by 1% or more also requires filings.

³ We also examined each institutional owner-type separately and found that financial institutions and corporations primarily drive the results. In order to compare our results to Nofsinger and Sias (1999), who use all institutional investors, we include all three types in our analysis.

This leaves ten institutional change portfolios within each of the ten institutional level portfolios. Now we begin to re-aggregate the firms. First, we combine each of the ten lowest-decile of institutional change portfolios from the institutional level portfolios. Then we combine each of the second lowest decile change portfolios. We continue until we are left with ten portfolios each year, which have similar institutional ownership at the beginning of the year but experience different changes in institutional ownership over the year. Lastly, we combine the portfolios over the different years. The results of this sorting process are shown in Table I.

[Insert Table I Here]

On average, the change in institutional ownership for the largest decrease decile is -5.8% per year. The change in institutional ownership monotonically increases across the ten portfolios to a 7.63% increase in the largest increase portfolio. An *F*-statistic reports the test that the change in institutional ownership across the ten portfolios is equal. The test rejects equality across the portfolios at the one percent level.⁵

Nofsinger and Sias (1999) find that U.S. institutions have a much larger change in ownership throughout the year. Using this procedure and a similar time period (1977-1995), they find the largest decrease (increase) institutional ownership portfolio experiences a change of -15.95% (18.30%) for New York Stock Exchanges listed firms. At the extremes, Japanese institutional ownership changed in a magnitude representing approximately one-third of that experienced by U.S. institutional ownership changes. Therefore, while institutional herding appears to exist in Japan, we see that it occurs at a lower level than in the U.S.⁶

⁴ Foreign investors and the government owned about 1% each.

⁵ Also, recall that the sorting procedure is designed so that all ten portfolios should have similar institutional ownership at the beginning of the year. To confirm that we did this successfully, we observe that every portfolio experiences an average of 65% in institutional ownership. An *F*-statistic of 0.11 indicates that the level of institutional ownership is not different between portfolios.

⁶ Brennan and Cao (1997) suggest that less informed traders herd more (i.e., they are more active) than informed traders because less informed traders understand their informational disadvantage and thus update their priors more

B. Herding

To investigate the impact of herding by institutional investors, we examine the relationship between the change in institutional ownership and abnormal returns over the herding year. The abnormal return for each institutional ownership change portfolio is also reported in table I. The portfolio with the largest increase in institutional ownership experiences an abnormal return of 17.17% over the herding year, statistically significant at the one percent level. This result is consistent with the hypothesis that institutional buy-herding impacts stock prices. The abnormal returns steadily decrease and turn significantly negative and become more negative when we go from the highest institutional ownership portfolio (decile 10) to decile 2, but we see that decile 1 returns are less negative than decile 2 stocks. Nonetheless, for the most part the pattern of our results is similar to the monotonic relationship between herding and price movement found by Nofsinger and Sias (1999) for U.S. institutions.

Perhaps the most striking finding, however, is that the impact of herding appears to be quite dramatic in Japan, despite the fact that herding occurs at a level of only one-third in Japan as compared to the U.S. The range of returns between Japanese herd-bought stocks and herd-sold stocks is 21.76 percent (17.17% for decile 10 versus -4.59 for decile 1). For the U.S., the range of these returns is 31.5%. Thus, a herding level one-third of that in the US, results in a price impact that is two-thirds of that in the U.S. Our finding here reveals the strength of the signal that institutional purchasing and selling has on stock prices, as it is well known that Japanese institutions have private information for the firms in which they own.

frequently than informed traders. Thus, our observation of less herding by Japanese institutional investors, as compared to U.S. institutional investors, can be considered consistent with our contention that Japanese institutions are better informed than U.S. institutions. Our subsequent analysis examining post-herding performance also confirms our contention that Japanese institutions are well-informed investors.

We next examine the abnormal returns in the year before the herding to investigate feedback-trading strategies. Traders who increase ownership after high returns and decrease ownership after low returns are considered to be positive feedback (or momentum) traders (see Jegadeesh and Titman (1993) and Grinblatt, Titman and Wermers (1995)). Alternatively, traders who increase ownership after low returns are considered to be negative feedback (or contrarian) traders (see Lakonishok, Shleifer and Vishny (1994) and Nofsinger and Sias (1999)).

The pre-herding year abnormal return for each institutional ownership change portfolio is reported in table I. The abnormal returns for the two largest institutional ownership change portfolios (deciles 9 and 10) are a significant 2.7% and 5.19%, respectively. This indicates that Japanese institutional investors exhibit positive feedback trading tendencies in their *buying* behavior. This finding is generally consistent to the U.S. market where institutions have been found to positive feedback traders (Nofsinger and Sias (1999)). However, we also see a positive 3.94% abnormal return for the largest decrease in institutional ownership change portfolio (decile 1). This suggests that institutions are negative feedback traders in *selling* behavior.

This latter result is consistent with a recent finding by Karolyi (1999). He studies Japan to examine the relationship between foreign investor trading activity and past returns to identify trading behaviors surrounding the 1997 Asian crisis. However, he notes that past returns and net trading by banks and companies are negatively related, which suggests institutional negative feedback trading behavior. Thus, our finding complements Karolyi's (1999) observation as we are able to confirm his "surprising" findings using individual stock data (Karolyi relies on a market index) and, more importantly, we are able to identify the type of feedback trading that is taking place, which is on the sell-side.

Overall, our findings indicate a different behavior between selling and buying for Japanese institutions. However, Odean (1998) and Nofsinger (2001) find that investor buying and selling behavior is frequently different. While our findings here indicate that Japanese institutions appear to use some public information (i.e., past performance) in their buying and selling decisions, we believe it is just as important to note that the outcome is different for previous winners that institutions buy (positive feedback trade) compared to the previous winners that institutions sell (negative feedback trade). The winners that institutions buy earn large abnormal returns during the herding year, while winners that are sold earn a negative abnormal return. This behavior is consistent with institutions having private information.

C. Post-Herding Returns

We examine the post-herding year abnormal returns for each institutional ownership change portfolio in the last row of Table I. The portfolios with the largest increases in institutional ownership (deciles 7, 8, 9, and 10) experience negative abnormal returns in the post-herding year. These negative abnormal returns are all significant at the one percent level. These findings are different from the U.S. where positive post-herd year abnormal returns have been documented (Nofsinger and Sias (1999)). There are three (albeit non-mutually exclusive) explanations for our results. First, it could be that Japanese institutions do not have private information, which leads to incorrect purchasing decisions. Second, Japanese institutions may not care about short-term profits. Finally, we could be observing some sort of return reversal behavior, especially because the herd-year returns for these stocks are relatively large. Note that the second and third explanations are related in the sense that if the second explanation is true, then return reversals in the markets, in and of themselves, can explain our results. We believe it is highly unlikely that Japanese institutional investors do *not* have private information (based on

our earlier discussions and findings). Therefore, we believe that Japanese institutions simply do not care about short-term profits, which is also a view that is consistent with conventional wisdom and the existing literature discussed earlier. It is important to note that these losses do not offset the gains that are achieved during the herd-year, attesting to the permanence of the gains. Additionally, note that the stocks institutions sold (decile 1) *continue* to experience negative returns. Thus, we see that institutions do know when to sell, as these stocks continue to perform poorly from the herd-sold year.

The other alternative explanation for the negative returns for the herd-bought stocks is that these firms are experiencing stock return reversals that are independent of the institutional behavior. Jegadeesh and Titman (1993) and Chan, Jegadeesh, and Lakonishok (1996) identify that stock momentum occurs in the U.S. stock market. In Japan, however, there does not seem to be a momentum effect (Chui, Titman, and Wei (2000)). Thus, we next investigate whether a reversal behavior is affecting our results.

To separate the price affects of institutional herding and that of return reversals, we use the double sorting method of Nofsinger and Sias (1999). Specifically, we first sort stocks (each year) by their herding year return into quintiles. The second sort groups stocks into quintiles (each year) by their change in institutional ownership in the herding year and is independent of the first sort. Therefore, each stock is a member of one of the twenty-five resulting portfolios.⁷ We then time-series average the post-herding year raw return for each of the portfolios and present the results in the five-by-five matrix in Table II. The five portfolios in any column have similar returns during the herding year but have very different changes in institutional ownership.

⁷ Unlike the previous sorting procedure, the double-sorting procedure used here does not automatically lead to uniform sample sizes across portfolios. Nonetheless, we find that sample sizes are fairly uniform across all of the 25 portfolios, with the smallest and largest sample sizes being 826 and 1,439 for the Loser-Increase and Winner-Increase portfolios, respectively. Thus, we conclude that a clustering effect does not plague our statistical analysis.

Similarly, the five portfolios in any row experienced similar changes in ownership during the herding year but very different stock returns.

[Insert Table II Here]

We first examine return reversals while controlling for the change in institutional ownership. The first row reports the quintile of firms that experienced large decreases in institutional ownership. The decrease-in-ownership firms that also were losers during the herding year have a subsequent raw return of 8.69%. This is larger than the 3.66% returns for firms that also had large decreases in ownership, but were herding year winners. This pattern is consistent in the other change-of-ownership rows as well. The F -statistic reported in the last column tests for equality among the different herding year return sorted portfolios. The statistic indicates that the herding year return sorted portfolio have different post-herding year returns. Note that these results indicate that stocks experience reversals. Past losers do better than past winners independent of an institutional herding effect. This result is different than for the U.S. market.

Next, we examine post-herd year stock returns while controlling for past performance. The mean return for stocks that were losers during the herding year is reported in the first column. Losers that experienced a large decrease in institutional ownership during the herding year returned an average 8.69% return the following year. This is comparable to the 9% for losers that experienced a large increase in institutional ownership. The similarity of these returns shows that the kind of institutional herding (selling versus buying) that is occurring does not cause a different impact on post performance, once we control for past performance. This finding is consistent for the other column of results (although the second column of results represents an striking exception). Thus, we believe that these findings support our general claim

that the post-herd year negative abnormal returns for the buy-herd portfolios are simply an artifact of return reversal behavior that exists in the Japanese markets, and not due to the herd-buying behavior per se. Note that if Japanese institutions do not care about short-term profits, as we suggest, then return reversals in the markets, in and of themselves, can explain the negative abnormal returns during the post-herd year for the buy-herd portfolios. While we do note statistically significant F -statistics reported at the bottom row, which rejects equality at conventional levels, we see that this is driven by differences between the following two sets of portfolios: the middle quintiles (2, 3, and 4) which generally have higher returns and the extreme quintiles (1 and 5) which generally have lower returns.

III. Herding and Business Groups

A unique institutional feature of the Japanese corporate finance environment is the existence of the prevalent business group known as a keiretsu. In a financial keiretsu, a diverse group of firms are interlinked through an extensive network of product-market and financial relationships, which is solidified through corporate cross-shareholdings. Further, these interlinked firms are centered around banks and other financial institutions that act as significant creditors and equity holders of its member firms (Nakatani (1984) and Prowse (1990)). Earlier research has found these keiretsu networks to be useful: financial institutions monitor member firms (Prowse (1992) and Sheard (1989)), banks will assist firms when they are financially distressed (Hoshi, Kashyap, and Scharstein (1990)), corporate cross-shareholders also actively monitor one another (Berglöf and Perotti (1994)), asymmetry and agency costs are reduced (Prowse (1990)), and debt capacity is increased (Kester (1986)). Additionally, with regard to firm performance, perhaps the best way to characterize keiretsu firms is that they pursue stable

profits and steady long-term growth for the benefit of their long-term shareholders (i.e., their group members) (Nakatani (1984) and Kang and Stulz (1996)).

Because the existence of the keiretsu organizational structure represents the most unique feature of the Japanese corporate finance environment (Hoshi, Kashyap, and Scharfstein (1991)), we investigate a possible keiretsu effect in our study. So far, we have argued that institutional shareholders are different in Japan than in the U.S. For example, both keiretsu and independent firms have strong relationships with banks (Hoshi, Kashyap, and Scharfstein (1990)). However, governance mechanisms, asymmetry and agency costs, capital structure, and liquidity have been found to be quite different between keiretsu and independent firms. As a result of these differences, it is argued that keiretsu firms and their shareholders enjoy reduced information asymmetry, incentive, and conflict of interest problems. Dewenter, Novaes, and Pettway (1999) argue that the complexity of the keiretsu structure fosters an environment where insiders have the opportunity to take advantage of “outside” stockholders by using their informational advantage. Therefore, because shareholders of keiretsu firms have superior access to private information as compared to shareholders of non-keiretsu firms, we expect that herding in keiretsu firms is a stronger signal as compared to herding in independent firms. To investigate the existence of a possible keiretsu effect, we split our sample into keiretsu firms and non-keiretsu (i.e., independent) firms.⁸ Herding year results are presented in Table III, Panel A.

[Insert Table III Here]

From Table III, Panel A, for both keiretsu and independent firms, we see that they experience the same strong pattern between buying/selling and abnormal returns. Firms that are

⁸ The keiretsu classification scheme that we adopt is Dodwell’s (1985, 1989). Their definition considers the group’s influential power, which is measured by the ratio of the group members’ shareholding to the total shares held by the top ten shareholders. In addition, the keiretsu classification is also based on the following factors: (1) the characteristics and historical background of the group and the company, (2) the different of sources and amounts of

bought have large positive returns and firms that are sold have negative abnormal returns. However, we see that the keiretsu firms with the largest increase in institutional ownership (deciles 8, 9, and 10) experience much larger positive abnormal returns than the non-keiretsu firms, and that these difference between keiretsu returns and non-keiretsu returns are statistically significant. Further, when we look to the firms with the greatest decrease in institutional ownership (decile 1), we see that keiretsu firms that are sold experience larger negative abnormal returns than the non-keiretsu firms that are sold. The formal industrial organization of the keiretsu allows for even greater access to private information than for independent Japanese firms. Thus, it appears that the selling and buying of keiretsu firms, as compared to the selling and buying of non-keiretsu firms, sends a much stronger signal of their long-run prospects, which is reflected by the much more dramatic price changes for keiretsu firms that are sold and bought.

Table III, Panel B shows post-herding year results. Overall, we see very little differences between keiretsu firms and non-keiretsu firms. Thus, the short-run results to institutional owners of keiretsu firms and non-keiretsu do not differ. This probably reflects that owners of both types of firms are equally indifferent to the short-run outcome of their purchasing and selling decisions.

We present pre-herding year results in Table III, Panel C. By examining the pre-herding-year firm performance, it may be possible to identify the motivation behind the herd-year buying and/or selling of institutional investors. The most interesting result from this panel is that the prior returns of non-keiretsu firms that are herd-bought (deciles 9 and 10) are larger than the prior returns of keiretsu firms that are herd-bought (for example, the difference in decile 10 is 5.99% versus 3.01%). These differences are statistically significant. This result is consistent

bank loans, (3) whether or not board members come from other group companies, (4) the company's attitude toward the group, and (5) the company's connections to nongroup companies and to other groups.

with the view that owners and potential owners of keiretsu firms do not rely as heavily on past performance in their buying decisions as they are able to rely more on their private information. The subsequent herd-year returns supports this conjecture.

Overall, from our keiretsu investigation, when we examine herd-year abnormal returns, we detect a significant difference between keiretsu and independent firms that indicates that keiretsu firm owners are better informed than non-keiretsu firm owners. When we examine post-herd-year returns, we see little differences between these two types of firms. Finally, when we observe pre-herd-year returns to detect possible motivations for purchasing decisions, we see that past performance of keiretsu firms seem less important than the past performance of independent firms.

IV. Herding and Economic Regimes

Aside from studying the keiretsu organizational structure, Japan offers the opportunity to study different economic environments. In its recent past, Japan has experienced at least three distinct economic regimes. During the 1980s, there was mass financial market liberalization in the form of interest rate deregulation, and the removal of bond and foreign market restrictions (for more details, see Hoshi, Kashyap, and Scharfstein (1993); Hoshi (1996); Kang and Stulz (1996); Kim and Limpaphayom (1997); Weinstein and Yafeh (1998)). Prior to deregulation, all firms primarily relied on bank debt. Thus, with the creation of an active secondary government bond market, the removal of corporate bond issuance restrictions, and the ability to finally access foreign markets, firms enjoyed greater financing flexibility (Hoshi (1996); Kang and Stulz (1996); Weinstein and Yafeh (1998)). Consequently, from the early 1980s to the end of the 1980s, the Japanese market experienced tremendous growth. From the beginning of 1984 to the end of 1989, the Tokyo Stock Price Index (TOPIX) grew 294%, with double digit growth every

year and an average annual return of 26.3% (TSE Fact Book (1997)). This time period is widely known as Japan's bubble economy (French and Poterba (1991); Kang and Stulz (1996, 2000)). In 1990, however, the Japanese economy experienced an enormous crash (the TOPIX plummeted by 40%) and the market became subsequently flat with an average annual return of approximately -1% from 1990 to 1997.

To examine herding and feedback trading during these distinct economic regimes, we split our sample into three subperiod categories: 1975-83, 1984-89, and 1990-97. The choice for using the 1983 year-end as our first splitting point is motivated by Kim and Limpaphayom (1997), and Weinstein and Yafeh (1998). They both identify 1984 as the beginning in which the effects of deregulation can be observed. The choice of the 1989 year-end as our second splitting point is motivated by Kang and Stulz (1996, 2000), who identify 1990 as the beginning of the Japanese economic downturn.

The current herding and feedback models and literature do not give us predictions on the affect of herding in bull versus bear markets. Neither do current theories predict the affect of herding in a highly regulated market. Intuitively, we might expect that buy-herding (sell-herding) is relatively more important during bull (bear) markets. For the most part, however, we consider our subperiod investigation to be exploratory in nature. The results are reported in Table IV.

[Insert Table IV Here]

Panel A shows the change in institutional ownership for the three different economic periods. Within each decile, we see that the largest institutional ownership percent increase (and the smallest percent decrease) occurs during the bull market (1984-89) period. The second largest institutional ownership percent increase, within each decile, occurs during the regulated

(1975-83) period. Finally, institutional ownership increases are not very large during the bear market (1990-1997) period. In other words, within each decile, the institutional ownership increases (decreases) are the largest during the bull (bear) market period, with decile 1 representing the only exception. For example, the institutional-ownership increase in decile 10 is 10.7% during the bull market, but only 4.6% during the bear market. Also, note that during the bull market, only 3 deciles experience average institutional ownership declines, while twice as many deciles experience institutional ownership declines during the bear market. Overall, these observations are consistent with the observation that institutional buy-herding is more active during the bull market, while institutional selling is more common during the bear market.

Herd-year abnormal returns are reported in Panel B. We see that the results to herding are greatest during the bull market and smallest during the bear market. The abnormal price increase to the herd bought portfolio (decile 10) is 23.06% and the abnormal price decrease for the herd sold portfolio (decile 1) is -10.05%, which yields a range of over 33%. In contrast, this same range measured during the bull market period is only 10.93%. Our results reveal the importance of both herd buying and selling when the overall market is expanding.

Panel C, which reports post-herding year returns, reveals that the short-run impact of herding is somewhat similar across all three subperiods. Earlier, we argued that short-run outcomes do not seem to be a determinant of herd behavior, thus we would expect these results to be more related to the propensity for return reversals meaning that subperiods with larger herd-year returns are likely to experience larger negative post-herd year returns. The results generally seem to support this contention.

Finally, Panel D reports pre-herding year abnormal returns. Earlier, we documented that institutions appeared to be negative feedback sellers. Here, we see that this primarily occurs

during the regulated and bull market periods. During a bear market, when few firms are performing well, it is probably less likely that institutions will sell stocks that are past winners. In fact, past winners are likely to be more coveted during a bear market as we see it appears to have had a large influence on what institutional investors bought (i.e., in decile 10, the pre-herding returns during the bear market are largest across the three subperiods). In contrast, during a bull market, past returns appear to be relied upon less to make purchasing decisions as the overall market is expanding.

V. Summary

In this paper, we examine herding and feedback trading in Japan. Currently, most of the evidence surrounding these trading behaviors comes from U.S. data. Japan represents an important market to study because their institutional shareholders are quite different from U.S. institutional shareholders. In Japan, institutional investors are known to be active and helpful toward the firms in which they own shares, which is unlike the U.S. where institutions are known to be passive and adversarial shareholders. Also, in Japan, some firms belong to a business group, known as a keiretsu. Thus, even within the Japanese market, we will be able to examine herding and feedback trading under different institutional arrangements (i.e., keiretsu firms versus non-keiretsu firms). Finally, the Japanese economy has experienced three distinct economic regimes in its recent past: a regulated period, a bull market, and a bear market. Therefore, we are also able to examine herding and feedback trading under different economic environments.

We develop the argument that the investment culture in Japan causes institutional investors to have a long-term focus and to develop close relationships with management (relative to U.S. institutions). This environment leads to several empirical predictions. First, based on

the long-term nature of institutional ownership, it's likely that herding in Japan will occur on a lower level than it does in the U.S., and that the subsequent short-run returns to herding will be unimportant. Second, based on the minimal information asymmetry problem between firms and their institutional shareholders, it's likely that if and when herding does occur, it will have a large impact on price movements, and that the use of past information (feedback trading) on herding behavior is only marginally important. Our evidence is generally consistent with these expectations.

Our first empirical finding is that the level of herding in Japan is only about one-third the level in the U.S. However, we find that herding in Japan has a price impact that is two-thirds to what is found in the U.S. Thus, herding occurs on a lower scale in Japan, but when it does occur, it has a dramatic effect on prices. We argue that the first finding is an artifact of the long-term nature of institutional ownership in Japan, while the latter finding is an artifact of the institutional owners' private information (i.e., their selling/buying is a strong signal). When we examine the prior performance of firms that institutions buy and sell, we find evidence that Japanese institutions are feedback traders, but we also document that their subsequent performance can only be partially explained by prior performance. Again, this last result is indicative of the important role that private information plays on Japanese institutions' buying/selling decisions. When we examine the year after herding, we find that bought-herd firms experience negative abnormal returns, but a follow-up analysis reveals that this is primarily due to a return reversal effect. Just as important, the reversals do not offset the gains that are achieved during the herd-year. Here, we claim that the herd year returns are rather permanent, and we also suggest that Japanese institutions probably do not care about short-term profits.

Much of our full sample findings are stronger for a subsample of keiretsu firms. Most notably, the price impact of herding for keiretsu firms is much larger than for non-keiretsu firms, and keiretsu firms seem to rely less on past information for their buying decisions. Both of these observations are consistent with the view that owners of keiretsu firms have access to more private information than owners of non-keiretsu firms, which is not surprising given the intimate nature of the keiretsu networks.

Finally, we conduct subperiod analyses of herding on a regulated period, a bull market, and a bear market. The results reveal that institutional herd-buying is more (less) active during bull (bear) markets. Further, the price impact of both buy *and* sell herding is much greater during a bear market. Additionally, Japanese institutions do not appear to be negative feedback sellers only during the great bull market. Therefore, these subperiod findings reveal the importance of considering different economic environments when examining herding and feedback trading behaviors. We hope this stimulates the development of herding models that explore the affects of these different environments.

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Table I
Abnormal Returns of Ownership-Change Portfolios

Each year (1975-1997), all non-financial TSE firms are sorted into 10 portfolios based on the fraction of shares held by institutions. The firms in each initial institutional ownership decile are then further sorted into 10 portfolios based on the change in the fraction of shares held by institutions over the following year (for a total of 100 portfolios). Firms are then reagggregated based on their change in ownership-decile rank resulting in 10 “initial-stratified ownership-change” portfolios. Δ Institutional is the average raw change in institutional ownership. Abnormal returns are compounded-monthly-capitalization-decile-adjusted returns. Herding year is the year of the ownership change, and post- (pre-) herding year is the year after (before) the herding year. t-statistics are reported in parentheses. The *F*-statistic tests the null hypothesis that abnormal returns do not differ across ownership-change portfolios. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

	Large Decrease	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Large Increase	<i>F</i> -stat.
Δ Institutional	-0.0580	-0.0248	-0.0137	-0.0067	-0.0014	0.0039	0.0102	0.0189	0.0328	0.0763	6593.35***
Herding Year	-0.0459 (-8.12)***	-0.0712 (-12.81)***	-0.0703 (-12.71)***	-0.0618 (-11.17)***	-0.0491 (-8.79)***	-0.0403 (-7.32)***	-0.0151 (-2.73)***	0.0146 (2.63)***	0.0520 (9.39)***	0.1717 (30.48)***	181.36***
Pre-Herding Year	0.0394 (6.93)***	-0.0116 (-2.07)**	-0.0388 (-6.97)***	-0.0526 (-9.45)***	-0.0456 (-8.11)***	-0.0388 (-7.00)***	-0.0230 (-4.14)***	0.0018 (0.32)	0.0270 (4.84)***	0.0519 (9.15)***	44.56***
Post-Herding Year	-0.0256 (-4.53)***	0.0034 (0.61)	-0.0030 (-0.53)	0.0033 (0.60)	0.0057 (1.01)	0.0004 (0.07)	-0.0158 (-2.86)***	-0.0216 (-3.90)***	-0.0264 (-4.77)***	-0.0473 (-8.39)***	9.80***

Table II
Analyses of Post-Herding Returns

Stocks are sorted into quintiles based on their raw returns over the “herding year.” At the same time, stocks are independently sorted into quintiles based on changes in the fraction of shares held by institutions over the herding year. Firms are then sorted into 25 portfolios based on their herding-year-return quintile and their change-in-ownership quintile. The mean raw returns for the following 12 months (post-herding year) are reported for each portfolio. The *F*-statistic reported in the last column tests the null hypothesis that post-herding year returns are equal across the change-in-ownership portfolios, within each return portfolio. The *F*-statistic reported in the last row tests that null hypothesis that post-herding year returns are equal across the return portfolios, within each change-in-ownership portfolio. *** denotes statistical significance at the 1 percent level.

Δ Institutional Ownership	Loser	Quintile 2	Quintile 3	Quintile 4	Winner	<i>F</i> -statistic
Decrease	0.0869	0.1071	0.0841	0.0802	0.0366	3.60***
Quintile 2	0.1309	0.1137	0.1129	0.0741	0.0503	5.35***
Quintile 3	0.1293	0.1074	0.1147	0.1092	0.0766	1.6.3
Quintile 4	0.1220	0.0858	0.0739	0.0551	0.0460	4.89***
Increase	0.0900	0.0370	0.0769	0.0631	0.0190	6.26***
<i>F</i> -statistic	2.67**	5.37***	2.37**	3.16**	2.69**	

Table III
Abnormal Returns of Institutional-Ownership-Change Portfolios: Keiretsu versus Independent Firms

Each year (1975-1997), for keiretsu firms and independent firms separately, firms are sorted into 10 portfolios based on the fraction of shares held by institutions. The firms in each initial institutional ownership decile are then further sorted into 10 portfolios based on the change in the fraction of shares held by institutions over the following year (for a total of 100 portfolios). Firms are then re-aggregated based on their change in ownership-decile rank resulting in 10 “initial-stratified ownership-change” portfolios. Abnormal returns are compounded-monthly-capitalization-decile-adjusted returns. Panel A reports the Herding Year abnormal returns, Panel B reports the Post-Herding-Year abnormal returns, and Panel C reports the Pre-Herding-Year abnormal returns. *t*-statistics are reported in parentheses. The *F*-statistics reported in the last column test the null hypothesis that the abnormal returns do not differ across ownership change portfolios, within each firm classification. The *F*-statistics reported in the last row of each Panel test the null hypothesis that the abnormal returns do not differ between keiretsu and independent firms, within each change decile. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

	Large Decrease	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Large Increase	<i>F</i> -stat.
Panel A: Herding Year Abnormal Returns											
Keiretsu Firms	-0.0657 (-7.01)***	-0.0829 (-8.93)***	-0.0735 (-7.81)***	-0.0590 (-6.28)***	-0.0591 (-6.08)***	-0.0395 (-4.13)***	-0.0064 (-0.65)	0.0280 (2.81)***	0.0671 (6.91)***	0.2174 (20.56)***	82.64***
Independent Firms	-0.0354 (-5.02)***	-0.0651 (-9.43)***	-0.0688 (-10.09)***	-0.0632 (-9.26)***	-0.0445 (-6.54)***	-0.0407 (-6.06)***	-0.0188 (-2.82)***	0.0089 (1.34)	0.0452 (6.72)***	0.1547 (23.25)***	105.31***
<i>F</i> -statistic	6.25**	2.22	0.16	0.12	1.42	0.01	1.01	2.35	3.20*	23.95***	

Panel B: Post-Herding Year Abnormal Returns

Keiretsu Firms	-0.0289 (-3.00)***	-0.0006 (-0.06)	-0.0179 (-1.85)*	0.0054 (0.55)	0.0145 (1.45)	-0.0022 (-0.22)	-0.0073 (-0.73)	-0.0111 (-1.09)	-0.0202 (-2.02)**	-0.0448 (-4.13)***	2.89***
Independent Firms	-0.0239 (-3.42)***	0.0055 (0.80)	0.0044 (0.65)	0.0023 (0.35)	0.0016 (0.24)	0.0016 (0.24)	-0.0195 (-2.95)***	-0.0261 (-3.94)***	-0.0293 (-4.38)***	-0.0482 (-7.31)***	7.80***
<i>F</i> -statistic	0.18	0.27	3.54*	0.06	1.13	0.10	1.01	1.51	0.57	0.07	

Panel C: Pre-Herding Year Abnormal Returns

Keiretsu Firms	0.0497 (5.19)***	-0.0062 (-0.65)	-0.0380 (-3.96)***	-0.0368 (-3.84)***	-0.0447 (-4.50)***	-0.0432 (-4.42)***	-0.0257 (-2.56)**	0.0000 (0.00)	0.0040 (0.40)	0.0301 (2.79)***	10.90***
Independent Firms	0.0339 (4.81)***	-0.0143 (-2.08)**	-0.0392 (-5.74)***	-0.0604 (-8.85)***	-0.0460 (-6.75)***	-0.0367 (-5.47)***	-0.0218 (-3.28)***	0.0025 (0.38)	0.0373 (5.55)***	0.0599 (9.00)***	35.73***
<i>F</i> -statistic	1.73	0.47	0.01	3.94**	0.01	0.29	0.10	0.04	7.56***	5.41**	

Table IV
Abnormal Returns of Ownership-Change Portfolios: By Subperiods

Each year, for three different subperiods (1975-83, 1984-89, and 1990-98), all non-financial TSE firms are sorted into 10 portfolios based on the fraction of shares held by institutions. The firms in each initial institutional ownership decile are then further sorted into 10 portfolios based on the change in the fraction of shares held by institutions over the following year (for a total of 100 portfolios). Firms are then re-aggregated based on their change in ownership-decile rank resulting in 10 “initial-stratified ownership-change” portfolios. Abnormal returns are compounded-monthly-capitalization-decile-adjusted returns. Panel A reports the change in institutional ownership, Panel B reports the Herding Year abnormal returns, Panel C reports the Post-Herding-Year abnormal returns, and Panel D reports the Pre-Herding-Year abnormal returns. *t*-statistics are reported in parentheses. The *F*-statistics reported in the last column test the null hypothesis that abnormal returns do not differ across ownership change portfolios, within each subperiod. The *F*-statistics reported in the last row of each Panel test the null hypothesis that abnormal returns do not differ among subperiods, within each change decile. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

	Large Decrease	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Large Increase	<i>F</i> -stat.
Panel A: Change in Institutional Ownership											
Regulated Period (1975 – 1983)	-0.060	-0.023	-0.010	-0.003	0.001	0.006	0.012	0.021	0.037	0.088	3,158.20***
Bull Market Period (1984 – 1989)	-0.052	-0.019	-0.007	0.000	0.007	0.014	0.024	0.036	0.055	0.107	3,543.38***
Bear Market Period (1990 – 1997)	-0.061	-0.030	-0.021	-0.014	-0.009	-0.005	0.000	0.006	0.015	0.046	2,209.90***
<i>F</i> -statistic	14.21***	20.87***	30.85***	36.50***	40.36***	55.30***	82.49***	135.38***	254.52***	883.64***	

Panel B: Herding Year Abnormal Returns

Regulated Period (1975 – 1983)	-0.0251 (-2.04)**	-0.0629 (-6.09)***	-0.0760 (-7.38)***	-0.0636 (-6.18)***	-0.0707 (-6.80)***	-0.0623 (-6.08)***	-0.0093 (-0.90)	0.0177 (1.71)*	0.0757 (7.34)***	0.2349 (22.36)***	85.84***
Bull Market Period (1984 – 1989)	-0.1005 (-7.62)***	-0.1368 (-10.53)***	-0.1081 (-8.35)***	-0.1096 (-8.48)***	-0.0470 (-3.60)***	-0.0226 (-1.75)*	-0.0031 (-0.24)	0.0430 (3.31)***	0.0843 (6.50)***	0.2306 (17.55)***	74.44***
Bear Market Period (1990 – 1997)	-0.0316 (-4.50)***	-0.0358 (-5.17)***	-0.0408 (-5.91)***	-0.0289 (-4.19)***	-0.0315 (-4.53)***	-0.0325 (-4.73)***	-0.0280 (-4.07)***	-0.0067 (-0.97)	0.0102 (1.48)	0.0777 (11.08)***	26.42***
<i>F</i> -statistic	15.18***	24.26***	10.86***	15.29***	4.22**	4.14**	1.73	5.79***	17.25***	86.15***	

Panel C: Post-Herding Year Abnormal Returns

Regulated Period (1975 – 1983)	-0.0183 (-1.70)	0.0114 (1.08)	-0.0097 (-0.92)	0.0027 (0.26)	-0.0054 (-0.51)	0.0077 (0.73)	-0.0108 (-1.03)	-0.0081 (-0.77)	-0.0219 (-2.07)**	-0.0405 (-3.76)***	2.05**
Bull Market Period (1984 – 1989)	-0.0357 (-2.75)***	-0.0199 (-1.56)	0.0111 (0.87)	0.0117 (0.92)	0.0340 (2.65)***	0.0023 (0.18)	-0.0138 (-1.09)	-0.0423 (-3.31)***	-0.0279 (-2.19)**	-0.0689 (-5.33)***	5.64***
Bear Market Period (1990 – 1997)	-0.0254 (-3.59)***	0.0115 (1.64)	-0.0062 (-0.89)	-0.0016 (-0.22)	-0.0030 (-0.43)	-0.0073 (-1.06)	-0.0215 (-3.11)***	-0.0201 (-2.89)***	-0.0295 (-4.24)***	-0.0392 (-5.55)***	4.83***
<i>F</i> -statistic	0.67	2.91*	1.11	0.43	4.28**	0.68	0.35	2.71*	0.18	2.47*	

Panel D: Pre-Herding Year Abnormal Returns

Regulated Period (1975 – 1983)	0.1035 (10.36)***	0.0294 (3.00)***	-0.0249 (-2.55)**	-0.0564 (-5.78)***	-0.0631 (-6.40)***	-0.0454 (-4.68)***	-0.0385 (-3.96)***	0.0001 (0.01)	0.0218 (2.23)**	0.0248 (2.49)**	26.96***
Bull Market Period (1984 – 1989)	0.0296 (2.07)**	-0.0055 (-0.39)	-0.0522 (-3.72)***	-0.0596 (-4.25)***	-0.0307 (-2.17)**	-0.0592 (-4.24)***	-0.0087 (-0.62)	-0.0033 (-0.23)	0.0283 (2.01)**	0.0456 (3.20)***	7.39***
Bear Market Period (1990 – 1997)	-0.0104 (-1.47)	-0.0517 (-7.41)***	-0.0424 (-6.10)***	-0.0447 (-6.42)***	-0.0398 (-5.68)***	-0.0196 (-2.83)***	-0.0186 (-2.68)***	0.0066 (0.94)	0.0308 (4.43)***	0.0797 (11.27)***	33.82***
<i>F</i> -statistic	35.65***	18.62***	1.81	0.65	2.65*	4.13**	2.21	0.25	0.24	8.40***	