Do short-term institutional investors hold riskier stock portfolios?

Abstract

Yan and Zhang (2009) document that short-term institutions are better informed and their study suggests there exists systematic differences between long- and short-term institutional preferences. We extend their study by hypothesizing that in addition to information advantage, short-term institutions are also less risk-averse and hold stocks with higher systematic risks, resulting in better portfolio performance. Consistent with our hypothesis, stock portfolios of short-term institutions have higher aggregate systematic risk than long-term institutions. Stocks increased by short-term institutions outperform stocks increased by long-term institutions by 0.15% monthly. Those stocks increased by short-term institutions have higher factor loadings in Carhart's (1997) four factor model. Our results suggest an inverse relationship between institutional investors' holding horizon and systematic risks of their stock selection.

JEL classification: G11, G12, G14, G20

Keywords: short- (long-) term institutional investors, portfolio risk, portfolio characteristics
1. Introduction

Our study examines the relationship between trading horizons of institutional investors and their portfolio risk characteristics in the U.S stock market from 1980 to 2011. Since institutional investors account for more than 50% of the stock market value, it is important for investors to know more about institutional investors' stock trading and risk management before they delegate their investments to those professional investors. Following Yan and Zhang (2009), we separate institutional investors into three groups according to their average quarterly churn rate. We find short-term institutions hold portfolios with higher market risk than long-term institutions. In comparison with long-term institutions under Carhart’s (1997) four factor model, short-term institutions tend to increase stocks with higher factor loadings on market risk premium, return difference between small size and big size stocks (SMB), return difference between high book-to-market and low book-to-market stocks (HML), and return difference between past winner and past loser stocks (UMD). Our results suggest that part of the explanation for the better performance of stocks increased by short-term institutions is because short-term institutions choose riskier stocks to add into their portfolios.

Gompers and Metrick (2001) document large institutional investors prefer to hold large stocks and their demand for large stocks accounts for the disappearing size premium after 1980. They treat all institutional investors as a group to perform the determinants of institutional ownership analysis and future one quarter return prediction by institutional ownership analysis. Instead of treating all institutions as a group, Yan and Zhang (2009) divide institutions into three groups on the basis of institutions’ trading turnover rate and re-examine the relationship between institutional ownership and equity returns. They find short-term institutions account for the positive relationship between institutional holdings and future stock returns. Furthermore, they argue that short-term institutions are better informed from the evidence that stocks increased by short-term institutions enjoy higher future returns and do not exhibit return reversal in the long run. Another supporting evidence is that they also find short-term institutions' trading is also positively related to future earnings surprises. Yan and Zhang (2009) show that the heterogeneity of institutions in the holding horizon dimension is important for studying institutional investors and that short-term institutional investors are more informed.
Continuing examining the influences of institutions with different holding horizons, Attig, Cleary, Ghoul, and Guedhami (2013) find that firms' cost of equity decreases in the presence of long-term institutions because of improved monitoring and information quality. They attribute their findings to the stability of long-term institutional investors' holding and the resulting relationship investing may favor an information advantage that stems from their ability to engage quality research and collect and process corporate information more efficiently than short-term institutions. Consistent with this argument, Chen, Harford, Li (2007) also document that independent institutions with long-term investments will specialize in monitoring and influence efforts rather than trading. Those researchers find evidence that long-term institutions are better informed about firms' long-term prospects than short-term institutions.

Instead of studying information roles played by short-term and long-term institutional investors, we examine the relationship between equity returns and institutional ownership from the risk-return tradeoff perspective. Specifically, we study whether short-term institutions bear higher systematic risks to have better stock portfolio performance in the future. Previous studies in the institutional investor literature often focus on how institutions may influence equity returns or other characteristics of a stock. To our best knowledge, there is little study on the riskiness of institutional investors' stock portfolios and what are the characteristics of stocks they add or decrease in their portfolios. Yan and Zhang (2009) suggest that there exist systematic differences between short- and long-term institutional preferences. Following this line of thought, we examine the systematic risk of stocks held by short-term and long-term institutions and provide several additional systematic differences between short-term and long-term institutional holdings.

Our sample period for institutional ownership is from 1980 to 2011 and we use institutions listed on the 13F database. In addition, we only use common stocks (with share code 10 and 11) listed in CRSP database for the entire analysis. Following Yan and Zhang (2009), we separate all qualified institutions into three groups based on their average quarterly churn rate. Short (long) term institutions are with the highest (lowest) average quarterly churn rate. To begin with our analysis, we use Herfindahl index to examine the concentration of short-term and long-term institutions' holdings. We find short term institutions have less concentrated stock holding and less holding percentage in each individual stock. In terms of liquidity measure, we find short-term institutions tend to own stocks with lower LM12 as mentioned in Liu (2006), lower
Amihud’s (2002) price impact, and higher turnover rate. Under CAPM model, Carhart’s (1997) four factor model, and Liu’s (2006) LCAPM model, short-term institutions have higher factor loadings on market risk premium, showing that short-term institutions hold stocks with higher market risk than long-term institutions. For the determinants of institutional holding regression similar to Gompers and Metrick (2001) and Yan and Zhang (2009), we find stocks' market beta remains its explanatory power on institutional holding (both short-term and long-term) after controlling return on asset, size, firm age, dividend yield, book to market, price level, turnover, volatility, member of S&P 500 index, past one quarter return, and accumulated return from four quarters ago to one quarter ago. This result shows both short-term and long-term institutions prefer stocks with higher market risk and short-term institutions hold stock portfolios with higher market risk.

Secondly, we compare short-term and long-term portfolio returns. Portfolios of short-term institutions have better past performance than portfolios of long-term institutions, suggesting short-term institutions tend to hold stocks with better performance in the past. In comparison with long-term institutions’ portfolios, short-term institutions’ portfolios have 0.05% higher return. We then use CAPM and Carhart’s (1997) four-factor model to get systematic risks of short-term and long-term stock portfolios. We find that short-term institutions hold portfolios with higher market betas and higher factor loading on SMB than long-term institutions. However, short-term institutions’ portfolios tend to have lower factor loading on HML and lower factor loading on UMD than long-term institutions. For our sample period from 1980 to 2011, the average monthly market risk premium is 0.56%, SMB is 0.14%, HML is 0.32%, and UMD is 0.65%. Under CAPM model, short-term institutions would earn 0.088*0.56% = 0.04928% more than long-term institutions. Under Carhart's (1997) four factor model, short-term institutions would earn 0.052*0.56% + 0.157*0.14% + (-0.024)*0.32% + (-0.018)*0.65% = 0.03172% more than long-term institutions. From 1981Q1 to 2011Q4, short-term institutions' stock portfolio quarterly earn 0.05% higher return than long-term institutions. For a 3 billion portfolio size institution, this 0.05% return difference is equal to 1.5 million per quarter. Hence, short-term institutions bear higher aggregate systematic risk than long-term institutions during our sample period.
Finally, we use CAPM model and Carhart (1997) four-factor model to analyze holding change of short-term and long-term institutions. Comparing stocks increased and decreased by short-term institutions, we find short-term institutions tend to increase stocks with higher factor loadings on market excess return, small size minus big size (SMB), past winner minus past loser (UMD), and similar factor loading on high book-to-market minus low book-to-market (HML), suggesting short-term institutions prefer small stocks and follow momentum strategy. However, although long-term institutions also tend to increase stocks with higher factor loadings on market excess return and SMB than stocks they decrease, long-term institutions tend to increase stocks with lower factor loadings on HML and similar factor loadings on UMD, showing that long-term institutions avoid value stocks and they do not follow momentum strategy. Next, we compare stocks increased by short-term and long-term institutions and then we compare stocks decreased by short-term and long-term institutions. Compared with long-term institutions, short-term institutions increase stocks with higher factor loadings on market excess return, SMB, HML, and UMD. Stocks increased by short-term institutions also outperform stocks increased by long-term institutions by 0.15% per month. For a 3 billion dollar stock portfolio, this 0.15% return difference is equal to 4.5 million dollars per month. From this Carhart's (1997) four factor analysis, it seems short-term institutions select stocks with higher systematic risks to get better future stock portfolio performance than long-term institutions. Compared with long-term institutions, short-term institutions tend to unload stocks with similar market risk, similar factor loading on SMB, lower factor loading on HML and UMD. Since stocks in short-term institutions' portfolios have higher market risk, higher factor loading on SMB, lower factor loadings on HML and UMD than long-term institutions' portfolios, it is reasonable stocks decreased by short-term institutions have similar patterns as their stock portfolios when compared with stocks decreased by long-term institutions.

Our study contributes the institutional investor literature in the following ways. First of all, short-term institutions is more diversified. We document that short-term institutions have a stock portfolio with lower HHI and long-term institutions have a more concentrated stock portfolio. Previous literature document institutional investors often vote with their feet when their investments do not meet their expectations. Our finding that long-term institutions have less stocks in their portfolios implies long-term institutions may spend more time to study those firms
Second, portfolios of short-term institutions outperform portfolios of long-term institutions and stocks increased by short-term institutions outperform stocks increased by long-term institutions suggest short-term institutions bear higher systematic risk than long-term institutions. We use Carhart's (1997) four factor model to analyze stocks increased by each institution and find stocks increased by short-term institutions have higher factor loadings on market excess return, small size minus big size, high book to market ratio minus low book to market ratio, and past winner minus past loser. This fact suggests institutional investors balance their stock holding horizon and stock riskiness in their portfolio. Since short-term institutions hold a stock less longer, they may choose to trade a stock with higher systematic risk.

Third, it is better for individual investors to consider their own risk tolerance before they invest their money to funds managed by institutional investor. Both short-term institutions and long-term institutions increase stocks with higher market beta and higher return on asset stocks in their portfolios. In addition, both institutional investors also hold liquid stocks. Institutional investors have to follow "Prudent Man's Rule" when they select stocks into their portfolio. Liquid stocks and stocks with positive net income seem good candidates to increase. However, both short-term and long-term institutions like stocks with higher market risk shows that institutional investors are less risk averse than individual investors. Investors who are more risk averse may be better off to choose to hold a market portfolio than to invest in the funds managed by institutional investors.

Finally, we show systematic differences between short-term and long-term institutions. Both short-term and long-term institutions increase stocks with market beta greater than one and stocks with positive factor loading on SMB, suggesting that they tend to increase stocks with higher comovement with the market and stocks with size below the median NYSE firm's market capitalization. This result is consistent with the fact that S&P500 membership has negative effect on institutional ownership. Since short-term institutions’ portfolios have significant higher factor loadings on market risk premium and SMB, short-term institutions bear higher market risk and size risk than long-term institutions. Both stocks increased by short-term institutions and stocks

in their holdings and may exert more monitoring as found by Chen et al. (2007) and Attig et al. (2013).
increased by long-term institutions have negative factor loadings on HML, showing that both institutions prefer to increase growth stocks into their portfolios. Since the factor loading difference is not significant, short-term and long-term institutions bear similar value risk. For the factor loading on UMD, stocks increased by short-term institutions have significant positive factor loadings and stocks increased by long-term institutions have insignificant positive factor loadings. Since their UMD factor loading is significant different, short-term institutions tend to follow momentum strategy to increase past winners into their stock portfolio and long-term institutions do not show this pattern.

The rest of the paper is organized as follows. In the next section, we review the literature on institutional investors and equity returns and form our hypothesis. Section 3 describes our data variables and the construction of short-term and long-term institutions. Section 4 reports our empirical results. We conclude our paper in section 5.

2. Literature Review

Our data for institutional investors are from Thomson-Reuters Institutional Holdings (13F) Database, formerly known as CDA/Spectrum 3 4 database. SEC requires all institutions with greater than $100 million of equity securities to report their quarterly holdings using SEC's Form 13F. Gompers and Metrick (2001) find that institutional investors' demand for large stocks account for the disappearing size premium after 1980 and document a positive relationship between institutional ownership and future equity returns. They treat all institutional investors as a group to perform the determinants of institutional ownership and future equity returns regression analysis.

There are five types of institutions in the CDA/Spectrum. Based on institutions' potential business ties with the invested firms, Chen, Harford, and Li (2007) group type 1 (banks), type 2 (insurance companies), and type 5 (except public pension funds) into the grey investor group and group type 3 (investment companies), type 4 (independent investment advisors), and public pension funds (one group of type 5) into the independent investor group. They document only concentrated holdings by independent long-term institutions are related to post-merger performance, suggesting those institutions exert their monitoring role for firms they hold. Jiao and Liu (2008) further show that independent institutional investors' trading predict future stock
returns with no long-run price reversal. Attig, Cleary, Ghoul, and Guedhami (2013) find that firms' cost of equity capital will decrease in the presence of longer term investment horizon institutional investors because those institutions will monitor firms and improve firms' information quality. Those studies suggest only institutions with no potential business ties with firms and with relative longer investment horizons will exert their monitoring role to receive information advantage for their equity holdings.

Yan and Zhang (2009) classify institutional investors into three groups based on their average quarterly churn rate. They find short-term institutions are more informed than long-term institutions because only short-term institutional ownership accounts for the positive relationship between equity returns and institutional ownership. In addition, stocks increased by short-term institutions also outperform stocks decreased by short-term institutions and there is no price-reversal one year later. They suggest firms should also consider attract short-term institutional investors due to those investors' information advantage. Yan and Zhang (2009) also analyze stock characteristics of short-term and long-term institutional holdings and suggest that there exist systematic differences between short-term and long-term institutional preferences. Our study extends their line of thoughts and explores short-term and long-term institutions’ preference differences from the systematic risk perspective.

Sias (1996) document a positive contemporaneous association between institutional ownership and security return volatility after accounting for capitalization. Falkenstein (1996) investigates mutual fund portfolio holdings and find mutual funds are averse to stocks with low idiosyncratic volatility. Their studies suggest that institutional investors prefer stocks with high total risk and high idiosyncratic risk. Our study addresses whether institutional investors also prefer stocks with higher systematic risk.

Since institutional investors account for more than a half of stock market capitalization, their portfolio management behavior may represent how a rational investor manage his/her wealth. If the market is relatively efficient, we expect a portfolio that has higher future return should bear higher systematic risk. Because Yan and Zhang (2009) find short-term institutions account for the positive relationship between institutional ownership and future equity returns, we
hypothesize short-term institutions bear higher systematic risk and perform the following analysis to testify our hypothesis.

3. Data and variables

Our sample period is from 1980Q1 to 2011Q4. We download quarterly institutional ownership data from Thomson-Reuters Institutional Holdings (13F) Database. We get stock information from the Center for Research in Security Prices (CRSP) and only include common stocks (share code 10 or 11) held by institutional investors. After combining institutional ownership and common stock dataset, we delete stock observations with total institutional ownership above 100%. We collect stocks’ book value, total asset, annual cash dividends from COMPUSTAT annual update. For Carhart’s (1997) four factor model analysis, we use factors listed on the WRDS database. We use Liu’s (2006) liquidity augmented asset pricing model for portfolios’ liquidity risk analysis.

Following Yan and Zhang (2009), we classify institutional investors into short-term and long-term institutions based on their portfolio turnover over the past four quarters. We first summarize each institution k’s each stock i holding cash inflow/outflow in quarter t and aggregate those stocks’ cash inflow/outflow to be institution k’s aggregate purchase and sale at the end of quarter t as shown in equation (1) and (2). $S_{k,i,t-1}$ and $S_{k,i,t}$ are number of shares held by institution k at the end of quarter t-1 and t. $P_{i,t-1}$ and $P_{i,t}$ are listed share price of stock i at the end of quarter t-1 and t. We use CRSP price adjustment factor to adjust stock splits and stock dividends to calculate stock i’s price change $\Delta P_{i,t}$ at the end of quarter t.

\[
CR_{buy,K,i}(S_{k,i,t} > S_{k,i,t-1}) = \sum_{i=1}^{N_k} |S_{k,i,t}P_{i,t} - S_{k,i,t-1}P_{i,t-1} - S_{k,i,t-1}\Delta P_{i,t}|
\]

\[
CR_{sell,K,i}(S_{k,i,t} \leq S_{k,i,t-1}) = \sum_{i=1}^{N_k} |S_{k,i,t}P_{i,t} - S_{k,i,t-1}P_{i,t-1} - S_{k,i,t-1}\Delta P_{i,t}|
\]

We then calculate each institution k’s churn rate as shown in equation (3). We use the minimum of aggregate purchase and sale divided by the institution k’s average portfolio holding value during quarter t to be its churn rate at the end of quarter t.
\[ CR_{k,t} = \frac{\min (CR_{\text{buy},k,t}, CR_{\text{sell},k,t})}{\sum_{i=1}^{N} S_{k,t,i} P_{i,t} + S_{k,t-1,i} P_{i,t-1}} \quad (3) \]

Finally, we calculate each institution's average churn rate over past four quarters as shown in equation (4).

\[ AVG_{\text{CR}}_{k,t} = \frac{1}{4} \sum_{j=0}^{3} CR_{k,t-j} \quad (4) \]

In the end of each quarter, we rank each institution's \( AVG_{\text{CR}}_{k,t} \) and separate them into three groups. Short-term institutions are institutions with highest \( AVG_{\text{CR}}_{k,t} \) group and long-term institutions are institutions with lowest \( AVG_{\text{CR}}_{k,t} \) group.

We define variables used in our study as follows:

- aggregate_ownership: individual stock's total institutional ownership in percentage.
- shortterm_ownership: individual stock's short-term institutional ownership in percentage.
- longterm_ownership: individual stock's long-term institutional ownership in percentage.
- all_change_summary: individual stock's total institutional ownership change from pervious quarter in percentage.
- short_change_summary: individual stock's short-term institutional ownership change from previous quarter in percentage.
- long_change_summary: individual stock's long-term institutional ownership change from previous quarter in percentage.
- short_ins_HHI: each short-term institution's sum of square of each individual stock holding.
- long_ins_HHI: each long-term institution's sum of square of each individual stock holding.
- within_institution_ratio: each individual stock's holding value within a institution divided by the institution's total holding value.
within_group_ratio: each individual stock's holding value within a group (short-term or long-term) divided by the group's total holding value.

capm_beta: factor loading on market excess return from CAPM model from past 5-year monthly return regression (at least 36 months).

4fmkt_beta: factor loading on market excess return of Carhart's (1997) four factor model from past 5-year monthly return regression (at least 36 months).

smb_beta: factor loading on return difference between small size portfolio return and big size portfolio return of Carhart's (1997) four factor model from past 5-year monthly return regression (at least 36 months).

hml_beta: factor loading on return difference between high book to market ratio portfolio return and low book to market ratio portfolio return of Carhart's (1997) four factor model from past 5-year monthly return regression (at least 36 months).

umd_beta: factor loading on return difference between past 12-month winner portfolio return and past 12-month loser portfolio return of Carhart's (1997) four factor model from past 5-year monthly return regression (at least 36 months).

sp_ratioret_future3: short-term institutions' future value-weighted (within-group-ratio) portfolio 3-month accumulated return.

lp_ratioret_future3: long-term institutions' future value-weighted (within-group-ratio) portfolio 3-month accumulated return.

sp_ratioret_future12: short-term institutions' future value-weighted (within-group-ratio) portfolio 1-year accumulated return.

lp_ratioret_future12: long-term institutions' future value-weighted (within-group-ratio) portfolio 1-year accumulated return.

s_buy_portfolio_ret: value-weighted (within-group-ratio) portfolio monthly return of stocks increased by short-term institutions.
l_buy_portfolio_ret: value-weighted (within-group-ratio) portfolio monthly return of stocks increased by long-term institutions.

s_sell_portfolio_ret: value-weighted (within-group-ratio) portfolio monthly return of stocks decreased by short-term institutions.

l_sell_portfolio_ret: value-weighted (within-group-ratio) portfolio monthly return of stocks decreased by long-term institutions.

ROA: return on asset calculated as annual net income divided by total asset.

AGE: firm age calculated as number of months since first return appearance in CRSP.

BM: book to market ratio calculated as annual book value before end of most recent June divided by market capitalization in the end of most recent December.

DP: dividend yield calculated as annual cash dividend divided by stock price.

MKTCAP: market capitalization calculated as share price times total shares outstanding in the end of each quarter.

PRICE: share price in the end of each quarter.

TURN: stock turnover calculated as average monthly turnover over past three months.

VOL: stock volatility calculated as standard deviation of monthly returns over past two years.

recent3_acret: cumulative return over past three months.

recent9_acret: cumulative return over nine months preceding the beginning of most recent quarter.

SP500: dummy variable for S&P500 index membership.

In the regression analysis, we take natural log for variables such as AGE, BM, (1+DP), MKTCAP, PRICE, TURN, and VOL. In reporting summary statistics for short-term and long-term institutions, we use within-institution-ratio to calculate each institution's portfolio.
characteristics. For short-term and long-term portfolios and holding change portfolios, we use within-group-ratio to calculate value-weighted portfolio returns.

4. Empirical results

We calculate within-institution value-weighted institution characteristics and treat each institution equally and then report the average summary statistics in Table I. In order to define short-term and long-term institutions, we need to have four quarterly institutional ownership change data. Since our institutional ownership data starts from 1980Q1, the institutional ownership change data starts from 1980Q2. Hence, we get our first quarterly short-term and long-term institution’s information at 1981Q1. For our sample period from 1981Q1 to 2011Q4, there are 124 quarters’ observations. From Panel A of Table I, we can see that short-term institutions have about $3.73 billion dollar stock portfolio size on average and their average portfolio size is bigger than long-term institutions’ $2.00 billion dollar portfolio size. In terms of ownership percentage for each common stock, short-term institutions’ average 1.16% is less than long-term institutions’ average 2.40%. Short-term institutions have average 293 stocks in their stock portfolio and long-term institutions have average 161 stocks in their stock portfolio. Therefore, institutions with higher turnover rate hold more stocks and less ownership in each individual stock than institutions with lower turnover rate. We can also see the difference from short-term and long-term institutions’ Herfindahl index (HHI) difference. Short-term institutions have HHI of 0.03, which is lower than long-term institutions’ HHI of 0.14.

We next report average factor loadings from CAPM, Carhart’s (1997) four factor model, and Liu’s (2006) LCAPM model for individual short-term and long-term institution. Short-term institutions have higher factor loading on market risk premium than long-term institutions in all three asset pricing models, showing that short-term institutions’ stock portfolios have higher market risk. Since short-term institutions have higher factor loading on SMB than long-term institutions, short-term institutions may select smaller stocks in their portfolios. In terms of Liu’s (2006) liquidity risk, short-term institutions have negative factor loading and long-term institutions have higher factor loading, suggesting that short-term institutions bear lower liquidity risk than long-term institutions.
We then compare stock characteristics in short-term and long-term institutions’ portfolios. On average short-term institutions have lower ROA, younger age, lower dividend yield, smaller size, and more liquid firms than long-term institutions. To see institutions’ characteristics in the beginning and the end of our sample period, we report short-term and long-term institutions’ characteristics in 1981Q1 and 2011Q4 in Panel B of Table I. The most obvious change is the average portfolio size and average stock market capitalization increases dramatically during past three decades. The monthly turnover rate also increases a lot during this period and maybe it is also related to the increasing number of institutional investors. Other pattern comparisons between short-term and long-term institutions remain qualitatively similar.

Next, we run the following determinants of institutional ownership regression in equation (5) and report the results in Table II.

\[
\text{INSTOWN}_{i,t} = \alpha_0 + \beta_1 \cdot \text{CAPM}_\text{beta}_{i,t} + \beta_2 \cdot \text{ROA}_{i,t} + \beta_3 \cdot \log \text{Age}_{i,t} + \beta_4 \cdot \log \text{BM}_{i,t} \\
+ \beta_5 \cdot \log(1 + \text{DP}_{i,t}) + \beta_6 \cdot \log \text{Mktcap}_{i,t} + \beta_7 \cdot \log \text{Price}_{i,t} + \beta_8 \cdot \log \text{Turn}_{i,t} + \beta_9 \cdot \log \text{Vol}_{i,t} \\
+ \beta_{10} \cdot \text{recent3}_{-accret}_{i,t} + \beta_{11} \cdot \text{recent9}_{-accret}_{i,t} + \beta_{12} \cdot \text{Sp500}_{i,t} + \epsilon_{i,t}
\]  

(5)

From Table II, we can see that \text{CAPM}_\text{beta} positively explains concurrently institutional ownership for both short-term and long-term institutions after controlling other stock characteristics. Both short-term and long-term tend to hold stocks with higher market risk in their portfolio. Da, Guo, and Jagannathan (2012) use return on asset as one proxy for future growth opportunity. We find that ROA positively correlates with short-term institutional ownership and negatively correlates with long-term institutional ownership. This may suggest short-term institutions prefer stocks with higher growth opportunity and long-term institutions prefer stocks with lower growth opportunity. Since the age number has negative impact on short-term institutional ownership and positive impact on long-term institutional ownership, short-term institutions prefer to hold younger firms and long-term institutions prefer to hold older firms. Stocks with higher book to market ratio seem to have higher both short-term and long-term institutional ownership. This fact may result from the fact that institutional ownership is persistent and market to book of stocks in their portfolio tend to decline as firms age according to Pastor and Veronesi (2003). Both short-term and long-term institutions seem to avoid holding stocks with high dividend yield. Short-term and long-term institutions both prefer stocks with...
larger size, higher price, and higher turnover rate. Short-term and long-term institutions both seem to avoid stocks with high volatility after we control additional $\text{CAPM\_beta}$ and $\text{ROA}$ in our regression compared with Yan and Zhang (2009), suggesting the positive relationship between volatility and institutional ownership in the previous literature may come from the systematic risk component of volatility. Consistent with previous literature, short-term and long-term institutional ownership negatively correlates with recent quarter and past three quarter accumulated return proceeding the most recent quarter. Finally, short-term institutions avoid stocks included in S&P 500 index and long-term institutions prefer stocks in the S&P 500 index, suggesting long-term institutions hold larger stocks than short-term institutions.

In Table III, we report within-group value-weighted raw returns for both short-term and long-term institutions. We can see that stock portfolios of short-term institutions outperform stock portfolios of long-term institutions in the most recent year. The fact that short-term institutions tend to hold stocks with better recent performance than stocks held by long-term institutions suggests short-term institutions more prefer past winner stocks than long-term institutions and short-term institutions may bear higher systematic risk. For the future quarterly return comparison, short-term institutions’ stock portfolio outperforms long-term institutions’ stock portfolio by 0.05% per quarter. From Table I, this 0.05% return difference may come from a combination effect of different systematic risks of short-term and long-term institutions’ stock portfolios. Although short-term institutions bear less value, momentum, and liquidity risk than long-term institutions, short-term institutions bear higher market risk and size risk. The higher future quarterly return for short-term institutions’ portfolios shows that short-term institutions bear higher aggregate systematic risk. In addition, in all sets of return comparison, the range between maximum and minimum return for short-term institutions is always greater than the range for long-term institutions. This fact also shows that short-term institutions hold a riskier portfolio.

In Table IV, we report future quarterly and yearly returns of short-term and long-term institutions’ trading portfolios. Each quarter we rank stocks traded by short-term and long-term institutions by total dollar trading value into five groups respectively and then we form value-weighted (on the basis of total dollar trading value) short-term buy, short-term sell, long-term buy, and long-term sell portfolios. The short-(long-) term buy portfolio consists of stocks
increased most by short-(long-) term institutions and the short-(long-) term sell portfolio consists of stocks decreased most by short-(long-) term institutions.

During our sample period from 1981Q1 to 2011Q4 (total 124 quarters), the short-term buy portfolio has an average 3.24% quarterly portfolio return, the short-term sell portfolio has an average 2.95% quarterly portfolio return, the long-term buy portfolio has an average 2.73% quarterly portfolio return, and the long-term sell portfolio has an average 3.20 portfolio. If stocks increased by institutions contain more information about institutions’ preference, the short-term buy portfolio outperforms the long-term buy portfolio by 0.51% per quarter. This fact suggests short-term institutions may select stocks with higher systematic risks than stocks selected by long-term institutions.

We use CAPM model, Carhart’s (1997) four factor model, and Liu’s (2006) LCAPM model in equations (6), (7), (8) to formally test this hypothesis that short-term institutions increase stocks with higher systematic risks than stocks increased by long-term institutions in Table V.

\[
Portfolio_{\text{excess return}} = \alpha_0 + \beta_1 \cdot MKT_t + \epsilon_t \tag{6}
\]

\[
Portfolio_{\text{excess return}} = \alpha_0 + \beta_1 \cdot MKT_t + \beta_2 \cdot SMB_t + \beta_3 \cdot HML_t + \beta_4 \cdot UMD_t + \epsilon_t \tag{7}
\]

\[
Portfolio_{\text{excess return}} = \alpha_0 + \beta_1 \cdot MKT_t + \beta_2 \cdot LIQ_t + \epsilon_t \tag{8}
\]

In Panel A of Table V, we compare short- (long-) term buy and sell portfolios. Short-term institutions tend to increase stocks with higher factor loading on market excess return, SMB, and UMD than stocks decreased by them. This comparison shows that short-term institutions prefer stocks with higher market risk, size risk, and momentum risk. In addition, although there is no significant difference on HML and LIQ factor loadings between stocks increased and decreased by short-term institutions, both factor loadings on HML and LIQ are negative, suggesting short-term institutions like to trade growth and liquid stocks. On the other hand, long-term institutions tend to increase stocks with lower factor loadings on SMB, HML, and LIQ than stocks decreased by them. This comparison shows that long-term institutions prefer stocks with lower size risk, value risk, and liquidity risk. The difference in market risk between stocks increased and decreased by long-term institutions is only statistically significant in CAPM model. Overall, the
result shows that long-term institutions increase stocks with lower systematic risks than stocks decreased by them and this fact may explain the negative 0.48% future quarterly return difference shown in Table IV.

In Panel B of Table V, we compare the short-term buy (sell) portfolio and the long-term buy (sell) portfolio. Stocks increased by short-term institutions outperform stocks increased by long-term institutions by 0.15% per month. In addition, stocks increased by short-term institutions have higher factor loadings on market risk premium, SMB, UMD than stocks increased by long-term institutions. The factor loadings on HML between these two portfolios are both negative and the factor loading difference on HML is not significant. The factor loading on LIQ for stocks increased by short-term institutions is lower than the LIQ factor loading for stocks increased by long-term institutions. Overall, short-term institutions bear higher market risk, size risk, and momentum risk than long-term institutions and short-term institutions bear lower liquidity risk than long-term institutions. Maio and Santa-Clara (2012) contend that Carhart’s (1997) model performs the best in consistently meeting the ICAPM restrictions. Since the alpha in Carhart’s (1997) four factor model is not significant, we attribute the better performance of stocks increased by short-term institutions to those stocks’ higher market risk, size risk, and momentum risk. Finally, comparing stocks decreased by short-term and long-term institutions, we find short-term institutions unload stocks with negative factor loading on UMD and lower UMD factor loading than stocks unloaded by long-term institutions. This shows that short-term institutions strongly avoid past loser stocks in their portfolio. We also find long-term institutions unload stocks with positive factor loading on HML and higher HML factor loading than stocks unloaded by short-term institutions. This shows that stocks in long-term institutions’ portfolios may have wider range of book to market ratio and long-term institutions tend to decrease stocks with high book to market ratio in their portfolios. Similarly, long-term institutions unload stocks with positive factor loading on LIQ and higher LIQ factor loading than stocks unloaded by short-term institutions. Stocks in long-term institutions’ portfolios may have wider range of liquidity measure and long-term institutions tend to decrease stocks with higher liquidity risk in their portfolio.

5. Conclusion
In this study, we compare institutional investors’ trading horizons and their stock portfolios’ systematic risks. We find short-term institutions hold stock portfolios with higher market risk and size risk than long-term institutions. Short-term institutions also increase stocks with higher market risk, size risk, and momentum risk than stocks increased by long-term institutions. With a shorter holding period for each stock, short-term institutions bear less liquidity risk than long-term institutions. Overall, short-term institutions seem to bear higher aggregate systematic risk than long-term institutions and this result may explain why short-term institutions’ stock portfolios outperform long-term institutions’ stock portfolios. One implication from our study is that investors who can bear higher systematic risks should choose institutional funds with higher turnover rate.
References


Table I

Summary Statistics:

This table reports an average institution’s stock portfolio characteristics. The sample period is from 1981Q1 to 2011Q4. Panel A reports time-series average of quarterly institutions’ characteristics. We use within-institution ratio to calculate each institution’s portfolio characteristic. Total_holding_value is the stock portfolio size of each institution. Holding percentage is the percentage holding for each individual stock of an institution. HHI is the sum of square of each individual stock holding of an institution. Factor loadings are from past 60-month (at least 36 months) monthly regressions. CAPM_beta is the factor loading on market excess return from CAPM model. 4fmkt_beta, SMB_beta, HML_beta, and UMD_beta are the factor loadings on market excess return, small minus big size, high minus low book to market, and winner minus loser from Carhart’s (1997) four factor model. Liumkt_beta and LIQ_beta are factor loadings on market excess return and illiquid minus liquid from Liu’s (2006) LCAPM. ROA is annual net income divided by total asset. AGE is the measure of firm age as the number of months since first return observation appears in CRSP. BM is annual most recent book equity till June 30 in year t divided by market capitalization in December year t-1. DP is annual cash dividend divided by share price. MKTCAP is quarterly outstanding shares times share price. TURN is monthly average trading volume divided by outstanding shares. VOL is past 24 month monthly stock return standard deviation. LM12 is yearly turnover adjusted number of nontrading days from Liu (2006). ILR is absolute return divided by dollar trading volume in millions from Amihud (2002). Highlow_spread is a bid-ask spread measure derived from daily high price and low price by Corwin and Schultz (2012).

Panel A: time-series average of institution’s stock portfolio characteristics

<table>
<thead>
<tr>
<th></th>
<th>All institutions</th>
<th>Short-term institutions</th>
<th>Long-term institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average number of institutions</strong></td>
<td>1634</td>
<td>501</td>
<td>501</td>
</tr>
<tr>
<td><strong>Average total_holding_value</strong></td>
<td>$2.52 billion</td>
<td>$3.73 billion</td>
<td>$2.00 billion</td>
</tr>
<tr>
<td><strong>Average holding percentage</strong></td>
<td>1.58%</td>
<td>1.16%</td>
<td>2.40%</td>
</tr>
<tr>
<td><strong>Average number of stocks held</strong></td>
<td>215</td>
<td>293</td>
<td>161</td>
</tr>
<tr>
<td><strong>Average HHI</strong></td>
<td>0.07</td>
<td>0.03</td>
<td>0.14</td>
</tr>
<tr>
<td><strong>Average CAPM_beta</strong></td>
<td>0.96</td>
<td>1.01</td>
<td>0.92</td>
</tr>
<tr>
<td><strong>Average 4fmkt_beta</strong></td>
<td>0.95</td>
<td>0.98</td>
<td>0.93</td>
</tr>
<tr>
<td><strong>Average SMB_beta</strong></td>
<td>0.10</td>
<td>0.18</td>
<td>0.03</td>
</tr>
<tr>
<td><strong>Average HML_beta</strong></td>
<td>0.03</td>
<td>0.02</td>
<td>0.04</td>
</tr>
<tr>
<td><strong>Average UMD_beta</strong></td>
<td>-0.05</td>
<td>-0.06</td>
<td>-0.05</td>
</tr>
<tr>
<td><strong>Average Liumkt_beta</strong></td>
<td>0.95</td>
<td>0.97</td>
<td>0.94</td>
</tr>
</tbody>
</table>
### Panel B: Average institution’s stock portfolio characteristics in 1981Q1 and 2011Q4

<table>
<thead>
<tr>
<th></th>
<th>All institutions</th>
<th>Short-term institutions</th>
<th>Long-term institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average LIQ_beta</strong></td>
<td>-0.02</td>
<td>-0.07</td>
<td>0.02</td>
</tr>
<tr>
<td><strong>ROA</strong></td>
<td>4.36%</td>
<td>3.97%</td>
<td>4.58%</td>
</tr>
<tr>
<td><strong>AGE</strong></td>
<td>379</td>
<td>347</td>
<td>408</td>
</tr>
<tr>
<td><strong>BM</strong></td>
<td>0.40</td>
<td>0.41</td>
<td>0.40</td>
</tr>
<tr>
<td><strong>DP (yearly)</strong></td>
<td>2.34%</td>
<td>2.15%</td>
<td>2.50%</td>
</tr>
<tr>
<td><strong>MKTCAP</strong></td>
<td>$31.31 billion</td>
<td>$24.38 billion</td>
<td>$37.45 billion</td>
</tr>
<tr>
<td><strong>PRICE</strong></td>
<td>$47.14</td>
<td>$46.32</td>
<td>$48.25</td>
</tr>
<tr>
<td><strong>TURN (monthly)</strong></td>
<td>0.12</td>
<td>0.14</td>
<td>0.10</td>
</tr>
<tr>
<td><strong>VOL (monthly)</strong></td>
<td>0.09</td>
<td>0.10</td>
<td>0.09</td>
</tr>
<tr>
<td><strong>LM12 (yearly)</strong></td>
<td>0.71</td>
<td>0.46</td>
<td>0.94</td>
</tr>
<tr>
<td><strong>ILR (daily)</strong></td>
<td>0.10</td>
<td>0.06</td>
<td>0.17</td>
</tr>
<tr>
<td><strong>Highlow_spread (daily)</strong></td>
<td>0.68%</td>
<td>0.69%</td>
<td>0.67%</td>
</tr>
<tr>
<td></td>
<td>All institutions</td>
<td>Short-term institutions</td>
<td>Long-term institutions</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------------</td>
<td>------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>ROA</td>
<td>6.14%</td>
<td>6.04%</td>
<td>6.23%</td>
</tr>
<tr>
<td>AGE</td>
<td>394</td>
<td>372</td>
<td>406</td>
</tr>
<tr>
<td>BM</td>
<td>0.64</td>
<td>0.63</td>
<td>0.64</td>
</tr>
<tr>
<td>DP (yearly)</td>
<td>4.15%</td>
<td>3.80%</td>
<td>4.38%</td>
</tr>
<tr>
<td>MKTCAP</td>
<td>$5.97 billion</td>
<td>$4.87 billion</td>
<td>$6.63 billion</td>
</tr>
<tr>
<td>PRICE</td>
<td>$48.52</td>
<td>$47.68</td>
<td>$50.50</td>
</tr>
<tr>
<td>TURN (monthly)</td>
<td>0.03</td>
<td>0.04</td>
<td>0.03</td>
</tr>
<tr>
<td>VOL (monthly)</td>
<td>0.09</td>
<td>0.09</td>
<td>0.08</td>
</tr>
<tr>
<td>LM12 (year1)</td>
<td>0.28</td>
<td>0.28</td>
<td>0.29</td>
</tr>
<tr>
<td>ILR (daily)</td>
<td>0.03</td>
<td>0.03</td>
<td>0.04</td>
</tr>
<tr>
<td>Highlow_spread (daily)</td>
<td>0.53%</td>
<td>0.53%</td>
<td>0.53%</td>
</tr>
</tbody>
</table>
Table II
Determinants of institutional ownership

This table reports the results of cross-sectional regressions of institutional ownership on stock characteristics. The sample period is from 1981Q1 to 2011Q4. CAPM_beta is the past 60-month (at least 36 months) monthly return regression factor loading on market excess return of CAPM model. ROA is annual net income divided by total asset. logAGE is natural logarithm of the measure of firm age as the number of months since first return observation appears in CRSP. logBM is natural logarithm of annual most recent book equity till June 30 in year t divided by market capitalization in December year t-1. Log(1+DP) is natural logarithm of one plus annual cash dividend divided by share price. logMKTCAP is natural logarithm of quarterly outstanding shares times share price. logTURN is natural logarithm of monthly average trading volume divided by outstanding shares. logVOL is natural logarithm of past 24 month monthly stock return standard deviation. Recent3_acret is accumulated most recent quarter return. Recent9_acret is lagged accumulated 3 quarter return preceding the most recent quarter. Sp500 is a dummy variable for S&P500 membership. We report time-series average cross-section regression coefficients by following Fama and MacBeth (1973) method. Numbers in parentheses are t-values corrected for heteroskedascity and autocorrelation by Newey and West (1987) approach.

<table>
<thead>
<tr>
<th>Institutional ownership</th>
<th>Total Institutional ownership</th>
<th>Short-term Institutional ownership</th>
<th>Long-term Institutional ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.0652</td>
<td>0.1473</td>
<td>-0.0638</td>
</tr>
<tr>
<td></td>
<td>(2.33)</td>
<td>(8.35)</td>
<td>(-14.72)</td>
</tr>
<tr>
<td>CAPM_beta</td>
<td>0.0202</td>
<td>0.0135</td>
<td>0.0016</td>
</tr>
<tr>
<td></td>
<td>(4.67)</td>
<td>(5.99)</td>
<td>(2.60)</td>
</tr>
<tr>
<td>ROA</td>
<td>0.0489</td>
<td>0.0396</td>
<td>-0.0081</td>
</tr>
<tr>
<td></td>
<td>(6.03)</td>
<td>(7.04)</td>
<td>(-3.98)</td>
</tr>
<tr>
<td>logAge</td>
<td>0.0114</td>
<td>-0.0089</td>
<td>0.0094</td>
</tr>
<tr>
<td></td>
<td>(6.02)</td>
<td>(-7.79)</td>
<td>(13.48)</td>
</tr>
<tr>
<td>logBM</td>
<td>0.0310</td>
<td>0.0120</td>
<td>0.0054</td>
</tr>
<tr>
<td></td>
<td>(13.53)</td>
<td>(8.94)</td>
<td>(13.70)</td>
</tr>
<tr>
<td>log(1+DP)</td>
<td>-1.1969</td>
<td>-0.7886</td>
<td>-0.1381</td>
</tr>
<tr>
<td></td>
<td>(-10.30)</td>
<td>(-11.60)</td>
<td>(-10.51)</td>
</tr>
<tr>
<td>logMktcap</td>
<td>0.0524</td>
<td>0.0267</td>
<td>0.0123</td>
</tr>
<tr>
<td></td>
<td>(25.40)</td>
<td>(20.42)</td>
<td>(15.15)</td>
</tr>
<tr>
<td>logPrice</td>
<td>0.0511</td>
<td>0.0254</td>
<td>0.0097</td>
</tr>
<tr>
<td></td>
<td>(25.13)</td>
<td>(16.54)</td>
<td>(17.72)</td>
</tr>
<tr>
<td>Institutional ownership</td>
<td>Total Institutional ownership</td>
<td>Short-term Institutional ownership</td>
<td>Long-term Institutional ownership</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------------</td>
<td>----------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>logTurn</td>
<td>0.0686 (11.88)</td>
<td>0.0485 (16.33)</td>
<td>0.0027 (2.20)</td>
</tr>
<tr>
<td>logVol</td>
<td>-0.0280 (-4.58)</td>
<td>-0.0053 (-1.59)</td>
<td>-0.0054 (-4.75)</td>
</tr>
<tr>
<td>recent3_acret</td>
<td>-0.0918 (-17.06)</td>
<td>-0.0405 (-15.24)</td>
<td>-0.0196 (-15.30)</td>
</tr>
<tr>
<td>recent9_acret</td>
<td>-0.0525 (-13.07)</td>
<td>-0.0129 (-7.68)</td>
<td>-0.0154 (-14.39)</td>
</tr>
<tr>
<td>Sp500</td>
<td>-0.0284 (-2.03)</td>
<td>-0.0276 (-4.24)</td>
<td>0.0143 (5.35)</td>
</tr>
</tbody>
</table>
Table III

Time-series future quarterly and yearly return quarterly return comparison between short-term and long-term portfolios

This table reports short-term and long-term institutions’ portfolio returns. The sample period is from 1981Q1 to 2011Q4. We use within-group ratio to calculate both short-term and long-term portfolio returns. Recent3_acret is accumulated most recent quarter return. Recent9_acret is lagged accumulated 3 quarter return preceding the most recent quarter. Future3_acret is accumulated next 3-month return. Future12_acret is accumulated next 12-month return.

<table>
<thead>
<tr>
<th></th>
<th>Short-term institution portfolio return</th>
<th>Long-term institution portfolio return</th>
<th>Short-term minus Long-term portfolio return</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recent3_acret</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.0584</td>
<td>0.0477</td>
<td>0.0107</td>
</tr>
<tr>
<td>Median</td>
<td>0.0605</td>
<td>0.0513</td>
<td>0.0099</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.3630</td>
<td>0.2478</td>
<td>0.1364</td>
</tr>
<tr>
<td>Minimum</td>
<td>-0.2254</td>
<td>-0.2112</td>
<td>-0.0489</td>
</tr>
<tr>
<td><strong>Recent9_acret</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.2010</td>
<td>0.1537</td>
<td>0.0473</td>
</tr>
<tr>
<td>Median</td>
<td>0.1734</td>
<td>0.1439</td>
<td>0.0330</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.8428</td>
<td>0.5919</td>
<td>0.4083</td>
</tr>
<tr>
<td>Minimum</td>
<td>-0.3011</td>
<td>-0.2963</td>
<td>-0.0450</td>
</tr>
<tr>
<td><strong>Future3_acret</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.0305</td>
<td>0.0300</td>
<td>0.0005</td>
</tr>
<tr>
<td>Median</td>
<td>0.0364</td>
<td>0.0324</td>
<td>0.0022</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.2434</td>
<td>0.2087</td>
<td>0.0733</td>
</tr>
<tr>
<td>Minimum</td>
<td>-0.2387</td>
<td>-0.2213</td>
<td>-0.0527</td>
</tr>
<tr>
<td><strong>Future12_acret</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.1123</td>
<td>0.1160</td>
<td>-0.0037</td>
</tr>
<tr>
<td>Median</td>
<td>0.1322</td>
<td>0.1341</td>
<td>-0.0054</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.6138</td>
<td>0.5509</td>
<td>0.0970</td>
</tr>
<tr>
<td>Minimum</td>
<td>-0.3747</td>
<td>-0.3577</td>
<td>-0.1050</td>
</tr>
</tbody>
</table>
Table IV

Time-series future quarterly and yearly return comparison between short-term and long-term institutions’ trading portfolios

This table reports short-term and long-term institutions buy and sell stock portfolios’ returns. The sample period is from 1981Q1 to 2011Q4. We use holding change in dollar value to calculate value-weighted portfolio returns. Buy portfolio is formed by stocks increased most in dollar value among 5 groups of stocks. Sell portfolio is formed by stocks increased least in dollar value among 5 groups of stocks. Future3_acret is accumulated next 3-month return. Future12_acret is accumulated next 12-month return.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.0324</td>
<td>0.0295</td>
<td>0.0273</td>
<td>0.0320</td>
<td>0.0028</td>
<td>-0.0048</td>
<td>0.0051</td>
<td>-0.0025</td>
</tr>
<tr>
<td>Median</td>
<td>0.0392</td>
<td>0.0368</td>
<td>0.0337</td>
<td>0.0375</td>
<td>-0.0006</td>
<td>-0.0052</td>
<td>0.0041</td>
<td>0.0004</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.2909</td>
<td>0.2454</td>
<td>0.3303</td>
<td>0.4366</td>
<td>0.1689</td>
<td>0.1999</td>
<td>0.1240</td>
<td>0.1333</td>
</tr>
<tr>
<td>Minimum</td>
<td>-0.3049</td>
<td>-0.3196</td>
<td>-0.2831</td>
<td>-0.3235</td>
<td>-0.1276</td>
<td>-0.2071</td>
<td>-0.0998</td>
<td>-0.1912</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.1163</td>
<td>0.1095</td>
<td>0.1103</td>
<td>0.1135</td>
<td>0.0068</td>
<td>-0.0033</td>
<td>0.0060</td>
<td>-0.0040</td>
</tr>
<tr>
<td>Median</td>
<td>0.1404</td>
<td>0.1203</td>
<td>0.1360</td>
<td>0.1221</td>
<td>0.0038</td>
<td>0.0057</td>
<td>0.0046</td>
<td>-0.0044</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.7178</td>
<td>0.6240</td>
<td>0.7820</td>
<td>0.6198</td>
<td>0.3373</td>
<td>0.3742</td>
<td>0.1282</td>
<td>0.3440</td>
</tr>
<tr>
<td>Minimum</td>
<td>-0.5819</td>
<td>-0.4165</td>
<td>-0.4911</td>
<td>-0.3691</td>
<td>-0.5528</td>
<td>-0.5470</td>
<td>-0.1268</td>
<td>-0.3266</td>
</tr>
</tbody>
</table>
Table V


This table reports factor loadings for short-term buy short-term sell, long-term buy, and long-term sell stock portfolios from CAPM, Carhart (1997), and Liu (2006) models. The sample period is from 1981Q1 to 2011Q4. We use holding change in dollar value to calculate value-weighted portfolio returns. Buy portfolio is formed by stocks increased most in dollar value among 5 groups of stocks. Sell portfolio is formed by stocks increased least in dollar value among 5 groups of stocks. Factor loadings are from monthly regression for the whole sample period.

Panel A: within short-term and long-term portfolio buy and sell comparison

<table>
<thead>
<tr>
<th>Short-term holding change</th>
<th>Short-term buy</th>
<th>Short-term sell</th>
<th>Short-term buy minus sell</th>
<th>Long-term holding change</th>
<th>Long-term buy</th>
<th>Long-term sell</th>
<th>Long-term buy minus sell</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RAW return</strong></td>
<td>0.0059</td>
<td>0.0053</td>
<td>0.0006</td>
<td><strong>RAW return</strong></td>
<td>0.0044</td>
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### Panel B: short-term and long-term portfolio buy comparison and sell comparison

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