**The Impact of Institutional Trading and Individual Trading on Value and Size Premiums: Evidence from the Japan Stock Market**

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**Abstract**

By using firm-level data of institutional and individual holdings, we examine the trading behavior of institutional and individual investors in Japan. We document a significantly and economically negative relation between annual changes in institutional ownership and future stocks returns. However, the relation between annual changes in individual ownership and future stock returns does not exist. We also find that institutional investors tend to net-buy growth stocks and net-sell value stocks. However, there is no significant relationship between changes in institutional ownership and size. Conversely, individual investors tend to net-buy small and value stocks, and net-sell large and growth stocks. Further, we find that incorporating information about the institutional trading can significantly improve the value strategy. Overall, we show that institutional trading and individual trading are weak in explaining value and size premiums, inconsistent with the behavioral explanation.

*JEL classification:* G12

*Keywords:* Institutional investors; Individual investors; Value effect; Size effect; Japan stock market

1. **Introduction**

Prior literature suggests that firms with high book-to-market equity (*BE/ME*) tend to have high future returns and poor past performances, and small firms tend to have higher returns than do large firms (e.g., Fama and French, 1992; 1993; 1996; 1998; Lakonishok, Shleifer, and Vishny, 1994). Empirical evidence of the existence of *BE/ME* and size premiums has also been documented in the Japan stock market (e.g., Chan et al., 1993; Cai, 1997; Bae and Kim, 1998; Chen and Zhang, 1998; Daniel et al., 2001).[[2]](#footnote-2)

Value and size premiums have been studied for a long time. However, studies on whether sophisticated institutions behave as arbitrageurs to exploit these premiums or push asset price away from fundamental value are rare. Many studies show that institutional trading is capable of predicting future stock returns, and it has a significant effect on the current stock price (Wermers, 1999; Sias, 2004). On the one hand, institutional trading may irrationally affect stock prices. The trading behavior may destabilize stock prices if overpriced securities are bought, and underpriced securities are sold (Hung et al., 2010; Dasgupta et al., 2011). After institutional irrational buying or selling, one would expect to see subsequent reversals in stock returns. If trading results from fads, reputational concerns, or preference for certain firm characteristics, such trading may drive asset prices away from fundamental values and create return reversals in the subsequent period. For example, Dasgupta et al. (2011) show that the long-run future returns on stocks that have been persistently sold by institutions outperform stocks persistently bought by them. Similar patterns of a long-run reversal associated with institutional trading are found in Frazzini and Lamont (2008), Gutierrez and Kelley (2009), and Brown et al. (2009). On the other hand, institutional buying (selling) may stabilize the stock market when prices are undervalued (overvalued). The absence of price reversals following institutional trading is consistent with the hypothesis that institutional trading reflects the manner by which information is impounded into security prices (DeLong et al., 1990; Choe et al., 1999; Nofsinger and Sias, 1999; Wermers, 1999; Sias, 2004).

Lakonishok et al. (1994) argue that the agency problem inherent in delegated portfolio management may induce institutions to trade toward growth stocks and away from value stocks and that such a behavioral tendency may be an important driver of the value premium. Recent evidence by Frazzini and Lamont (2008) and Sharma et al. (2008) justify the argument of Lakonishok et al. (1994) that institutions tend to buy growth stocks and sell value stocks. Further, recent studies document that institutional investors prefer holding large capitalization stocks (Bennett, Sias, Starks, 2003; Dahlquist and Robertsson, 2001; Falkenstein, 1996).

Although Frazzini and Lamont (2008) and Sharma et al. (2008) indicate that institutions tend to buy growth stocks and sell value stocks, they do not explore whether trading preference by institutional investor drives the value and size premiums. Jiang (2010) shows that institutions tend to buy (sell) shares in response to positive (negative) intangible information (Daniel and Titman, 2006) and that the reversal of the intangible return is most pronounced among stocks traded by a large proportion of active institutions in the direction of intangible information. He finds that the *BE/ME* effect is large and significant in stocks with intense past institutional trading but is almost nonexistent in stocks with moderate institutional trading. The tendency of institutions to trade in the direction of intangible information exacerbates price overreaction, thereby contributing to the value premium.

Even if the investigation of Jiang (2010) is qualitatively close to ours, several differences exist between Jiang and this paper. First, Jiang focuses on the effect of institutional trading behavior on the *BE/ME* effect, whereas this study sheds light on the effect of both institutional and individual trading behaviors on the *BE/ME* and size premiums. Second, Jiang’s results are based on a US dataset, a widely used dataset. Conversely, we provide out-of-sample evidence from the Japan stock market, which is independent from data used in previous research. Thus, we will avoid the possibility that some of them are significant in the US market just by chance, that is, data-snooping bias. There are many significant differences between the US market and the Japan market, such as cultural backgrounds and institutional structures. For example, Chui et al. (2010) provide evidence that overconfidence and self-attribution are lower in less individualistic cultures like Japan, leading to lower momentum profits. Plausibly, the trading preference of institutional investors and/or individual investors in Japan is different from that of the US. Moreover, Daniel et al. (2001) show that the stock returns in Japan are more closely related to the *BE/ME* than to the return/*BE/ME* relation in the US. Thus, as the world’s second largest in terms of market capitalization, the Japanese data represent a good independent sample that enables the testing for the relation between institutional/individual trading and *BE/ME*/size premiums. Overall, the current study complements Jiang’s (2010) empirical findings by simultaneously examining the relations between institutional/individual investors and value/size premiums in the Japan stock market.

Further, many studies have supported the immediacy of providing the hypothesis that individuals tend to supply liquidity to institutions, and thus individual investors tend to be contrarian in the short term. For example, Kaniel et al. (2008) examine NYSE trading data and find that individual investors tend to be contrarian traders in the short run. That is, they buy stocks after prices decrease and sell stocks after prices increase.[[3]](#footnote-3) The results of Sharma et al. (2008) implicitly imply that individuals tend to sell growth stocks and buy value stocks.[[4]](#footnote-4) Goetzmann and Massa (2003) find that individuals who invest in an index fund are more likely to be contrarians. However, there is less agreement about the long-run trading preference by individual investors. Particularly, the long-run relation between individual trading and future stock returns has received little attention.[[5]](#footnote-5) The current paper attempts to fill this gap.

Our findings are summarized as follows. First, we document a significantly and economically negative relation between annual changes in institutional ownership and future stocks returns. That is, institutional trading is associated with reversals in stock returns. This finding is consistent with Jiang (2010) and Dasgupta et al. (2011). More importantly, the institutional trading effect is not a manifestation of *BE/ME* and size effect. However, the relation between annual changes in individual ownership and future stock returns does not exist.

Second, consistent with Frazzini and Lamont (2008) and Sharma et al. (2006), a negative association exists between institutional trading and *BE/ME* ratio. That is, institutional investors tend to net-buy growth stocks and net-sell value stocks. However, inconsistent with Gompers and Metrick (2001) who attribute the disappearance of size premium to the substantial increase in institutional ownership of large stocks and decrease in small stocks, we document an insignificant relation between annual changes in institutional ownership and size. Alternatively, individual investors tend to net-buy small and value stocks, and net-sell large and growth stocks, that is, exhibit contrarian trading behavior.

Finally and more importantly, although institutional trading and individual trading are associated with *BE/ME* and/or size, their effects appear to be limited on value and size premiums. This finding is inconsistent with the behavioral explanation that value premium is mainly driven by investors’ trading behavior (Lakonishok, et al. 1994; Jiang, 2010). We also find that incorporating information about the institutional trading behavior can significantly enhance the value strategy. However, information about annual changes in institutional ownership has limited ability in improving size strategy. Information about individual trading behavior is unable to enhance either value strategy or size strategy.

Our paper proceeds as follows. Section 2 discusses the data and variables. In Section 3, we present the empirical relationship between *BE/ME* ratio, size, institutional trading, and individual trading. In Section 4, we examine the relation between institutional trading, individual trading, and stock returns. In Section 5, we analyze the influence of institutional and individual trading on value and size premiums. Section 6 examines whether institutional or individual trading behavior can enhance value or size strategy. Section 7 concludes the paper.

1. **Data descriptions and variable definitions**
   1. **Data source**

Our data come from the Pacific Basin Capital Market Research Center (PACAP) database maintained by the University of Rhode Island. We collect monthly returns, annual aggregate ownership data, and annual accounting data from PACAP for all Japanese securities listed in the Tokyo Stock Exchange (TSE) over the sample period of 1975 to 2005. For each firm, annual aggregate ownership data of individual investor and institutional investor are shown at the end of each fiscal year (usually occurring on March 31). There are four types of institutions: government, financial institutions, securities companies, and other business corporations. Following Kim and Nofsinger (2005), we define institutions as domestic financial institutions, securities companies, and business companies. Following Chan et al. (1991) and Chang et al. (1995), we use the 30-day Gensaki rate as the risk-free interest rate. The Gensaki rate is accepted by the Japanese Ministry of Finance as an official measure of the short-term interest rate. It is also extracted from PACAP.

The stocks must jointly satisfy the following criteria. First, they should not have negative book equity. Second, they should have stock prices at the end of March and September of year *t*. Third, they must have data on institutional and individual holdings. In addition, we only include industrial firms. The number of firms in the final sample for years 1975, 1985, 1995, and 2005 is 709, 1225, 1385, and 842, respectively, with an average of 1,166 firms per year. Firm-year observations are 36,233.

* 1. **Summary statistics**

For each year *t*, we compute *BE/ME* as the ratio of book value of equity (computed as in Fama and French, 1992) at the end of March (the end of the fiscal year) divided by the market value of equity at the end of March from 1975 to 2005. We compute market capitalization (*ME*) using market equity at the end of June in the calendar year *t*. To avoid look-ahead-bias, stock returns are over the period of July 1976 to December 2006.

For each year and stock, institutional ownership (individual ownership) is defined as institutional holdings (individual holdings) scaled by shares outstanding. We calculate institutional trading (*DITH*) as changes in institutional ownership between fiscal year end *t*-2 and fiscal year end *t*-1, and individual trading (*DIND*) as changes in individual ownership between fiscal year end *t*-2 and fiscal year end *t*-1. To control for the systematic component, we compute industry-adjusted change in institutional ownership (*AdjDITH*) as *DITH* subtracted from the median value of industry *DITH*, where industry *DITH* is measured by the two-digits SIC industry. Adjusted change in individual ownership (*AdjDIND*) is defined similarly. The time line for the measures of book-to-market ratio, market capitalization, institutional and individual investors’ trading, and the subsequent stock return performance is illustrated in Figure 1.

< Insert Figure 1 about here>

Following the previous literature, we do not include firms until they are in the PACAP database for two years to reduce survival biases. These requirements should reduce the influence of small, young growth stocks on the results. To prevent extreme observations from influencing our results, we follow the literature (Fama and French, 1992; Dichev, 1998) and winsorize the top 99% and bottom 1% of all relevant variables. The resulting sample data are summarized in Table 1. As a first step in analyzing the data, we compute the correlations between the variables. As demonstrated in Panel B of Table 1, *AdjDITH* is negatively correlated with *BE/ME* and size. In addition, *AdjDIND* is positively associated with *BE/ME* and negatively associated with *ME*.

<Insert Table 1 about here>

1. **Relations between *BE/ME*, size, *AdjDITH*, and *AdjDIND***

In this section, we present preliminary results on the cross-sectional associations between *BE/ME*, size, *AdjDITH*, and *AdjDIND*. In Table 2, we report equal- and value-weighted monthly stock returns and average lagged institutional ownership (*LITH*), lagged individual ownership (*LIND*), adjusted institutional trading (*AdjDITH*), and adjusted individual trading (*AdjDIND*) estimates for 25 portfolios based on *BE/ME* and *ME*, as in Fama and French (1993).

First, high *BE/ME* stocks outperform low *BE/ME* stocks over the sample period. For example, average equal- (value-) weighted monthly stock returns are 1.15% (1.13%) for the highest and 0.85% (0.81%) for the lowest *BE/ME* quintile across all firms, and 0.99% (1.04%) and 0.57% (0.51%), respectively, within large firms. However, there seems to be no association between *BE/ME* and returns within small firms. For example, average equal- (value-) weighted monthly stock return is 1.51% (1.41%) and 1.58% (1.46%) for the highest and the lowest *BE/ME* quintile within small firms, respectively. This evidence seems to contradict the previous finding that the value effect is strongest among small firms.[[6]](#footnote-6)

Moreover, small stocks tend to consistently outperform large stocks in our sample. For instance, average equal- (value-) weighted monthly stock returns are 1.46% (1.36%) for the smallest and 0.82% (0.85%) for the largest quintile across all firms, 1.58% (1.46%) and 0.57% (0.51%), respectively, within the low-*BE/ME* quintile, and 1.51% (1.41%) and 0.99% (1.04%), respectively, within the high-*BE/ME* quintile.

In Table 2 and graphically in Figure 2, we report *AdjDITH* estimates by *BE/ME* and size groups. A clear negative association exists between *AdjDITH* and *BE/ME*. Unconditionally, *AdjDITH* estimates decrease monotonically from 0.38% to -0.04% as *BE/ME* increases from the lowest to the highest quintile. Depending on the market value, *AdjDITH* estimates decrease from 0.23% to 0.03% across *BE/ME* quintiles within small stocks and from 0.24% to 0.11% across *BE/ME* quintiles within large stocks. However, there seems to be a weak positive association between *AdjDITH* and size.

<Insert Table 2 and Figure 2 about here>

As for individual trading shown in Table 2 and graphically in Figure 3, there is evidence of a positive association between *AdjDIND* and *BE/ME*. Unconditionally, *AdjDIND* estimates increase monotonically from -0.67% to 0.73% as *BE/ME* increases. Conditionally, *AdjDIND* estimates increase from 0.21% to 1.61% within the small *ME* quintile and from -1.23% to 0.07% within the high *ME* quintile. There is also a pronounced negative association between *AdjDIND* and size. *AdjDIND* estimates decrease monotonically from 0.91% to -0.73% as size increases. Conditionally, *AdjDIND* estimates decrease from 0.21% to -1.23% within the low-*BE/ME* quintile and from 1.61% to 0.07% within the high-*BE/ME* quintile.

<Insert Figure 3 about here>

Although the evidence from Table 2 is suggestive, it does not constitute formal evidence. Thus, we assess the statistical significance of the previous results in Table 3. We form quintiles based on either *BE/ME* or size, and compare the two extreme quintiles. High *BE/ME* stocks have *AdjDITH* (*AdjDIND*) levels that are typically 0.45% (1.74%) lower (higher) than those of low *BE/ME* stocks. This difference is statistically significant at the 1% level. Therefore, there is strong evidence that high *BE/ME* stocks have smaller (greater) *AdjDITH* (*AdjDIND*) levels than do low *BE/ME* stocks.

Additionally, when we compare the two extreme size quintiles, we find that small stocks have higher *AdjDIND* levels than do large stocks. However, there is no evidence that small stocks have lower *AdjDITH* levels than do large stocks. Although the *AdjDITH* difference is -0.07%, it is not significantly different from zero. Therefore, there is strong evidence that small stocks have greater *AdjDIND* levels than do large stocks, but there is no clear association between size and *AdjDITH*.

<Insert Table 3 about here>

Furthermore, we show direct evidence of links between *BE/ME*, size, *AdjDITH*, and *AdjDIND* using regression analysis. Specifically, for a robustness check, we use annual cross-sectional regressions of *BE/ME* or size on *AdjDITH* and *AdjDIND*. The time-series estimates and *t*-statistics based on time-series standard errors are shown in Table 4. The standard errors are adjusted for serial correlation and clustered standard errors. The results suggest that the *BE/ME* is negatively associated with *AdjDITH* and positively associated with *AdjDIND*. The *AdjDITH* coefficient of -0.70 and *AdjDIND* coefficient of 0.74 are highly significant statistically and economically. Size is negatively associated with *AdjDIND* but unrelated to *AdjDITH*. In sum, these results indicate that *BE/ME* is negatively associated with institutional trading and positively associated with individual trading. Size is negatively associated with individual trading but unrelated to institutional trading.

<Insert Table 4 about here>

1. ***AdjDITH*, *AdjDIND*, and the cross-section of average stock returns**

In this section, we investigate the association between *AdjDITH* and *AdjDIND,* and the cross-section of stock returns. We use two ways to explore the relations between stock returns and institutional and individual trading. The first method is the portfolio formation. Specifically, we evaluate the difference in monthly returns between portfolios of stocks with institutional (individual) net-buying and portfolios of stocks with net-selling.

First, following Nofsinger and Sias (1999), from 1975 to 2005, all selected stocks in the sample are first sorted into 10 portfolios based on the fraction of shares held by institutional (or individual) investors. Second, firms within each initial institutional (or individual) ownership-sorted portfolio are then sorted into 10 portfolios based on the institutional (or individual) trade imbalance. Finally, firms with the largest institutional (or individual) trade imbalance are then re-aggregated across the 10 initial institutional (or individual) ownership-sorted portfolios to form a stratified portfolio that shows a largest increase in institutional (or individual) ownership. Similarly, firms within each of the other nine portfolios are re-aggregated in the same manner.

In Table 5, we report the average monthly stock returns by deciles based on adjusted changes in institutional ownership (*AdjDITH*). The portfolios are constructed to isolate them from any possible influence of level of institutional ownership. This sorting procedure produces 10 portfolios with similar institutional ownership levels. Similar to Kim and Nofsinger (2005), the average level of shares held by all institutions is about 61%. The average ownership of individual investors is around 32%.

The reported returns are the monthly averages in the 12 months following each June. The portfolio returns are equal and value weighted. We adopt two methods to adjust the monthly stock returns. First, we measure the abnormal returns for each portfolio with the intercept of the Carhart (1997) four-factor model.[[7]](#footnote-7) The second method is the benchmark-adjusted procedure. Abnormal returns are calculated using size- and *BE/ME*-adjusted average portfolio returns. To construct the benchmark portfolios, we independently sort whole-listed stocks into size and *BE/ME* deciles. Next, we compute a monthly value-weighted average return for each of the 100 (10 x 10) portfolios. The monthly abnormal return for each stock is the difference between the stock’s monthly raw return and its monthly benchmark portfolio return.

Evidence indicates that the firms with higher *AdjDITH* earn lower subsequent returns. Equal- (value-) weighted monthly raw returns decrease from an average of 1.12% (0.90%) for the lowest to 0.66% (0.45%) for the highest *AdjDITH* decile. The equal- (value-) weighted average of the monthly raw return difference between stocks in the highest decile and stocks in the lowest decile is -0.46% (-0.45%), which is significantly different from zero at the 1% level. Moreover, the four-factor model risk-adjusted returns and benchmark-adjusted returns show similar results. That is, institutional trading is significantly and negatively related to future stock returns.

Moreover, consistent with the results in the previous section, Panel B of Table 5 shows that the *BE/ME* of net-selling portfolio (P01) is higher than that of net-buying portfolio (P10). Moreover, there is a negative relationship between *AdjDIND* and *AdjDITH*. There seems to be no clear association between *AdjDITH* and size. *AdjDITH* is also positively associated with prior returns, indicating that they are positive feedback traders. They tend to net-buy past winners and net-sell past losers.

The portfolio results based on adjusted changes in individual ownership (*AdjDIND*) are reported in Table 6. Evidence indicates that firms with higher *AdjDIND* earn higher subsequent raw returns. However, the equal- (value-) weighted average of the monthly raw return difference between stocks in the highest decile and stocks in the lowest decile is an insignificantly positive 0.28% (0.17%). Consistent with the results in the previous section, Panel B reveals that there is an increasing pattern of *BE/ME* and a decreasing pattern of size as *AdjDIND* increases. Moreover, individual investors are contrarian investors; that is, they net-buy prior losers and net-sell prior winners.

<Insert Tables 5 and 6 about here>

As robustness checks, we use a second method to examine the relation between institutional trading (individual trading) and stock returns. In Table 7, we present a cross-sectional regression analysis at the firm level. Using the Fama and MacBeth (1973) procedure, we report the time-series averages of slopes from the monthly cross-sectional regressions of stock returns on *BE/ME*, size, *AdjDITH*, and *AdjDIND*. The model 8 shows that the coefficients on *BE/ME* and size are 0.16 and -0.14, which are significantly positive and negative at about the 5% level, respectively, suggesting the existence of *BE/ME* and size effects. More importantly, the significantly negative coefficient on *AdjDITH* (-1.44 with a t-statistic of -1.74) suggests that *AdjDITH* is related to future stock returns. However, there seems to be no relation between *AdjDIND* (0.14 with a t-statistic of 0.27) and future stock returns.

In sum, we document a significantly and economically negative relation between annual changes in institutional ownership and future stocks returns. That is, institutional trading is associated with reversals in returns, and its effect is not a subsumed by *BE/ME* and size effects. However, annual changes in individual ownership have a weak relation to future stock returns.

<Insert Table 7 about here>

1. **Institutional/individual trading behavior and value/size premiums**

As previously shown, *AdjDITH* is negatively associated with future stock returns. However, although we have controlled for the possible factors, such as risks and characteristics, which have been proved to significantly affect the stock returns, whether *AdjDITH* is a manifestation of *BE/ME* effect and/or size effect remains questionable.

Lakonishok, Shleifer, and Vishny (1994) argue that the agency problem inherent in delegated portfolio management may induce institutions to trade toward growth stocks and away from value stocks and that such a tendency can be an important driver of the value premium. We have shown that *BE/ME* is negatively related to *AdjDITH* and positively associated with *AdjDIND*, and size is positively related to *AdjDIND*. Thus, we are particularly interested in whether the influence of *BE/ME* (or size) on stock returns is also associated with that of *AdjDITH* (or *AdjDIND*) on stock returns.

In this section, we examine the interactive relation between *AdjDITH* premium (or *AdjDIND* premium) and *BE/ME* (or size) premium. We use independent double sorts on *BE/ME* (or size) and *AdjDITH* (or *AdjDIND*) to explore the effect of institutional trading (or individual trading) on *BE/ME* and size premiums. Specifically, at the end of each June, we sort all stocks into 25 portfolios independently based on *BE/ME* (or size) and *AdjDITH* (or *AdjDIND*). The results are shown in Table 8.

First, the evidence indicates that *BE/ME* and size premiums appear to have a weak relation to *AdjDITH* and *AdjDIND*. For example, Panel A indicates that there is no systematic pattern of *BE/ME* premium (returns on stocks with high *BE/ME* minus returns on stocks with low *BE/ME*) across *AdjDITH* and *AdjDIND* portfolios. The size premium in Panel B also shows similar evidence. Second, *AdjDITH* and *AdjDIND* premiums have little association with *BE/ME* and size. For instance, *AdjDITH* and *AdjDIND* premiums show no systematic pattern across *BE/ME* and size portfolios. As a result, although stocks with high (low) *BE/ME* tend to experience institutional net-selling (net-buying), the influences of *BE/ME* and institutional trading on stock returns seem to be weakly related.

For a robustness check, we use the dependent sorting procedure (i.e., *AdjDITH* (or *AdjDIND*) is sorted first followed by *BE/ME* (or size)) to explore the effect of *AdjDITH* (or *AdjDIND*) on *BE/ME* and size premiums. The results shown in Table 9 suggest that *BE/ME* and size premiums are not driven by *AdjDITH* and *AdjDIND*. Specifically, holding *AdjDITH* constant, value and size premiums remain significantly different from zero.

<Insert Tables 8 and 9 about here>

Moreover, we calculate *AdjDITH* and *AdjDIND* benchmark-adjusted returns to purge the institutional and individual trading effect from *BE/ME* and size premiums. Specifically, in a manner similar to that in the *BE/ME* and size benchmark-adjusted procedure in Section 4, the *AdjDITH* and *AdjDIND* benchmark-adjusted returns are measured using *AdjDITH-* and *AdjDIND*-adjusted average portfolio returns. To construct the *AdjDITH* and *AdjDIND* benchmark portfolios, we independently sort whole-listed stocks into *AdjDITH* and *AdjDIND* deciles. Next, we compute a monthly value-weighted average return for each of the 100 (10 x 10) portfolios. The monthly abnormal return of each stock is the difference between the stock’s monthly raw return and its monthly benchmark portfolio return.[[8]](#footnote-8) The results shown in Tables 10 and 11 indicate that, after purging out the information associated with *AdjDITH* and *AdjDIND*, *BE/ME* and size premiums are still significantly positive. More specifically, while the value-weighted *BE/ME* (size) spread does decrease by about one third, from 1.09% (0.92%) to 0.72% (0.76%), it is still economically large and statistically significant at the five-percent level.

<Insert Tables 10 and 11 about here>

On the other hand, if *BE/ME* premium (or size premium) are driven by institutional and/or individual trading, the volatility of *BE/ME* premium (or size premium) should be explained by volatility of spreads on institutional trading portfolio and individual trading portfolio. We employ a simple two-factor model (similar to the model adopted by Eun et al. (2008)), the results of which are given in Table 12. This model assumes that *BE/ME* and size premiums are driven by spreads of institutional trading portfolio and individual trading portfolio.

|  |  |
| --- | --- |
|  | (1) |

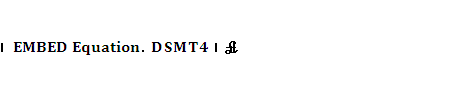
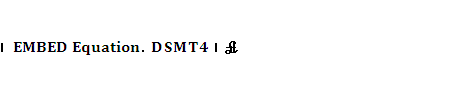
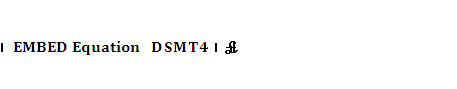
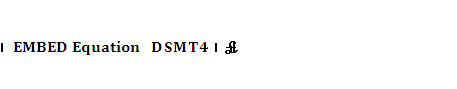
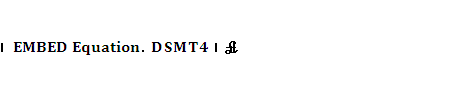
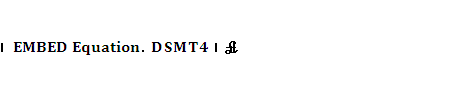
This two-factor model is estimated as where *Rk* is *BE/ME* premium and size premium shown in Tables 10 and 11; *RAdjDITH* is the spread returns on *AdjDITH* portfolios presented in Table 5 (defined as returns on stocks with heavy institutional net-selling minus returns on stocks with heavy institutional net-buying); and *ξAdjDIND* is the residual obtained by regressing *RAdjDIND* on *RAdjDITH*. *RAdjDIND* is the spread returns on *AdjDIND* portfolios presented in Table 6 (defined as returns on stocks with heavy individual net-buying minus returns on stocks with heavy individual net-selling). The coefficients of *βAdjDITH* and *βAdjDIND* in Equation (1) denote the institutional trading beta and orthogonalized individual trading beta, respectively. They measure the sensitivities of returns on *BE/ME* premium (or size premium) to institutional trading and individual trading.

Based on the estimated institutional trading and individual trading betas, we can decompose the variance of a *BE/ME* (*RHML*) premium into three possible channels: (i) (*βAdjDITH*)2 × *Var*(*RAdjDITH*), the component attributable to the volatility of the institutional trading portfolio, (ii) (*βAdjDIND*)2 × *Var*(*RAdjDIND*), the component attributable to the volatility of individual trading portfolio, and (iii) *Var*(*ε*), the idiosyncratic volatility of the *BE/ME* premium itself. The variance of a *BE/ME* premium is written as:

|  |  |
| --- | --- |
| . | (2) |

Each part of the decomposition can be calculated as follows:

denotes the institutional trading fraction; denotes the individual trading fraction; denotes the idiosyncratic fraction. The decomposition of the variance of size premium (*RSMB*) is defined similarly.



Panel A of Table 12 indicates that the institutional trading (individual trading) beta is 0.42 (-0.26) for the equal-weighted *BE/ME* premium, -0.76 (-0.33) for the equal-weighted size premium, 0.37 (0.07) for the value-weighted value premium, and -0.33 (-0.27) for the value-weighted size premium. Except for the coefficient of *AdjDIND* on value-weighted *BE/ME* premium, all coefficients are significant at the 1% level. The explanatory power of the two factor model is little, with adjusted *R*2s of 9% (2.1%) and 16.4% (4.5%) for equal-weighted (value-weighted) *BE/ME* premium and size premium, respectively. Our results show that idiosyncratic volatility accounts for about 90.48% (97.28%) and 83.07% (94.92%) of the variance in the equal-weighted (value-weighted) *BE/ME* premium and size premium, respectively. Both weak explanatory power of the two factor model and the high proportion of variance accounted for by idiosyncratic volatility seems to indicate that the *BE/ME* premium and size premium are not driven by institutional trading and individual trading. This is inconsistent with the argument that value and size premiums are driven by investor’s trading behavior.

<Insert Table 12 about here>

1. **Value and size strategies with institutional and individual trading**

According to the previous section, the *AdjDITH* spread (i.e., returns on stocks with heavy institutional net-selling minus returns on stocks with heavy institutional net-buying) and *AdjDIND* spread (i.e., returns on stocks with heavy individual net-buying minus returns on stocks with heavy individual net-selling) have little association with value and size premiums. Thus, we attempt to examine whether a strategy that buys high *BE/ME* (or small size) stocks with heavy institutional net-selling (or individual net-buying) and sells short low *BE/ME* (or large size) stocks with heavy institutional net-buying (or individual net-buying) can experience high returns. Moreover, we can use two dimensions sorts to further examine whether *AdjDITH* spread and value premium (or size premium) is independent of each other. The intuition is: If *AdjDITH* spread and value premium (or size premium) are the same, the stock performance based on *AdjDITH* and *BE/ME* (or size) two-dimensions sorts should be indifferent to that of *BE/ME* (or size) single-dimension sort. On the other hand, if *AdjDITH* spread is not a manifestation of *BE/ME* or size premium, then we might see that *AdjDITH* could provide additional information to improve the performance of value (or size) strategy.

We adopt independent double sorts on *BE/ME* (or size) and *AdjDITH* (*AdjDIND*) to examine the profitability of the investing strategies. First, five portfolios are formed based on *BE/ME* or size, and five portfolios are formed based on *AdjDITH* or *AdjDIND*. Second, 25 portfolios are produced from the four types of intersections, namely, the intersection between *BE/ME* vs. *AdjDITH*, *BE/ME* vs. *AdjDIND*, size vs. *AdjDITH*, and size vs. *AdjDIND,* as shown in Panels A to D, respectively. The investing strategy “(Small, Sell) – (Large, Buy)” denotes a zero-cost portfolio that buys small stocks with institutional (or individual) net-selling and sells short large stocks with institutional (or individual) net-buying. The rest of the strategies are defined similarly. The results are shown in Table 13.

First, for value strategy, Panel A indicates that the enhanced strategy (3) (i.e., buys value (high *BE/ME*) stocks with institutional net-selling and sells short growth (low *BE/ME*) stocks with institutional net-buying [(Value, Sell) – (Growth, Buy)] experience the largest mean monthly equal-weighted (value-weighted) raw return of 085% (0.98%), and a Carhart’s alpha of 0.28% (0.33%). The raw return and Carhart’s alphaare significant at the 10% level or better. Particularly, strategy (3) has the highest profits among strategies (1) to (4). That is, strategy (3) significantly dominates the rest of the strategies. This finding suggests that, by including the information about institutional trading behavior, one can significantly improve the profitability of the value strategy. Panel B indicates that information about individual trading behavior has limited ability in improving value strategy. That is, strategy (2) (i.e., buys high BE/ME stocks with individual net-buying and sells short low *BE/ME* stocks with individual net-selling [(Value, Buy) – (Growth, Sell)]) does not significantly experience higher returns compared with other strategies.

Second, Panels C and D indicate that, for size strategy, neither institutional trading nor individual trading can significantly improve the size strategy. For example, we expect a size strategy that buys small stocks with institutional net-selling (or individual net-buying) and sells short large stocks with institutional net-buying (or individual net-selling) to experience the largest returns among all strategies. Panel C shows that the equal-weighted (value-weighted) mean monthly raw returns and Carhart’s alpha on strategy (3) (i.e., buys small stocks with institutional net-selling and sells short large stocks with institutional net-buying [(Small, Sell) – (Large, Buy)]) yields the highest at 084% (0.86%) and 0.42% (0.40%) at a 5% significance level. However, when we compare the performance among strategies (1) to (4), although strategy (3) indeed earns higher returns than do the other strategies, it is not significantly positive. Panel D also suggests that strategy (2) (i.e., buys small stocks with individual net-buying and sells short large stocks with individual net-selling [(Small, Buy) – (Large, Sell)]) does not experience higher returns compared with other strategies. Overall, we argue that enhancing the size strategy by incorporating the information of institutional and individual trading behavior is limited.

<Insert Table 13 about here>

Moreover, Bekaert and Urias (1996) suggest that one can assess the economic significance of the shift in the mean-variance frontier by evaluating the change in the Sharpe ratio. We argue that if the enhanced strategy dominates other strategies, then the percentage changes in the Sharpe ratio between the enhanced strategy and other strategies should be positive. The Sharpe ratio for each zero-investment return is calculated as the ratio of excess return to standard deviation. Panel A of Table 14 indicates that strategy (3) (i.e., buys value stocks with institutional net-selling and sells short growth stocks with institutional net-buying [(Value, Sell) – (Growth, Buy)]) yields the highest Sharpe ratio among all strategies. In sum, we find that incorporating information about the institutional trading behavior can significantly enhance the value strategy but not the size strategy. However, information about individual trading behavior cannot enhance either value strategy or size strategy.

<Insert Table 14 about here>

1. **Conclusions**

This paper attempts to test the behavioral hypothesis of Lakonishok, Shleifer, and Vishny (1994) in explaining value and size premiums. We show that there is a significantly and economically negative relation between annual changes in institutional ownership and future stocks returns. Institutional investors tend to net-buy growth stocks and net-sell value stocks. However, an insignificant relationship exists between changes in institutional ownership and size, inconsistent with Gompers and Metrick (2001) who attribute the disappearance of size premium to the substantial increase in institutional ownership of large stocks and decrease in small stocks.

Individual investors tend to net-buy small and value stocks, and net-sell large and growth stocks; that is, they are contrarian traders. The relation between annual changes in individual ownership and future stock returns does not exist. Although institutional and individual trading seem to be associated with *BE/ME* and/or size, their effects appear to be limited on value and size premiums. This finding is inconsistent with the behavioral explanation that value premium is driven by investors’ trading behavior (Lakonishok, et al. 1994; Jiang, 2010).

We also find that, by including information about institutional trading behavior, one can improve the profitability of the value strategy. However, information about annual changes in institutional ownership has a limited ability in improving size strategy. Information about individual trading behavior cannot enhance either value strategy or size strategy.

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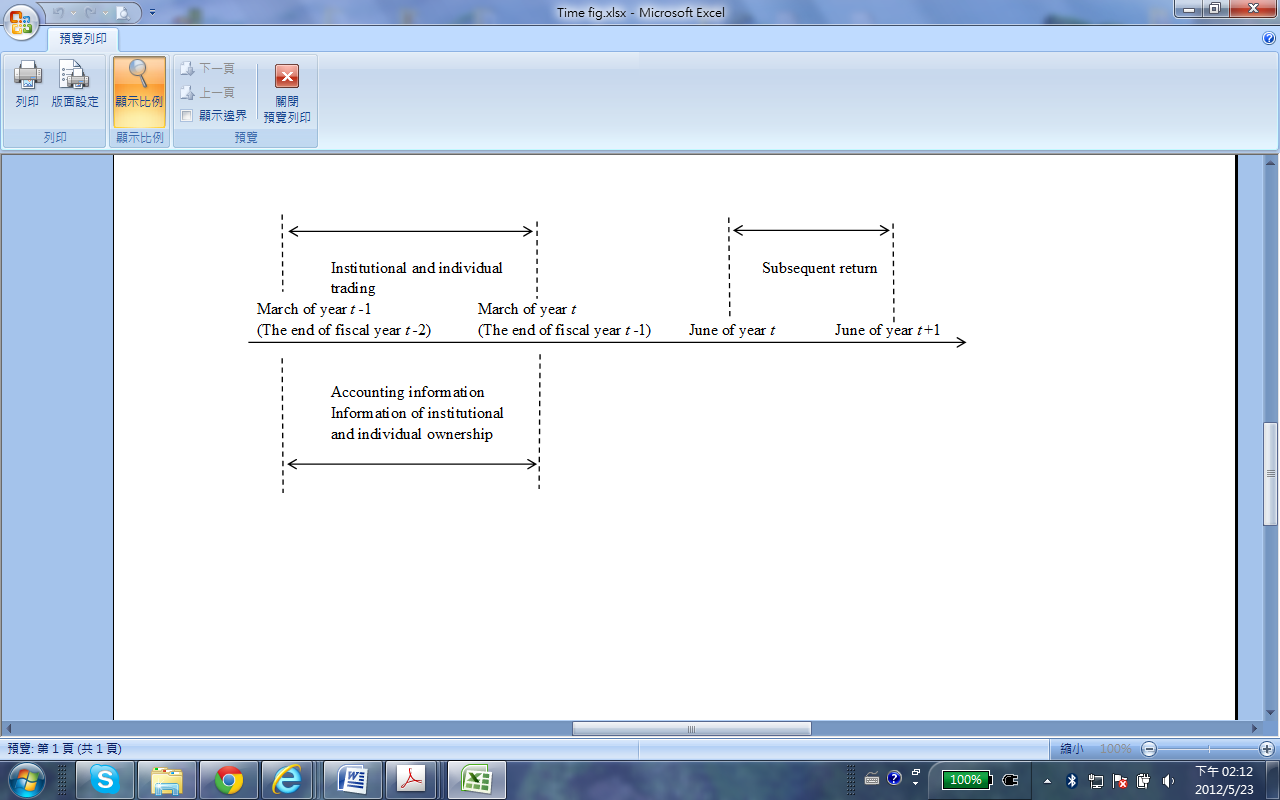
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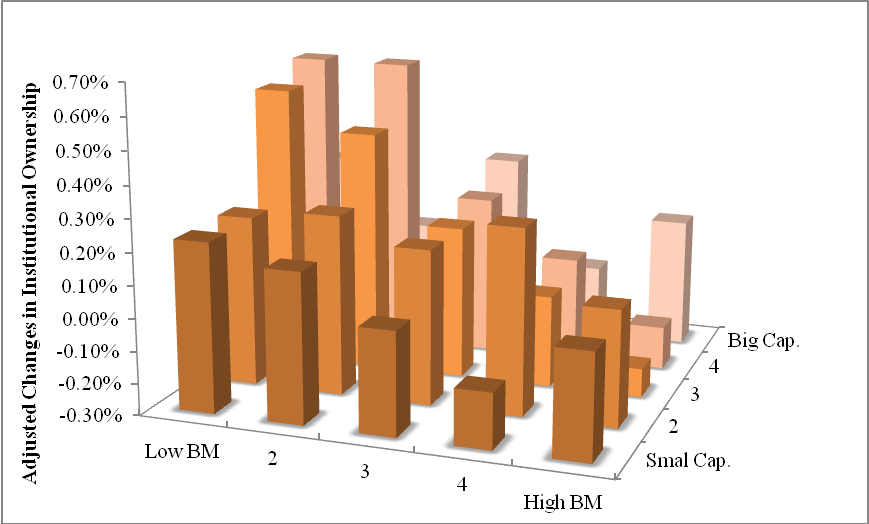
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**Figure 1. The time line for the measures of book-to-market ratio, market capitalization, institutional and individual investors’ trading, and the subsequent stock return performance**

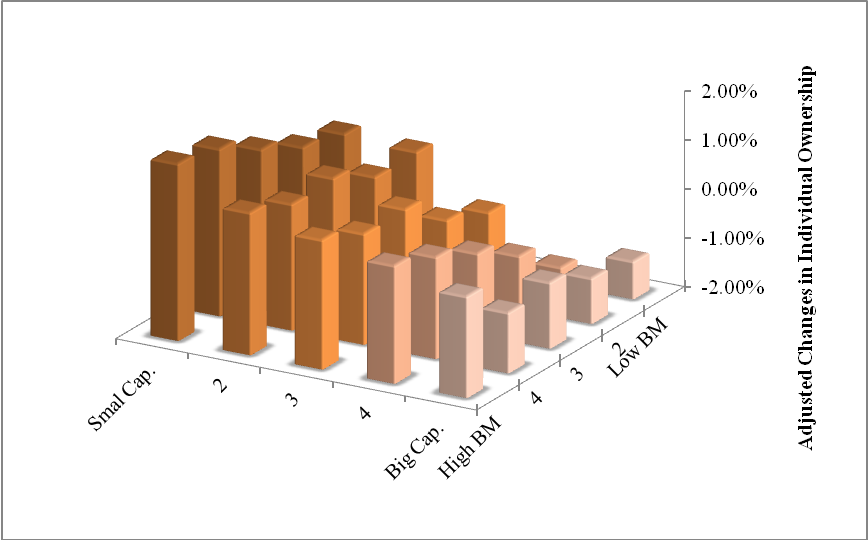


**Figure 2. Average adjusted changes in institutional ownership (*AdjDITH*) by *BE/ME* and size quintiles**



For each year, we divide all stocks into five groups based on their size (price times shares outstanding) at the end of June of year *t* and into five groups based on *BE/ME* for individual stocks. Size is the market value (price times shares outstanding) at the end of June of each year *t*, *t* = 1975-2005. *BE/ME* is the ratio of book value equity at March at year *t* divided by the market value of equity at the end of March at year *t*. We form 25 portfolios by combining the sorts by size and by *BE/ME*. *AdjDITH* is the adjusted change in institutional ownership.

**Figure 3. Average adjusted changes in individual ownership (*AdjDIND*) by *BE/ME* and size quintiles**



For each year, we divide all stocks into five groups based on their size (price times shares outstanding) at the end of June of year *t* and into five groups based on *BE/ME* for individual stocks. Size is the market value (price times shares outstanding) at the end of June of each year *t*, *t* = 1975-2005. *BE/ME* is the ratio of book value equity at March at year *t* divided by the market value of equity at the end of March at year *t*. We form 25 portfolios by combining the sorts by size and by *BE/ME*. *AdjDIND* is the adjusted change in individual ownership.

**Table 1. Summary statistics of the sample**

This table presents the summary statistics of the sample’s cover period of 1975 to 2005. *ITH* denotes the institutional ownership at the end of prior year (*t*-1), and *IND* denotes the individual ownership at the end of prior year (*t*-1). The book-to-market ratio (*BE/ME*) is computed as the ratio of the book value of equity of year t divided by the market value of equity at the end of March of year t. Market capitalization (*ME*) is computed as the market equity at the end of June in the calendar year *t*. *DITH* denotes the changes in institutional ownership between fiscal year end of *t*-2 and fiscal year end of *t*-1, and *DIND* denotes the changes in individual ownership between fiscal year end of *t*-2 and fiscal year end of *t*-1. Adjusted change in institutional ownership (*AdjDITH*) is defined as *DITH* subtracted from the median value of industry *DITH*, where industry *DITH* is measured by the two-digits SIC industry. Adjusted change in individual ownership (*AdjDIND*) is defined similarly. Panel A reports the summary statistics of the sample, and Panel B provides the Person correlation coefficients of the variables.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Panel A. Descriptive Statistics of the Test Variables** | | | | | | | |
| Variable | Mean | Std Dev | P5 | P25 | P50 | P75 | P95 |
| *BE/ME* | 0.68 | 0.53 | 0.15 | 0.34 | 0.53 | 0.81 | 1.79 |
| *ME* ($millions) | 111,558 | 233,535 | 3,024 | 11,492 | 31,450 | 93,915 | 514,387 |
| *ITH* (%) | 61.96 | 15.09 | 33.03 | 52.97 | 63.97 | 73.06 | 83.43 |
| *IND* (%) | 32.09 | 16.38 | 10.55 | 20.06 | 29.45 | 40.89 | 63.10 |
| *DITH* (%) | 0.15 | 4.54 | -6.84 | -1.90 | -0.11 | 1.82 | 8.26 |
| *DIND* (%) | 0.20 | 7.96 | -9.44 | -2.00 | -0.04 | 1.82 | 9.90 |
| *AdjDITH* (%) | 0.17 | 4.35 | -6.75 | -1.65 | 0.00 | 1.75 | 7.73 |
| *AdjDIND* (%) | 0.03 | 7.31 | -8.93 | -1.71 | 0.00 | 1.76 | 8.70 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Panel B. Pearson Correlation Coefficients of the Test Variables (%)** | | | | | | | | |
|  | *BE/ME* | *ME* | *ITH* | *IND* | *DITH* | *DIND* | *AdjDITH* | *AdjDIND* |
| *BE/ME* | 100.00 |  |  |  |  |  |  |  |
| *ME* | -18.36 | 100.00 |  |  |  |  |  |  |
| *ITH* | -8.48 | 10.01 | 100.00 |  |  |  |  |  |
| *IND* | 10.62 | -23.76 | -72.74 | 100.00 |  |  |  |  |
| *DITH* | -15.63 | -1.30 | -22.49 | 12.41 | 100.00 |  |  |  |
| *DIND* | 12.14 | -5.19 | -1.88 | -33.69 | -27.75 | 100.00 |  |  |
| *AdjDITH* | -7.09 | -1.63 | -21.49 | 11.03 | 96.94 | -26.19 | 100.00 |  |
| *AdjDIND* | 8.11 | -3.66 | -0.79 | -33.07 | -27.38 | 94.32 | -28.17 | 100.00 |

**Table 2. Average monthly percent returns and characteristics of quintile portfolios formed on size and book-to-market equity**

For each year, we divide all stocks into five groups based on their size (price times shares outstanding) at the end of June of year *t* and into five groups based on *BE/ME* for individual stocks. Size is the market value (price times shares outstanding) at the end of June of each year *t*, *t* = 1975-2005. *BE/ME* is the ratio of book value equity of fiscal year end of *t-1* divided by the market value of equity at the end of March at year *t*. We form 25 portfolios by combining the sorts by size and by *BE/ME*. *AdjDITH*, *AdjDIND*, *ITH*, and *IND* are the adjusted changes in institutional ownership, adjusted changes in individual ownership, institutional ownership, and individual ownership, respectively, which are computed as explained in Table 1. Equal-weighted and value-weighted averages are calculated. All numbers are in percentage.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | Size Quintile | | | | | | |  |  |  |
|  | Panel A: Average Monthly Return (Equal Weighted) | | | | | |  |  | Panel B: Average Monthly Return (Value Weighted) | | | | | |
| *BE/ME* Quintile | Small | 2 | 3 | 4 | Large | All |  | *BE/ME* Quintile | Small | 2 | 3 | 4 | Large | All |
| Low | 1.58 | 0.65 | 1.05 | 0.41 | 0.57 | 0.85 |  | Low | 1.46 | 0.64 | 1.03 | 0.41 | 0.51 | 0.81 |
| 2 | 1.41 | 0.83 | 0.84 | 0.68 | 0.72 | 0.90 |  | 2 | 1.35 | 0.84 | 0.83 | 0.69 | 0.74 | 0.89 |
| 3 | 1.45 | 1.16 | 0.94 | 0.92 | 0.90 | 1.07 |  | 3 | 1.35 | 1.11 | 0.92 | 0.94 | 0.89 | 1.04 |
| 4 | 1.32 | 1.13 | 0.87 | 1.03 | 0.94 | 1.09 |  | 4 | 1.25 | 1.1 | 0.85 | 1.02 | 1.08 | 1.06 |
| High | 1.51 | 1.15 | 1.06 | 1.02 | 0.99 | 1.15 |  | High | 1.41 | 1.11 | 1.06 | 1.03 | 1.04 | 1.13 |
| All | 1.46 | 0.98 | 0.95 | 0.81 | 0.82 |  |  | All | 1.36 | 0.96 | 0.94 | 0.82 | 0.85 |  |

**Table 2. continued**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | Size Quintile | | | | | | |  |  |  |
|  | Panel C: *AdjDITH* | | | | | |  |  | Panel D: *AdjDIND* | | | | | |
| *BE/ME* Quintile | Small | 2 | 3 | 4 | Large | All |  | *BE/ME* Quintile | Small | 2 | 3 | 4 | Large | All |
| Low | 0.23 | 0.23 | 0.57 | 0.63 | 0.24 | 0.38 |  | Low | 0.21 | 0.14 | -0.82 | -1.65 | -1.23 | -0.67 |
| 2 | 0.17 | 0.26 | 0.45 | 0.63 | 0.02 | 0.31 |  | 2 | 0.44 | 0.12 | -0.47 | -0.91 | -1.07 | -0.38 |
| 3 | 0.02 | 0.18 | 0.18 | 0.20 | 0.27 | 0.17 |  | 3 | 0.9 | 0.60 | 0.26 | -0.36 | -0.66 | 0.15 |
| 4 | -0.13 | 0.28 | -0.01 | 0.03 | -0.07 | 0.02 |  | 4 | 1.41 | 0.58 | 0.26 | 0.08 | -0.77 | 0.31 |
| High | 0.03 | 0.06 | -0.21 | -0.17 | 0.11 | -0.04 |  | High | 1.61 | 0.90 | 0.64 | 0.41 | 0.07 | 0.73 |
| All | 0.06 | 0.20 | 0.20 | 0.27 | 0.11 |  |  | All | 0.91 | 0.47 | -0.03 | -0.49 | -0.73 |  |
|  | Panel E: Average *ITH* | | | | | |  |  | Panel F: Average *IND* | | | | | |
| *BE/ME* Quintile | Small | 2 | 3 | 4 | Large | All |  | *BE/ME* Quintile | Small | 2 | 3 | 4 | Large | All |
| Low | 60.24 | 63.77 | 65.70 | 64.29 | 62.37 | 63.27 |  | Low | 37.53 | 32.62 | 30.01 | 29.22 | 24.84 | 30.84 |
| 2 | 57.68 | 62.52 | 62.57 | 63.82 | 64.36 | 62.19 |  | 2 | 39.53 | 33.49 | 32.70 | 29.17 | 24.56 | 31.89 |
| 3 | 58.21 | 60.25 | 61.71 | 65.10 | 65.66 | 62.19 |  | 3 | 38.83 | 35.56 | 33.00 | 27.85 | 24.82 | 32.01 |
| 4 | 57.52 | 59.53 | 62.25 | 65.26 | 65.59 | 62.03 |  | 4 | 39.08 | 36.15 | 32.62 | 27.93 | 26.25 | 32.41 |
| High | 55.67 | 57.68 | 62.91 | 64.94 | 64.52 | 61.14 |  | High | 40.25 | 37.47 | 31.94 | 28.93 | 27.82 | 33.28 |
| All | 57.86 | 60.75 | 63.03 | 64.68 | 64.50 |  |  | All | 39.04 | 35.06 | 32.05 | 28.62 | 25.66 |  |

**Table 3. Characteristics of the quintile portfolios formed on book-to-market equity ratio or size**

The table reports the mean values of the monthly equal- and value-weighted stock returns and adjusted changes in institutional ownership, adjusted changes in individual ownership, institutional ownership, and individual ownership for stocks grouped into five portfolios based on *BE/ME* or size. Only the values for stocks in the smallest/largest group and the lowest/highest *BE/ME* group are shown. All returns are in percentage. The variable definitions are presented in Table 1. *t*-statistics are shown in parentheses. The asterisks \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively. All numbers are presented in percentage.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Time-Series Averages of Monthly Cross-Sectional Means** | | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  | |
|  | **Panel A: *BE/ME* Quintiles** | | | |  | **Panel B: Size Quintiles** | | | | |
|  | **High** | **Low** | **High-Low** | **t-stat.** |  | **Small** | **Large** | **Small-Large** | | **t-stat.** |
|  |  |  |  |  |  |  |  |  | |  |
| *Ewret* | 1.24 | 0.89 | 0.35\*\* | (1.97) |  | 1.47 | 0.77 | 0.70\*\* | | (2.41) |
| *Vwret* | 1.08 | 0.62 | 0.46\* | (1.82) |  | 1.38 | 0.75 | 0.63\* | | (1.93) |
| *ITH* | 59.14 | 62.28 | -3.14\*\*\* | (-4.99) |  | 57.01 | 63.46 | -6.45\*\*\* | | (-14.08) |
| *IND* | 35.83 | 30.41 | 5.42\*\*\* | (5.81) |  | 39.70 | 25.56 | 14.14\*\*\* | | (8.20) |
| *AdjDITH* | -0.04 | 0.41 | -0.45\*\*\* | (-2.58) |  | 0.03 | 0.10 | -0.07 | | (-0.31) |
| *AdjDIND* | 0.99 | -0.75 | 1.74\*\*\* | (5.53) |  | 1.31 | -1.00 | 2.31\*\* | | (2.35) |

**Table 4. Average parameter values from the cross-sectional regressions of annual book-to-market ratio and size on changes in institutional and individual ownership**

The annual logarithm of book-to-market ratio (size) is regressed on the adjusted changes in institutional ownership (*AdjDITH*) and adjusted changes in individual ownership (*AdjDIND*). Average parameter values are the time series averages, and *t*-statistics are time-series averages divided by the time-series standard errors (198 months). Ln denotes the natural logarithm. The variable definitions are presented in Table 1. *t*-statistics are shown in parentheses. The asterisks \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Regression Specification, Average Parameter Values (%) and t-statistics** | | | | | | |
|  |  |  | |  | |  |
| **Dependent variable** | **Intercept** | | ***AdjDITH*** | | ***AdjDIND*** |  |
|  |  | |  | |  |  |
| Ln(*BE/ME*) | -0.61\*\*\* | | -0.70\*\*\* | |  |  |
| (-7.36) | | (-2.79) | |  |  |
| -0.61\*\*\* | |  | | 0.74\*\*\* |  |
| (-7.40) | |  | | (4.77) |  |
|  |  | |  | |  |  |
| Ln(*ME*) | 10.40\*\*\* | | 0.42 | |  |  |
| (98.95) | | (0.54) | |  |  |
| 10.41\*\*\* | |  | | -1.94\*\*\* |  |
| (99.49) | |  | | (-4.90) |  |
|  |  | |  | |  |  |

**Table 5. Average monthly percent returns and characteristics of the decile portfolios formed on *AdjDITH***

For each year from 1975 to 2005, all selected stocks in the sample are first sorted into 10 portfolios based on the fraction of shares held by institutional investors. Then, firms within each initial institutional-ownership-sorted portfolio are sorted into 10 portfolios based on the institutional trade imbalance. Finally, firms with the largest institutional trade imbalance are re-aggregated across the 10 initial institutional ownership sorted portfolios to form a stratified portfolio that shows the largest increase in institutional ownership. Similarly, firms within each of the other nine portfolios are re-aggregated in the same manner. *EW* (*VW*) return is calculated as an equal- (value-) weighted portfolio based on the adjusted changes in institutional ownership. “Carhart’s alpha” indicates the risk adjusted returns by Carhart’s (1997) four factors, i.e., market excess returns, *HML*, *SMB,* and *MOM*. “*SZBM*-adjusted” denotes *BE/ME* and size benchmark-adjusted returns. *t*-statistics are shown in parentheses. The asterisks \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Panel A: Returns** | **Low** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **High** | **High-Low** |
| *EW* raw return | 1.12 | 1.22 | 1.10 | 1.09 | 1.07 | 1.14 | 1.05 | 1.07 | 0.82 | 0.66 | -0.46\*\*\* |
| t ratio | (2.96) | (3.42) | (3.32) | (3.43) | (3.46) | (3.71) | (3.55) | (3.37) | (2.77) | (2.19) | (-2.97) |
| *EW* Carhart’s alpha | 0.12 | 0.16 | 0.19 | 0.18 | 0.14 | 0.21 | 0.21 | 0.13 | 0.05 | -0.01 | -0.13 |
| t ratio | (0.81) | (1.36) | (1.71) | (1.76) | (1.42) | (2.10) | (2.17) | (1.28) | (0.43) | (-0.11) | (-1.06) |
| *EW SZBM*-adjusted | 0.09 | 0.16 | 0.09 | 0.01 | -0.05 | 0.06 | 0.07 | 0.09 | -0.08 | -0.20 | -0.29\*\* |
| t ratio | (0.82) | (1.41) | (1.63) | (0.23) | (-0.77) | (0.82) | (1.50) | (0.76) | (-1.65) | (-2.51) | (-2.29) |
| *VW* raw return | 0.90 | 0.99 | 0.90 | 0.95 | 0.92 | 0.83 | 0.83 | 0.88 | 0.65 | 0.45 | -0.45\*\*\* |
| t ratio | (2.86) | (2.89) | (3.18) | (3.48) | (3.31) | (2.99) | (3.14) | (2.78) | (2.30) | (1.52) | (-2.78) |
| *VW* Carhart’s alpha | 0.15 | 0.05 | 0.27 | 0.20 | 0.14 | 0.08 | 0.19 | 0.16 | 0.02 | -0.11 | -0.26\* |
| t ratio | (0.99) | (0.33) | (2.19) | (1.71) | (1.09) | (0.59) | (1.55) | (1.04) | (0.15) | (-0.70) | (-1.75) |
| *VW* *SZBM*-adjusted | 0.08 | 0.10 | 0.11 | 0.08 | 0.04 | 0.06 | 0.05 | 0.10 | -0.10 | -0.19 | -0.27\*\* |
| t ratio | (0.69) | (0.58) | (1.25) | (0.94) | (0.39) | (0.55) | (0.61) | (0.68) | (-1.38) | (-1.76) | (-1.98) |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Panel B: Characteristics** | |  |  |  |  |  |  |  |  |  |  |
| *PR1 EW* | 1.09 | 0.80 | 0.81 | 0.85 | 0.96 | 0.86 | 1.03 | 1.28 | 1.37 | 1.83 | 0.74\*\*\* |
| t ratio | (3.00) | (2.36) | (2.44) | (2.67) | (3.03) | (2.94) | (3.55) | (4.29) | (4.82) | (6.01) | (3.66) |
| *PR1 VW* | 1.41 | 1.12 | 1.19 | 1.18 | 1.19 | 1.13 | 1.19 | 1.63 | 1.59 | 1.90 | 0.49\*\* |
| t ratio | (4.48) | (3.83) | (3.94) | (4.16) | (4.23) | (4.12) | (4.23) | (5.58) | (5.81) | (6.57) | (2.21) |
| *PR2EW* | 1.34 | 0.90 | 0.79 | 0.75 | 0.67 | 0.90 | 0.86 | 1.09 | 1.40 | 1.80 | 0.46\*\*\* |
| t ratio | (3.81) | (2.68) | (2.46) | (2.42) | (2.20) | (2.97) | (2.89) | (3.54) | (4.66) | (5.89) | (3.36) |
| *PR2 VW* | 1.40 | 1.02 | 1.09 | 0.97 | 0.90 | 1.29 | 1.17 | 1.56 | 1.69 | 1.88 | 0.48\*\*\* |
| t ratio | (4.60) | (3.39) | (3.75) | (3.45) | (3.41) | (4.76) | (3.97) | (5.36) | (6.02) | (6.21) | (2.50) |
| *ITH* | 61.83 | 61.37 | 61.29 | 61.25 | 61.40 | 61.28 | 61.38 | 61.23 | 61.23 | 61.31 | -0.52 |
| *IND* | 32.70 | 32.61 | 33.11 | 32.94 | 33.50 | 33.01 | 33.04 | 32.58 | 31.75 | 30.77 | -1.93 |
| *AdjDITH* | -7.56 | -3.38 | -1.83 | -0.93 | -0.20 | 0.40 | 1.16 | 2.17 | 3.83 | 7.81 | 15.37\*\*\* |
| *AdjDIND* | 4.13 | 2.05 | 1.21 | 0.88 | 0.22 | -0.31 | -0.62 | -1.21 | -2.07 | -3.87 | -8.00\*\*\* |
| *BE/ME* | 0.67 | 0.71 | 0.73 | 0.74 | 0.76 | 0.73 | 0.71 | 0.67 | 0.65 | 0.55 | -0.12\*\*\* |
| *ME* ($millions) | 106,077 | 122,663 | 116,509 | 103,048 | 103,253 | 103,015 | 98,830 | 114,870 | 112,126 | 108,080 | 2,003 |
|  |  |  |  |  |  |  |  |  |  |  |  |

**Table 6. Average monthly percent returns and characteristics for decile portfolios formed on the *AdjDIND***

For each year from 1975 to 2005, all selected stocks in the sample are first sorted into 10 portfolios based on the fraction of shares held by individual investors. Secondly, firms within each initial individual-ownership-sorted portfolio are then sorted into 10 portfolios based on the individual trade imbalance. Finally, firms with the largest individual trade imbalance are then re-aggregated across the 10 initial individual ownership sorted portfolios to form a stratified portfolio that shows the largest increase in individual ownership. Similarly, firms within each of the other nine portfolios are re-aggregated in the same manner. *EW* (*VW*) return is calculated as an equal- (value-) weighted portfolio based on the adjusted changes in individual ownership. “Carhart’s alpha” indicates the risk adjusted returns by Carhart’s (1997) four factors, i.e., market excess returns, *HML*, *SMB,* and *MOM*. “*SZBM*-adjusted” denotes *BE/ME* and size benchmark-adjusted returns. *t*-statistics are shown in parentheses. The asterisks \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Panel A: Returns** | **Low** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **High** | **High-Low** |
| *EW* raw return | 0.71 | 0.79 | 0.96 | 0.97 | 1.11 | 1.12 | 1.09 | 1.34 | 1.07 | 0.99 | 0.28 |
| t ratio | (2.29) | (2.70) | (3.30) | (3.32) | (3.70) | (3.58) | (3.43) | (3.78) | (3.00) | (2.61) | (1.19) |
| *EW* Carhart’s alpha | 0.97 | 0.54 | 0.27 | 0.06 | -0.05 | -0.20 | -0.16 | -0.21 | -0.15 | 0.16 | -0.81\*\*\* |
| t ratio | (7.29) | (4.73) | (2.57) | (0.61) | (-0.49) | (-1.90) | (-1.62) | (-1.96) | (-1.20) | (1.15) | (-5.46) |
| *EW SZBM*-adjusted | 0.01 | -0.05 | 0.00 | -0.06 | 0.14 | -0.06 | 0.01 | 0.23 | 0.02 | 0.02 | 0.01 |
| t ratio | (0.14) | (-1.08) | (-0.06) | (-0.87) | (1.25) | (-0.77) | (0.17) | (1.83) | (0.21) | (0.25) | (0.06) |
| *VW* raw return | 0.62 | 0.65 | 0.77 | 0.91 | 0.61 | 0.91 | 0.75 | 1.05 | 0.88 | 0.79 | 0.17 |
| t ratio | (2.06) | (2.27) | (2.85) | (3.38) | (2.30) | (3.19) | (2.65) | (3.21) | (2.73) | (2.36) | (0.37) |
| *VW* Carhart’s alpha | 1.23 | 0.81 | 0.83 | 0.52 | 0.29 | 0.21 | 0.08 | 0.10 | -0.02 | 0.42 | -0.81\*\*\* |
| t ratio | (6.92) | (5.46) | (5.91) | (3.72) | (2.33) | (1.57) | (0.59) | (0.64) | (-0.15) | (2.39) | (-3.75) |
| *VW* SZBM-adjusted | 0.01 | -0.04 | 0.02 | 0.03 | 0.04 | -0.04 | -0.02 | 0.13 | -0.02 | -0.06 | -0.07 |
| t ratio | (0.15) | (-0.60) | (0.17) | (0.30) | (0.31) | (-0.45) | (-0.21) | (0.91) | (-0.23) | (-0.48) | (-0.46) |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Panel B: Characteristics** | |  |  |  |  |  |  |  |  |  |  |
| *PR1 EW* | 2.24 | 1.64 | 1.29 | 1.20 | 1.01 | 0.86 | 0.71 | 0.69 | 0.58 | 0.75 | -1.49\*\*\* |
| t ratio | (6.68) | (5.86) | (4.52) | (4.12) | (3.48) | (2.80) | (2.29) | (2.04) | (1.66) | (1.93) | (-7.40) |
| *PR1 VW* | 2.51 | 1.82 | 1.60 | 1.29 | 1.09 | 0.93 | 0.71 | 0.74 | 0.63 | 1.04 | -1.47\*\*\* |
| t ratio | (7.73) | (6.75) | (5.68) | (4.84) | (4.05) | (3.25) | (2.42) | (2.32) | (1.94) | (3.03) | (-5.89) |
| *PR2EW* | 1.93 | 1.47 | 1.20 | 0.96 | 0.88 | 0.73 | 0.75 | 0.71 | 0.75 | 1.12 | -0.81\*\*\* |
| t ratio | (6.10) | (4.88) | (4.08) | (3.28) | (2.95) | (2.43) | (2.41) | (2.19) | (2.20) | (3.04) | (-5.19) |
| *PR2 VW* | 2.08 | 1.64 | 1.54 | 1.27 | 1.03 | 0.93 | 0.77 | 0.81 | 0.70 | 1.14 | -0.94\*\*\* |
| t ratio | (6.78) | (5.70) | (5.79) | (4.65) | (3.93) | (3.36) | (2.65) | (2.59) | (2.23) | (3.34) | (-4.17) |
| *ITH* | 62.91 | 61.91 | 61.60 | 62.02 | 62.01 | 61.75 | 61.57 | 61.27 | 60.51 | 57.58 | -5.33\*\*\* |
| *IND* | 33.55 | 32.78 | 32.59 | 32.55 | 32.43 | 32.48 | 32.48 | 32.63 | 32.36 | 32.17 | -1.38 |
| *AdjDITH* | 3.03 | 2.32 | 1.50 | 0.91 | 0.45 | 0.10 | -0.46 | -1.07 | -1.87 | -3.31 | -6.34\*\*\* |
| *AdjDIND* | -9.40 | -4.71 | -2.70 | -1.49 | -0.54 | 0.18 | 1.13 | 2.27 | 4.40 | 11.22 | 20.62\*\*\* |
| *BE/ME* | 0.52 | 0.61 | 0.65 | 0.69 | 0.71 | 0.75 | 0.74 | 0.76 | 0.75 | 0.73 | 0.21\*\*\* |
| *ME* ($millions) | 134,066 | 138,348 | 139,760 | 126,797 | 120,562 | 106,817 | 90,808 | 90,466 | 79,372 | 59,059 | -75,007\*\*\* |
|  |  |  |  |  |  |  |  |  |  |  |  |

**Table 7. Average parameter values from the cross-sectional regressions of monthly returns on size, book-to-market ratio, and adjusted changes in institutional and individual ownership**

Raw monthly returns are regressed on size (ME), *BE/ME*, adjusted changes in institutional ownership (*AdjDITH*), and adjusted changes in individual ownership (*AdjDIND*). Size is the market value (price times shares outstanding) at the end of June of each year *t*, *t* = 1975-2005. *BE/ME* is the ratio of the book value equity at March at year *t* divided by the market value of equity at the end of March at year *t*. Adjusted change in institutional ownership (*AdjDITH*) is defined as *DITH* subtracted from the median value of industry *DITH*, where industry *DITH* is measured by the two-digits SIC industry. Adjusted change in individual ownership (*AdjDIND*) is defined similarly. Average parameter values are the time series averages, and *t*-statistics are the time-series averages divided by the time-series standard errors (198 months). Ln denotes the natural logarithm. *t*-statistics are shown in parentheses. The asterisks \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Regression specification, average parameter values (%) and *t*-statistics** | | | | | |
|  | |  |  |  |  |
| **Model** | **Intercept** | **Ln(*BE/ME*)** | **Ln(*ME*)** | ***AdjDITH*** | ***AdjDIND*** |
| (1) | 2.53\*\*\* | 0.17\*\* | -0.14\*\* |  |  |
|  | (2.83) | (2.06) | (-2.04) |  |  |
| (2) | 1.00\*\*\* |  |  | -1.89\* |  |
|  | (3.22) |  |  | (-1.80) |  |
| (3) | 1.00\*\*\* |  |  |  | 0.79 |
|  | (3.22) |  |  |  | (1.01) |
| (4) | 1.00\*\*\* |  |  | -1.72\* | 0.38 |
|  | (3.23) |  |  | (-1.92) | (0.59) |
| (5) | 2.56\*\*\* | 0.16\*\* | -0.14\*\* | -1.45\* |  |
|  | (2.89) | (1.97) | (-2.09) | (-1.65) |  |
| (6) | 2.52\*\*\* | 0.16\*\* | -0.14\*\* |  | 0.47 |
|  | (2.86) | (2.02) | (-2.04) |  | (0.74) |
| (7) | 1.15\*\*\* | 0.22\*\*\* |  | -1.73\* | 0.16 |
|  | (3.73) | (2.65) |  | (-1.94) | (0.25) |
| (8) | 2.56\*\*\* |  | -0.15\*\* | -1.47\* | 0.25 |
|  | (2.92) |  | (-2.30) | (-1.78) | (0.49) |
| (9) | 2.56\*\*\* | 0.16\* | -0.14\*\* | -1.44\* | 0.14 |
|  | (2.91) | (1.95) | (-2.10) | (-1.74) | (0.27) |

**Table 8. Portfolio returns based on two-way independent sorts**

This table reports the value-weighted mean monthly portfolio returns for portfolios of stocks formed at the end of June from 1975 to 2005. It also presents the results of the two-way independent sorts based on *AdjDITH* and *AdjDIND* into quintiles. Portfolios are rebalanced annually. Portfolio returns are from the beginning of July of the sorting year to the end of June of the following year. Statistics on “high-low,” “small-large,” and “buy-sell” difference portfolio returns are also reported. For each month, we take the difference in portfolio return for the extreme quintiles. *t*-statistics are shown in parentheses. The asterisks \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Panel A: *BE/ME* Quintile** | | | | | | | | | | | | |
|  | Low | 2 | 3 | 4 | High | High-Low |  | Low | 2 | 3 | 4 | High | High-Low |
| *AdjDITH* Quintile |  |  |  | |  |  | *AdjDIND* Quintile |  |  |  | |  |  |
| Sell | 0.57 | 0.63 | 0.90 | 1.32 | 1.28 | 0.71\*\* | Sell | 0.47 | 0.76 | 0.84 | 1.08 | 0.93 | 0.46 |
| 2 | 1.04 | 0.88 | 0.94 | 1.08 | 0.98 | -0.07 | 2 | 0.51 | 0.84 | 0.90 | 1.04 | 0.99 | 0.47 |
| 3 | 0.65 | 0.99 | 1.10 | 1.07 | 1.12 | 0.47\* | 3 | 0.50 | 0.77 | 1.03 | 0.99 | 1.05 | 0.55\* |
| 4 | 0.33 | 1.00 | 0.78 | 1.07 | 1.15 | 0.81\*\*\* | 4 | 0.40 | 0.69 | 0.79 | 0.97 | 1.27 | 0.87\*\*\* |
| Buy | 0.30 | 0.64 | 0.77 | 0.69 | 0.71 | 0.41 | Buy | 0.85 | 0.62 | 0.90 | 1.12 | 1.00 | 0.15 |
| Buy-Sell | -0.27 | 0.01 | -0.14 | -0.63\*\*\* | -0.57\*\* |  | Buy-Sell | 0.38 | -0.15 | 0.06 | 0.04 | 0.07 |  |
|  | **Panel B: Size Quintile** | | | | | | | | | | | | |
|  | Small | 2 | 3 | 4 | Large | Small-Large |  | Small | 2 | 3 | 4 | Large | Small-Large |
| *AdjDITH* Quintile |  |  |  | |  |  | *AdjDIND* Quintile |  |  |  | |  |  |
| Sell | 1.45 | 1.15 | 0.87 | 0.93 | 0.71 | 0.74\*\* | Sell | 1.34 | 0.98 | 0.83 | 0.63 | 0.72 | 0.61\* |
| 2 | 1.31 | 1.13 | 1.32 | 0.89 | 0.87 | 0.43 | 2 | 1.28 | 0.92 | 0.81 | 0.86 | 0.77 | 0.51 |
| 3 | 1.29 | 1.06 | 0.98 | 0.85 | 0.91 | 0.39 | 3 | 1.41 | 0.92 | 0.96 | 0.81 | 0.77 | 0.64\*\* |
| 4 | 1.44 | 1.07 | 0.85 | 0.83 | 0.74 | 0.70\*\* | 4 | 1.44 | 1.20 | 1.05 | 0.95 | 0.72 | 0.72\*\* |
| Buy | 1.24 | 0.78 | 0.78 | 0.66 | 0.59 | 0.65\*\* | Buy | 1.31 | 1.10 | 1.17 | 0.87 | 0.74 | 0.57\* |
| Buy-Sell | -0.21 | -0.36\* | -0.08 | -0.27 | -0.12 |  | Buy-Sell | -0.03 | 0.12 | 0.33 | 0.23 | 0.02 |  |

**Table 9. Portfolio returns based on dependent double sorts**

This table reports the value-weighted average monthly portfolio returns for portfolios of stocks formed at the end of June from 1975 to 2005. It also presents the results of the two-way independent sorts based on *AdjDITH* and *AdjDIND* into quintiles. Portfolios are rebalanced annually. Portfolio returns are from the beginning of July of the sorting year to the end of June of the following year. Statistics on “high-low,” “small-large,” and “buy-sell” difference portfolio returns are also reported. For each month, we take the difference in portfolio return for the extreme quintiles. *t*-statistics are shown in parentheses. The asterisks \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Panel A: *BE/ME* and Size premiums conditional on changes in institutional ownership (*AdjDITH*)** | | | | | | | | | |
|  | *BE/ME* premium | | | |  | Size premium | | | |
|  | Equal Weighted | t-stat | Value Weighted | t-stat |  | Equal Weighted | t-stat | Value Weighted | t-stat |
|  |  |  |  |  |  |  |  |  |  |
| Large Sell | 0.46\*\* | (2.44) | 0.60\*\* | (2.07) |  | 0.73\*\* | (2.50) | 0.68\*\* | (2.08) |
| P02 | 0.06 | (0.20) | -0.02 | (-0.04) |  | 0.64\*\* | (2.21) | 0.50 | (1.47) |
| P03 | 0.33\*\* | (1.99) | 0.49\* | (1.95) |  | 0.55\* | (1.93) | 0.54\* | (1.74) |
| P04 | 0.62\*\*\* | (3.50) | 0.60\*\* | (2.27) |  | 0.56\*\* | (2.02) | 0.54\* | (1.79) |
| Large Buy | 0.24 | (1.28) | 0.34 | (1.14) |  | 0.67\*\*\* | (2.54) | 0.60\*\* | (2.11) |
| **Panel B: *BE/ME* and Size spreads conditional on changes in individual ownership (*AdjDIND*)** | | | | | | | | | |
|  | *BE/ME* premium | | | |  | Size premium | | | |
|  | Equal Weighted | t-stat | Value Weighted | t-stat |  | Equal Weighted | t-stat | Value Weighted | t-stat |
|  |  |  |  |  |  |  |  |  |  |
| Large Sell | 0.43\*\* | (2.19) | 0.53\* | (1.93) |  | 0.52\* | (1.85) | 0.43 | (1.47) |
| P02 | 0.35\* | (1.91) | 0.42 | (1.47) |  | 0.52\* | (1.78) | 0.46 | (1.45) |
| P03 | 0.46\*\*\* | (2.56) | 0.61\*\* | (2.15) |  | 0.78\*\*\* | (2.72) | 0.76\*\* | (2.36) |
| P04 | 0.48\*\*\* | (2.91) | 0.68\*\*\* | (2.67) |  | 0.70\*\* | (2.52) | 0.66\*\* | (2.19) |
| Large Buy | 0.41\*\* | (2.21) | 0.39 | (1.53) |  | 0.47\* | (1.69) | 0.42 | (1.45) |
|  |  |  |  |  |  |  |  |  |  |

**Table 10. Average returns of *BE/ME* decile portfolios**

For each year from 1975 to 2005, all selected stocks in the sample are sorted into 10 portfolios based on *BE/ME*. EW (VW) return is calculated as an equal- (value-) weighted portfolio based on the adjusted changes in institutional ownership. “*AdjDITH*&*AdjDIND* adjusted” denotes *AdjDITH* and *AdjDIND* benchmark-adjusted returns. The rest of the methods are defined similarly. *t*-statistics are shown in parentheses. The asterisks \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Low | P02 | P03 | P04 | P05 | P06 | P07 | P08 | P09 | High | High-Low |
| **Average returns** | **Panel A: Equal weighted** | | | | | | | | | | |
| Raw | 0.68 | 0.78 | 0.84 | 0.94 | 1.01 | 1.08 | 1.08 | 1.13 | 1.24 | 1.44 | 0.77\*\*\* |
|  | (2.02) | (2.58) | (2.85) | (3.18) | (3.50) | (3.67) | (3.63) | (3.71) | (3.96) | (4.06) | (3.47) |
| *AdjDITH* Adjusted | 0.01 | 0.07 | 0.13 | 0.18 | 0.26 | 0.28 | 0.26 | 0.31 | 0.38 | 0.50 | 0.49\*\* |
|  | (0.06) | (0.44) | (0.94) | (1.31) | (1.82) | (1.91) | (1.67) | (1.79) | (1.96) | (2.16) | (2.48) |
| *AdjDIND* Adjusted | 0.05 | 0.10 | 0.14 | 0.19 | 0.28 | 0.29 | 0.29 | 0.34 | 0.42 | 0.56 | 0.52\*\*\* |
|  | (0.27) | (0.68) | (1.05) | (1.51) | (2.14) | (2.18) | (2.03) | (2.20) | (2.41) | (2.63) | (2.74) |
| *AdjDITH*&*AdjDIND* Adjusted | 0.03 | 0.09 | 0.11 | 0.14 | 0.21 | 0.25 | 0.24 | 0.27 | 0.34 | 0.44 | 0.40\*\* |
|  | (0.22) | (0.75) | (1.01) | (1.41) | (2.05) | (2.38) | (2.11) | (2.18) | (2.38) | (2.37) | (2.32) |
|  | **Panel B: Value weighted** | | | | | | | | | | |
| Raw | 0.29 | 0.62 | 0.68 | 0.81 | 0.88 | 0.99 | 1.10 | 1.04 | 1.11 | 1.38 | 1.09\*\*\* |
|  | (0.98) | (2.28) | (2.54) | (2.89) | (3.33) | (3.61) | (3.83) | (3.49) | (3.72) | (3.62) | (2.96) |
| *AdjDITH* Adjusted | -0.36 | -0.07 | -0.05 | 0.02 | 0.15 | 0.22 | 0.26 | 0.26 | 0.25 | 0.52 | 0.88\*\* |
|  | (-2.83) | (-0.79) | (-0.62) | (0.19) | (1.54) | (1.99) | (1.82) | (1.74) | (1.48) | (1.60) | (2.31) |
| *AdjDIND* Adjusted | -0.36 | -0.07 | -0.07 | -0.02 | 0.13 | 0.20 | 0.27 | 0.31 | 0.26 | 0.58 | 0.94\*\*\* |
|  | (-3.00) | (-0.74) | (-0.85) | (-0.18) | (1.40) | (2.25) | (2.27) | (2.44) | (1.72) | (1.88) | (2.63) |
| *AdjDITH*&*AdjDIND* Adjusted | -0.29 | -0.04 | -0.05 | -0.03 | 0.09 | 0.18 | 0.21 | 0.19 | 0.17 | 0.43 | 0.72\*\* |
|  | (-3.37) | (-0.57) | (-0.74) | (-0.50) | (1.43) | (2.63) | (2.64) | (2.03) | (1.46) | (1.51) | (2.27) |

**Table 11. Average returns of size decile portfolios**

For each year from 1975 to 2005, all selected stocks in the sample are sorted into 10 portfolios based on size. *EW* (*VW*) return is calculated as an equal- (value-) weighted portfolio based on the adjusted changes in institutional ownership. “*AdjDITH*&*AdjDIND* adjusted” denotes *AdjDITH* and *AdjDIND* benchmark-adjusted returns. The rest of the methods are defined similarly. *t*-statistics are shown in parentheses. The asterisks \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Small | P02 | P03 | P04 | P05 | P06 | P07 | P08 | P09 | Large | Small-Large |
| **Average returns** | **Panel A: Equal weighted** | | | | | | | | | | |
| Raw | 1.77 | 1.28 | 1.16 | 0.99 | 0.96 | 0.85 | 0.80 | 0.78 | 0.79 | 0.76 | 1.01\*\*\* |
|  | (4.55) | (3.65) | (3.37) | (3.00) | (2.97) | (2.67) | (2.59) | (2.72) | (2.89) | (3.03) | (2.98) |
| *AdjDITH* Adjusted | 0.88 | 0.47 | 0.34 | 0.21 | 0.18 | 0.08 | 0.06 | 0.06 | 0.05 | 0.00 | 0.88\*\*\* |
|  | (2.96) | (1.94) | (1.53) | (1.05) | (0.97) | (0.47) | (0.40) | (0.47) | (0.55) | (0.02) | (2.71) |
| *AdjDIND* Adjusted | 0.95 | 0.53 | 0.40 | 0.24 | 0.21 | 0.12 | 0.06 | 0.05 | 0.05 | 0.00 | 0.95\*\*\* |
|  | (3.30) | (2.31) | (1.93) | (1.32) | (1.25) | (0.74) | (0.44) | (0.44) | (0.67) | (-0.04) | (3.03) |
| *AdjDITH*&*AdjDIND* Adjusted | 0.84 | 0.44 | 0.33 | 0.17 | 0.15 | 0.05 | 0.02 | 0.03 | 0.04 | 0.00 | 0.85\*\*\* |
|  | (3.24) | (2.23) | (1.90) | (1.13) | (1.06) | (0.38) | (0.17) | (0.38) | (0.67) | (-0.10) | (2.98) |
|  | **Panel B: Value weighted** | | | | | | | | | | |
| Raw | 1.61 | 1.26 | 1.13 | 0.97 | 0.96 | 0.84 | 0.79 | 0.78 | 0.79 | 0.69 | 0.92\*\*\* |
|  | (4.32) | (3.60) | (3.30) | (2.97) | (2.97) | (2.65) | (2.57) | (2.72) | (2.87) | (2.69) | (2.62) |
| *AdjDITH* Adjusted | 0.76 | 0.46 | 0.31 | 0.20 | 0.18 | 0.08 | 0.06 | 0.05 | 0.04 | -0.03 | 0.79\*\* |
|  | (2.71) | (1.89) | (1.43) | (1.02) | (0.96) | (0.43) | (0.40) | (0.46) | (0.52) | (-0.47) | (2.41) |
| *AdjDIND* Adjusted | 0.83 | 0.51 | 0.37 | 0.23 | 0.21 | 0.11 | 0.06 | 0.05 | 0.05 | -0.04 | 0.87\*\*\* |
|  | (3.04) | (2.24) | (1.81) | (1.28) | (1.25) | (0.69) | (0.43) | (0.43) | (0.64) | (-0.68) | (2.77) |
| *AdjDITH*&*AdjDIND* Adjusted | 0.73 | 0.42 | 0.30 | 0.16 | 0.14 | 0.04 | 0.02 | 0.03 | 0.04 | -0.03 | 0.76\*\*\* |
|  | (2.97) | (2.16) | (1.77) | (1.08) | (1.05) | (0.31) | (0.16) | (0.36) | (0.69) | (-0.68) | (2.78) |

**Table 12. Source of changes in value premium and size premium**

The table provides the results from estimating the two-factor regression equation and variance decomposition for *BE/ME* and size premiums. Panel A provides the estimation results of the two-factor regression equation:where *k* is the spreads based on *BE/ME* (*HML*) and size (*SMB*) portfolios shown in Tables 10 and 11. *RAdjDITH* is the spread returns on *AdjDITH* portfolios presented in Table 5 (defined as returns on stocks with heavy institutional net-selling minus returns on stocks with heavy institutional net-buying). *RAdjDIND* is the spread returns on *AdjDIND* portfolios which presented in Table 6 (defined as returns on stocks with heavy individual net-buying minus returns on stocks with heavy individual net-selling). The portfolio variances are computed using the monthly percentage returns. *t*-statistics are shown in parentheses. Panel B provides the decomposition of the variance [Var(R)] of HML and SMB into three components: (i) the proportion of the variance attributable to the volatility of the institutional trading portfolio, (ii) the proportion attributable to the volatility of the individual trading portfolio, and (iii) the idiosyncratic variance or the variance attributable to the premium itself. The relative contributions of individual components to the total risk appear in bracket.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Equal weighted | | | | | | | | |
|  | Panel A: Regression estimates | | |  |  | Panel B: Variance decomposition | | |
| Dependent variable | *AdjDITH* | *AdjDIND* | Adjusted *R*2 |  |  | *Var*(*AdjDITH*) | *Var* (*AdjDIND*) | *Var*(*ε*) |
| *RHML* | 0.42 | -0.26 | 0.09 |  | Components of *Var*(*RHML*) | 0.00016 | 0.00006 | 0.00168 |
| *t*-ratio | (5.73) | (-3.53) |  |  | Percentage | [8.87%] | [3.36%] | [90.48%] |
| *RSMB* | -0.76 | -0.33 | 0.16 |  | Components of *Var*(*RSMB*) | 0.00054 | 0.00010 | 0.00372 |
| *t*-ratio | (-7.00) | (-2.99) |  |  | Percentage | [12.14%] | [2.21%] | [83.07%] |
| Value weighted | | | |  | | | | |
| *RHML* | 0.37 | 0.07 | 0.02 |  | Components of *Var*(*RHML*) | 0.00014 | 0.00001 | 0.00516 |
| *t*-ratio | (3.06) | (0.77) |  |  | Percentage | [2.56%] | [0.16%] | [97.28%] |
| *RSMB* | -0.33 | -0.27 | 0.05 |  | Components of *Var*(*RSMB*) | 0.00011 | 0.00014 | 0.00450 |
| *t*-ratio | (-2.91) | (-3.26) |  |  | Percentage | [2.25%] | [2.85%] | [94.92%] |

**Table 13. Investing strategies based on independent double sorts**

This table reports the average returns on different investing strategies. First, five portfolios are formed based on *BE/ME* or size, and five portfolios are formed based on *AdjDITH* or *AdjDIND*. Second, 25 portfolios result from the four types of intersections. The intersection between size and *AdjDITH*, size and *AdjDIND*, *BE/ME* and *AdjDITH*, and *BE/ME* and *AdjDIND* is shown in Panels A to D, respectively. The investing strategy “(Small, Sell) – (Large, Sell)” denotes a zero-cost portfolio that buys small stocks with institutional (or individual) net-selling and sells short large stocks with institutional (or individual) net-buying. The rest of the strategies are defined similarly. “Carhart’s alpha” indicates the risk adjusted returns by Carhart’s (1997) four factors, i.e., market excess returns, *HML*, *SMB,* and *MOM*. *t*-statistics are shown in parentheses. The asterisks \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Panel A: BE/ME vs. *AdjDITH*** | | | | | | | | |  | **Panel B: BE/ME vs. *AdjDIND*** | | | | | | | | |
|  | **Raw returns** | | | |  | **Carhart’s alphas** | | | |  | **Raw returns** | | | |  | **Carhart’s alphas** | | | |
| Investing strategy | EW | t-value | VW | t-value |  | EW | t-value | VW | t-value |  | EW | t-value | VW | t-value |  | EW | t-value | VW | t-value |
| (1) (Value, Sell) – (Growth, Sell) | 0.51\*\*\* | (2.54) | 0.71\*\* | (2.41) |  | 0.02 | (0.11) | 0.03 | (0.13) |  | 0.38\* | (1.93) | 0.41 | (1.55) |  | -0.08 | (-0.52) | -0.18 | (-1.02) |
| (2) (Value, Buy) – (Growth, Sell) | 0.03 | (0.12) | 0.14 | (0.50) |  | -0.32\* | (-1.83) | -0.38\* | (-1.80) |  | 0.65\*\*\* | (2.64) | 0.53 | (1.60) |  | -0.01 | (-0.07) | -0.21 | (-0.89) |
| (3) (Value, Sell) – (Growth, Buy) | 0.85\*\*\* | (3.70) | 0.98\*\*\* | (3.01) |  | 0.28\* | (1.83) | 0.33\* | (1.87) |  | 0.19 | (0.79) | 0.43\* | (1.68) |  | -0.14 | (-0.67) | -0.13 | (-0.58) |
| (4) (Value, Buy) – (Growth, Buy) | 0.36\* | (1.85) | 0.41 | (1.39) |  | -0.05 | (-0.36) | -0.08 | (-0.35) |  | 0.06 | (0.21) | 0.15 | (0.44) |  | -0.07 | (-0.47) | -0.16 | (-0.71) |
| (5) (Growth, Sell) – (Growth, Buy) | 0.33\* | (1.86) | 0.27 | (1.47) |  | 0.27\* | (1.65) | 0.31\* | (1.65) |  | -0.59\* | (-1.86) | -0.38 | (-1.12) |  | -0.06 | (-0.32) | 0.05 | (0.21) |
| (6) (Value, Sell) – (Value, Buy) | 0.49\*\*\* | (2.97) | 0.57\*\* | (2.42) |  | 0.34\*\* | (2.15) | 0.41\* | (1.73) |  | -0.19 | (-1.14) | -0.05 | (-0.24) |  | -0.07 | (-0.43) | 0.03 | (0.13) |
| (3) – (1) | 0.33\* | (1.86) | 0.27 | (1.47) |  | 0.27\* | (1.65) | 0.31\* | (1.65) |  | -0.19 | (-0.82) | 0.03 | (0.11) |  | -0.06 | (-0.32) | 0.05 | (0.21) |
| (3) – (2) | 0.82\*\*\* | (2.92) | 0.85\*\*\* | (2.70) |  | 0.60\*\* | (2.44) | 0.71\*\* | (2.32) |  | -0.38 | (-1.10) | -0.02 | (-0.06) |  | -0.13 | (-0.45) | 0.08 | (0.22) |
| (3) – (4) | 0.49\*\*\* | (2.97) | 0.57\*\* | (2.42) |  | 0.34\*\* | (2.15) | 0.41\* | (1.73) |  | -0.19 | (-1.14) | -0.05 | (-0.24) |  | -0.07 | (-0.43) | 0.03 | (0.13) |
| (3) – (5) | 0.51\*\*\* | (2.54) | 0.71\*\* | (2.41) |  | 0.02 | (0.11) | 0.03 | (0.13) |  | 0.38\* | (1.93) | 0.41 | (1.55) |  | -0.08 | (-0.52) | -0.18 | (-1.02) |
| (3) – (6) | 0.36\* | (1.85) | 0.41 | (1.39) |  | -0.05 | (-0.36) | -0.08 | (-0.35) |  | 0.38\* | (1.95) | 0.48\* | (1.79) |  | -0.07 | (-0.47) | -0.16 | (-0.71) |
| (2) – (1) | -0.49\*\*\* | (-2.97) | -0.57\*\* | (-2.42) |  | -0.34\*\* | (-2.15) | -0.41\*\* | (-1.73) |  | 0.19 | (1.14) | 0.05 | (0.24) |  | 0.07 | (0.43) | -0.03 | (-0.13) |
| (2) – (4) | -0.33\* | (-1.86) | -0.27 | (-1.47) |  | -0.27\* | (-1.65) | -0.31\* | (-1.65) |  | 0.59\* | (1.86) | 0.38 | (1.12) |  | 0.06 | (0.32) | -0.05 | (-0.21) |
| (2) – (5) | -0.31 | (-0.89) | -0.14 | (-0.38) |  | -0.58\* | (-1.93) | -0.69\*\* | (-2.05) |  | 1.24\*\* | (2.51) | 0.91 | (1.57) |  | 0.05 | (0.16) | -0.26 | (-0.61) |
| (2) – (6) | -0.46 | (-1.43) | -0.44 | (-1.04) |  | -0.65\*\* | (-2.22) | -0.79\*\* | (-2.00) |  | 0.76\*\* | (2.08) | 0.51 | (1.03) |  | 0.06 | (0.20) | -0.23 | (-0.58) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Panel C: Size vs. *AdjDITH*** | | | | | | | | |  | **Panel D: Size vs. *AdjDIND*** | | | | | | | | |
|  | **Raw returns** | | | |  | **Carhart’s alphas** | | | |  | **Raw returns** | | | |  | **Carhart’s alphas** | | | |
| Investing strategy | EW | t-value | VW | t-value |  | EW | t-value | VW | t-value |  | EW | t-value | VW | t-value |  | EW | t-value | VW | t-value |
| (1) (Small, Sell) – (Large, Sell) | 0.72\*\* | (2.15) | 0.74\*\* | (2.09) |  | 0.36\* | (1.80) | 0.29 | (1.47) |  | 0.67\*\* | (2.21) | 0.61\* | (1.88) |  | 0.32\* | (1.69) | 0.23 | (1.22) |
| (2) (Small, Buy) – (Large, Sell) | 0.59\*\* | (2.01) | 0.53\* | (1.73) |  | 0.32\* | (1.70) | 0.16 | (0.91) |  | 0.67\*\* | (2.07) | 0.56 | (1.61) |  | 0.22 | (1.25) | 0.09 | (0.52) |
| (3) (Small, Sell) – (Large, Buy) | 0.84\*\* | (2.53) | 0.86\*\* | (2.41) |  | 0.42\*\* | (2.17) | 0.40\*\* | (2.08) |  | 0.59\*\* | (2.01) | 0.60\* | (1.92) |  | 0.38\* | (1.75) | 0.35 | (1.60) |
| (4) (Small, Buy) – (Large, Buy) | 0.71\*\* | (2.44) | 0.65\*\* | (2.10) |  | 0.39\*\* | (2.05) | 0.27 | (1.52) |  | 0.58\*\* | (1.98) | 0.54\* | (1.72) |  | 0.28 | (1.45) | 0.21 | (1.09) |
| (5) (Large, Sell) – (Large, Buy) | 0.12 | (1.13) | 0.12 | (0.86) |  | 0.06 | (0.57) | 0.11 | (0.79) |  | -0.08 | (-0.50) | -0.02 | (-0.08) |  | 0.05 | (0.34) | 0.12 | (0.60) |
| (6) (Small, Sell) – (Small, Buy) | 0.13 | (0.63) | 0.21 | (0.95) |  | 0.03 | (0.17) | 0.13 | (0.62) |  | 0.01 | (0.04) | 0.06 | (0.28) |  | 0.10 | (0.55) | 0.14 | (0.72) |
| (3) – (1) | 0.12 | (1.13) | 0.12 | (0.86) |  | 0.06 | (0.57) | 0.11 | (0.79) |  | -0.08 | (-0.50) | -0.02 | (-0.08) |  | 0.05 | (0.34) | 0.12 | (0.60) |
| (3) – (2) | 0.25 | (1.08) | 0.33 | (1.27) |  | 0.10 | (0.43) | 0.24 | (0.97) |  | -0.07 | (-0.28) | 0.04 | (0.14) |  | 0.15 | (0.61) | 0.26 | (0.91) |
| (3) – (4) | 0.13 | (0.63) | 0.21 | (0.95) |  | 0.03 | (0.17) | 0.13 | (0.62) |  | 0.01 | (0.04) | 0.06 | (0.28) |  | 0.10 | (0.55) | 0.14 | (0.72) |
| (3) – (5) | 0.72\*\* | (2.15) | 0.74\*\* | (2.09) |  | 0.36\* | (1.80) | 0.29 | (1.47) |  | 0.67\*\* | (2.21) | 0.61\* | (1.88) |  | 0.32\* | (1.69) | 0.23 | (1.22) |
| (3) – (6) | 0.71\*\* | (2.44) | 0.65\*\* | (2.10) |  | 0.39\*\* | (2.05) | 0.27 | (1.52) |  | 0.58\*\* | (1.98) | 0.54\* | (1.72) |  | 0.28 | (1.45) | 0.21 | (1.09) |
| (2) – (1) | -0.13 | (-0.63) | -0.21 | (-0.95) |  | -0.03 | (-0.17) | -0.13 | (-0.62) |  | -0.01 | (-0.04) | -0.06 | (-0.28) |  | -0.10 | (-0.55) | -0.14 | (-0.72) |
| (2) – (4) | -0.12 | (-1.13) | -0.12 | (-0.86) |  | -0.06 | (-0.57) | -0.11 | (-0.79) |  | 0.08 | (0.50) | 0.02 | (0.08) |  | -0.05 | (-0.34) | -0.12 | (-0.60) |
| (2) – (5) | 0.47 | (1.40) | 0.42 | (1.16) |  | 0.26 | (1.05) | 0.05 | (0.20) |  | 0.75\* | (1.79) | 0.57 | (1.22) |  | 0.17 | (0.60) | -0.03 | (-0.09) |
| (2) – (6) | 0.46 | (1.18) | 0.32 | (0.81) |  | 0.29 | (0.87) | 0.03 | (0.10) |  | 0.66 | (1.54) | 0.50 | (1.09) |  | 0.12 | (0.39) | -0.05 | (-0.16) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Table 14. Sharpe ratios and percentage changes in the Sharpe ratios**

This table reports the Sharpe ratio on different investing strategies. First, five portfolios are formed based on *BE/ME* or size, and five portfolios are formed based on *AdjDITH* or *AdjDIND*. Second, 25 portfolios result from the four types of intersections. The intersection between size and *AdjDITH*, size and *AdjDIND*, *BE/ME* and *AdjDITH*, and *BE/ME* and *AdjDIND* is shown in Panels A to D, respectively. The investing strategy “(Small, Sell) – (Large, Sell)” denotes a zero-cost portfolio that buys small stocks with institutional (or individual) net-selling and sells short large stocks with institutional (or individual) net-buying. The rest of the strategies are defined similarly. The Sharpe ratio for each zero investment factor fund is calculated as the ratio of excess return to standard deviation.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Panel A: *BE/ME* vs. *AdjDITH*** | |  | **Panel B: *BE/ME* vs. *AdjDIND*** | |  |  | **Panel C: Size vs. *AdjDITH*** | | |  | **Panel D: Size vs. *AdjDIND*** | |
| Investing strategy | EW | VW |  | EW | VW |  | Investing strategy | EW | VW | |  | EW | VW |
| (1) (Value, Sell) – (Growth, Sell) | 0.13 | 0.13 |  | 0.10 | 0.08 |  | (1) (Small, Sell) – (Large, Sell) | 0.11 | | 0.11 |  | 0.12 | 0.10 |
| (2) (Value, Buy) – (Growth, Sell) | 0.01 | 0.03 |  | 0.14 | 0.08 |  | (2) (Small, Buy) – (Large, Sell) | 0.10 | | 0.09 |  | 0.11 | 0.08 |
| (3) (Value, Sell) – (Growth, Buy) | 0.19 | 0.16 |  | 0.04 | 0.09 |  | (3) (Small, Sell) – (Large, Buy) | 0.13 | | 0.13 |  | 0.10 | 0.10 |
| (4) (Value, Buy) – (Growth, Buy) | 0.10 | 0.07 |  | 0.01 | 0.02 |  | (4) (Small, Buy) – (Large, Buy) | 0.13 | | 0.11 |  | 0.10 | 0.09 |
| (5) (Growth, Sell) – (Growth, Buy) | 0.10 | 0.08 |  | -0.10 | -0.06 |  | (5) (Large, Sell) – (Large, Buy) | 0.06 | | 0.05 |  | -0.03 | 0.00 |
| (6) (Value, Sell) – (Value, Buy) | 0.16 | 0.13 |  | -0.06 | -0.01 |  | (6) (Small, Sell) – (Small, Buy) | 0.03 | | 0.05 |  | 0.00 | 0.01 |
| Percentage changes in Sharpe ratio (%) | | | | | | |  | | | | | | |
| (3) – (1) | 46 | 23 |  | -60 | 12 |  | (3) – (1) | 18 | | 18 |  | -16 | 0 |
| (3) – (2) | 1800 | 433 |  | -71 | 12 |  | (3) – (2) | 30 | | 44 |  | -9 | 25 |
| (3) – (4) | 90 | 128 |  | 300 | 350 |  | (3) – (4) | 0 | | 18 |  | 0 | 11 |
| (3) – (5) | 90 | 100 |  | -140 | -250 |  | (3) – (5) | 116 | | 160 |  | -433 | 900 |
| (3) – (6) | 19 | 23 |  | -166 | -1000 |  | (3) – (6) | 333 | | 160 |  | 900 | 900 |
| (2) – (1) | -92 | -77 |  | 40 | 0 |  | (2) – (1) | -9 | | -18 |  | -8 | -20 |
| (2) – (4) | -90 | -57 |  | 1300 | 300 |  | (2) – (4) | -23 | | -18 |  | 10 | -11 |
| (2) – (5) | -90 | -63 |  | -240 | -233 |  | (2) – (5) | 66 | | 80 |  | -466 | 700 |
| (2) – (6) | -94 | -77 |  | -333 | -900 |  | (2) – (6) | 233 | | 80 |  | 1000 | 700 |

1. \*Corresponding author, E-mail address: [wfhung@fcu.edu.tw](mailto:wfhung@fcu.edu.tw). Phone**: 886-4-24517250, Ext. 4173.**No. 100 Wenhwa Rd., Seatwen, Taichung, Taiwan 40724, R.O.C.**This research is financially supported by the Taiwan National Science Council (**NSC 100-2410-H-035-025-MY2**).**  [↑](#footnote-ref-1)
2. There are three prominent explanations about the existence of *BE/ME* and size premiums. The first one supports the efficient market hypothesis in which investors are rational. It argues that, as firms with high *BE/ME* (small market capitalization) usually experience poor past performance and have high distress risk, investors require these firms to have high expected returns (e.g., Fama and French, 1993, 1995; Lewellen, 1999; Chen and Zhang, 1998). Second, some economists argue that investors tend to overreact to good or bad news about firms’ fundamentals and exhibit excess extrapolation on firms’ future performance (DeBondt and Thaler, 1987; Lakonishok et al. (1994). For instance, Lakonishok et al. (1994) find that naive investors are inclined to undervalue (overvalue) value (growth) stocks and value (growth) strategies composed of high (low) *BE/ME* stocks, and they bet against those investors who extrapolate past performance too far into the future. When mispricing is subsequently corrected, value (growth) stocks yield higher (lower) returns, implying that overreaction by investors leads to the *BE/ME* effect. The third possible explanation is about data snooping/data problems (i.e., survivorship and look-ahead biases), which suggest that the *BE/ME* or size effect is simply due to chance (Lo and MacKinlay, 1990; Black, 1993; MacKinlay, 1995). [↑](#footnote-ref-2)
3. Moreover, Choe et al. (1999) report short-horizon contrarian patterns of Korean individual investors (i.e., buying after prices go down and selling after prices go up). Grinblatt and Keloharju (2000, 2001) report contrarian tendencies by individual investors (both long- and short-term) using Finnish data. Jackson (2003) demonstrates such short-horizon patterns using Australian data, and Richards (2005) reports similar findings in six Asian markets. In the US, Goetzmann and Massa (2003) examine individuals who invest in an index fund and find that contrarians outnumber momentum traders two to one, and Griffin et al. (2003) document a short-horizon contrarian tendency of traders who submit orders in Nasdaq stocks through a set of retail brokers. By using firm-level margin trading data, Hirose, Kato, and Bremer (2009) show that individual investors in Japan appear to follow negative feedback trading behavior for large stocks and positive feedback trading behavior for small stocks. [↑](#footnote-ref-3)
4. As individual ownership is not directly observable, prior studies refer to shares that are not owned by large institutions as belonging to individual investors (Nofsinger and Sias, 1999; Dennis and Strickland, 2002; Sharma et al. 2006). That is, individual ownership is “implied” from the value of institutional ownership. However, in Japan, firms are required to disclose their shareholder profile (i.e., the number of shares owned by different owner-types) in their formal annual report. Thus, the individual ownership used in this paper is a more straightforward and precise measure than that in past studies. [↑](#footnote-ref-4)
5. Existing studies show that there is a negative long-run relationship between individual trading and future stock returns (Odean, 1999; Barber and Odean, 2000; Grinblatt and Keloharju, 2000). [↑](#footnote-ref-5)
6. Fama and French (2006) find that the value premium is 55% larger for small stocks than for large stocks from 1926 to 2004. They report no evidence of a statistically significant value premium (based on *BE/ME*) for large stocks in the US over the 1926 to 1963 or the 1963 to 2004 subsample periods. [↑](#footnote-ref-6)
7. Following Fama and French (1993), *HML* and *SMB* are constructed as follows. At the beginning of each July of year *t*, all stocks are allocated to two size groups (i.e., small and big, *S* and *B*) based on whether their June of year *t*’s market equity is below or above the median market equity. Then, all stocks are independently allocated to three *BE/ME* groups (i.e., low (*L*), medium (*M*), and high (*H*)) based on the breakpoints for the bottom 30%, middle 40%, and top 30% of the values of March of year *t*’s *BE/ME*. Six size/*BE/ME* portfolios (i.e., *S/L*, *S/M*, *S/H*, *B/L*, *B/M*, and *B/H*) are constructed from the intersections of the two size and the three *BE/ME* groups. Their value-weighted returns are calculated from *t*’s July to the *t*+1’s June, the first 12 months after formation. The portfolio return *HML* is the difference between the average returns on the *S/H* and *B/H* portfolios and the average returns on the *S/L* and *B/L* portfolios. Similarly, *SMB* is the difference between the average returns on the *S/L*, *S/M*, and *S/H* portfolios and the average returns on the *B/L*, *B/M*, and *B/H* portfolios. We construct the returns on winner minus loser (*WML)* as long–short portfolios using momentum information while not holding the other two attributes (i.e., size and *BE/ME* ratio) constant. *WML* is constructed as follows. At the beginning of July of year *t*, each stock in a given sample is assigned to one of the five portfolios based on its prior 12-month cumulative returns. Portfolio “Loser” (“Winner”) refers to the portfolio with the lowest (highest) prior 12-month cumulative returns. *WML* denotes the zero-investment portfolio formed by buying the past winner portfolio and short selling the past loser portfolio. The portfolio returns are value weighted. [↑](#footnote-ref-7)
8. We also calculate a one-dimensional benchmark-adjusted return, that is, *AdjDITH* and *AdjDIND* separately. First, we form 10 decile portfolios based on *AdjDITH* (or *AdjDIND*). Second, the monthly abnormal return for each stock is the difference between the stock’s monthly raw return and its monthly *AdjDITH* (or *AdjDIND*) benchmark portfolio return. [↑](#footnote-ref-8)