

Unlocking the Reversal Anomaly in the A-share Market: Insights from Marginal Funds of Institutional Investors

Shi Pu *

Research Institute of Economics and Management, Southwestern University of Finance And Economics, Chengdu, China, 611130

* Corresponding Author Email: 19923881996@163.com

Abstract. Fama's Efficient Market Hypothesis (1970) posits that all valuable information is swiftly reflected in stock prices in mature markets. However, anomalies like momentum and reversal effects persist in China's A-share market. This study investigated the short-term reversal effect using turnover rates and institutional investor marginal funds. Significant reversals were found in high-turnover stocks due to speculative trading and deviations from intrinsic value. Institutional investors played a crucial role in correcting mispricing. The Institutional Holding Change Ratio (IHCR) demonstrated that institutional investors' marginal funds strongly explain the reversal anomaly and act as a style factor with positive returns. This research highlights the impact of institutional and individual investor behaviors on market efficiency and investment strategies.

Keywords: Efficient Market Hypothesis, reversal effect, institutional investors, A-share market.

1. Introduction

Fama's Efficient Market Hypothesis posited that in a mature market, all valuable information is reflected in prices, making technical analysis, fundamental analysis, and insider information ineffective for excess returns. In 1993, Fama and French refined the CAPM with the three-factor model, foundational for later research. This paper employed Hou, Xue, and Zhang's Q-factor model (2015) [1], based on Hanauer et al. (2024), which found the Q-factor model outperformed by a modified Fama-French six-factor model and a four-factor model tailored to China's A-shares market [2]. Despite addressing many anomalies, the Q-factor model failed to explain short-term reversal effects in China's A-share market.

Investors' bounded rationality often leads to overestimating or underestimating historical information, causing overreaction (reversal effect) or underreaction (momentum effect) in stock returns. In the U.S. market, individual stock returns show short-term reversal, medium-term momentum, and long-term reversal effects. China's market, with more individual investors, exhibits more irrational behavior and higher risk preferences, often overreacting to new information [3].

This paper double sorted momentum and turnover rate into five groups each, finding a significant reversal effect in the high turnover group. High turnover stocks, being more speculative, deviate more from intrinsic value, providing institutional investors with arbitrage opportunities. Since institutional investors are adept at identifying mispricing, this paper introduced the Institutional Holding Change Ratio (IHCR) to represent institutional marginal funds and investigate if chip exchanges could explain the reversal effect. IHCR was deduced to reflect a specific stock style, leading to the construction of the IMI factor, which proved to be a style factor with positive returns.

2. Literature Review

Recent studies have explored reversal effects, often focusing on the irrational behaviors of individual investors. From a behavioral finance perspective, anomalies like momentum and reversal are explained by factors such as investors' excessive focus on price rather than returns, contributing to market volatility [4]. He Chengying (2021) argued that overconfidence leads to price overreactions, which then correct themselves, influencing reversal effects [5].

This paper differs from previous research by examining both individual and institutional investor behaviors. Institutional investors, with their long-term value investment philosophy, play a significant role in mature markets like Hong Kong, providing more rational company valuations [6]. Increasing institutional presence optimizes investor structure, fostering better pricing and resource allocation (Lian Lishuai et al., 2019) [7]. Foreign institutional investors entering the A-share market via the QFII system enhance pricing efficiency in Shanghai and Shenzhen (Carpenter et al., 2021) [8]. Li Xin et al. (2023) found that higher institutional holdings in these markets correlate with excess returns, indicating that institutional investor structure is a pricing factor [9].

However, there is currently no literature explaining reversal effects from the perspective of institutional investors' marginal funds. This paper introduces the Institutional Holding Change Ratio (IHCR) to represent these marginal funds. IHCR reflects exchanges between institutional and individual investors, revealing their divergent beliefs. Numerous studies have shown that divergent opinions contribute to excess returns unexplained by traditional models [10], but research on heterogeneous beliefs between institutional and individual investors remains limited. This paper aims to enrich this area of study by focusing on the role of IHCR in explaining reversal effects.

3. Hypothesis

In contrast to developed markets, China's stock market has a higher proportion of individual investors who exhibit more irrational behavior and higher risk preferences [11]. High risk preferences often lead to overreaction to new information, resulting in reversal effects. Behavioral finance theory suggests that turnover rate inherently reflects irrational investor characteristics and can be seen as an emotional indicator [12]. High turnover stocks, due to their speculative nature and heightened trading sentiment, are more likely to deviate from intrinsic value.

Based on this, the following hypotheses were proposed:

H1: A short-term reversal anomaly exists in the A-share market that cannot be explained by the Q-factor model. The reversal anomaly is primarily observed in high-turnover stocks.

Institutional investors and individual investors in the A-share market exhibit significant differences in investment behavior. Institutional investors tend to trade based on intrinsic value metrics, buying undervalued stocks and selling overvalued ones. Conversely, individual investors often act as momentum traders, focusing on historical price trends and technical indicators, leading to overreactions and short-term price fluctuations [13]. The substantial discrepancies between institutional and individual investors often result in significant trading imbalances.

In high-turnover stocks, both pronounced reversal effects and the presence of institutional investors seeking arbitrage opportunities are observed. This simultaneous occurrence suggests a significant correlation between the two phenomena. Therefore, the Institutional Holding Change Ratio (IHCR) was introduced as a potential explanatory variable for the one-month reversal effect. The IHCR, representing the marginal funds of institutional investors, may also capture the momentum factor's explanatory power, offering additional insights into the reversal effects observed in high-turnover stocks.

H2: The IHCR can explain the one-month reversal anomaly in high-turnover stocks.

This paper found that IHCR can explain the reversal anomaly, and constructing a long-short portfolio based on IHCR can generate excess returns. Given the differences in investment behaviors between institutional and individual investors, IHCR reflects a specific style of stock. Therefore, the IMI factor was constructed, calculating the excess return difference between stocks most marginally bought by institutions and those most marginally bought by individual investors.

H3: The IMI factor is a style factor for stock returns and can generate positive excess returns.

4. Research Design

4.1. Data Selection

The data spans from September 1, 2005, to December 31, 2022, covering 208 months. Following Liu et al. (2019) [14], the sample was processed as follows:

- (1) Exclude stocks listed for less than one year and the first 250 trading days of newly listed stocks.
- (2) Exclude stocks suspended for long periods or with fewer than 120 trading days in the past year.
- (3) Exclude specially treated (ST) stocks or delisted stocks.
- (4) Exclude stocks with missing data or negative/zero assets.

Data sources included the Choice, CSMAR, and Wind databases, with financial data from consolidated financial statements of listed companies.

4.2. Variable Definition

Table 1. Variable Definition.

Symbol	Definition	Description
R	Stock Return	Quarterly return of stock, considering cash dividends reinvested.
RF	Risk-Free Rate	The Shanghai Interbank Offered Rate (SHIBOR) for three-month loans.
Turn	Turn over rate	Turnover rate of stock in the previous period.
MKT	Market Return Factor	Q-factor, following Hou, Xue and Zhang(2015)
SMB	Size Factor	Q-factor, following Hou, Xue and Zhang(2015)
ROE	Profitability Factor	Q-factor, following Hou, Xue and Zhang(2015)
INV	Investment Factor	Q-factor, following Hou, Xue and Zhang(2015)
MOM	One-Month Momentum Factor	Industry-neutral adjusted stock returns from the previous month.
IHCR	Institutional Holding Change Ratio	The change in institutional investors' holding ratio from the previous quarter.
IMI	Institutional minus Individual	The excess return difference between the highest and lowest IHCR groups.

4.3. Factor Construction

(1) Q-factor

Following Hou, Xue, and Zhang (2015), size, profitability, and investment factors were constructed. Rebalancing was conducted on the last trading day of each month.

(2) IMI Factor

This paper compiled the quarterly holding ratios of institutional investors relative to free-floating A-shares. Free-floating A-shares were mainly held by individual investors, institutional investors, and company executives. Due to strict controls on executive holdings, the marginal capital in this market mainly came from institutional and individual investors.

$$\Delta \text{Institutional Investor Holdings Ratio} = -\Delta \text{Individual Investor Holdings Ratio} \quad (1)$$

The IHCR (Δ Institutional Investor Holdings Ratio) was defined as the quarterly change in the institutional investor holding ratio, representing the marginal inflow of institutional capital. Assuming the IHCR remained constant within a quarter for monthly data, it was neutralized for industry and market capitalization influences. Stocks were then divided into quintiles based on IHCR, and the market capitalization-weighted average excess return for each group was calculated. The IMI (Institutional minus Individual) factor was determined as the difference in excess returns between the highest and lowest IHCR quintiles.

5. Research Methods

5.1. Factor Analysis Method

Factor analysis helps in observing the performance of different portfolios based on characteristic variables and assessing whether potential pricing factors are captured by existing models.

(1) Reversal Anomaly

To study the impact of a stock's past performance on its future excess return, stocks were sorted into five deciles based on their industry-neutral adjusted return (MOM) in month t-1. The average excess return of each group in month t and the difference in returns between decile 5 and decile 1 were calculated. These six time series of returns were then regressed against the Q-factor model:

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_{MKT,i}(R_{M,t} - R_{f,t}) + \beta_{SMB,i}SMB_t + \beta_{ROE,i}R_{ROE,t} + \beta_{INV,i}R_{INV,t} + \epsilon_i \quad (2)$$

(2) Abnormal Returns of IHCR Long-Short Strategy

Using the same method as the reversal anomaly analysis, the impact of the Institutional Holding Change Ratio (IHCR) on future excess returns was examined by sorting stocks into five IHCR groups in month t-1 and regressing the excess returns against the Q-factor model.

5.2. Fama-Macbeth Two-step Regression Method

In 1973, Fama and Macbeth introduced the Fama-Macbeth cross-sectional regression method to test the CAPM model [15]. This paper employs the Fama-Macbeth (1973) method for testing whether the IMI factor constructed from IHCR can generate significant returns.

First step: Each stock's excess returns were regressed separately against the IMI factor returns, MKT factor returns, SMB factor returns, ROE factor returns, and INV factor returns. This regression retained the coefficients, representing each stock's exposure to the respective factors (Equation 2). Second step: For each period t, each stock's excess return was regressed against the four regression coefficients from Step 1 for the previous period t-1 (Equation3). The coefficient obtained in this step represented the return of the IMI factor.

$$R_{i,t} - R_{f,t} = \beta_{IMI}IMI + \beta_{SMB}SMB + \beta_{MKT}MKT + \beta_{ROE}ROE + \beta_{INV}INV + \epsilon_{i,t} \quad (3)$$

$$average R_i = \mu_0 + \beta_{IMI} \mu_{IMI} + \beta_{SMB} \mu_{SMB} + \beta_{MKT} \mu_{MKT} + \beta_{ROE} \mu_{ROE} + \beta_{INV} \mu_{INV} \quad (4)$$

6. Empirical Results

6.1. Descriptive Statistics

Each month, stocks were divided into five groups based on their IHCR values, from lowest to highest. The average excess return of each group was calculated. Stocks with higher IHCR values, indicating greater institutional buying from individual investors, had higher returns. Groups with the smallest and largest IHCR values, where chip exchange was most frequent, showed higher standard deviations in returns.

Table 2. Descriptive Statistics: Institutional Holding Change Ratio Decile.

IHCR_decile	N	Mean	SD	Min	25%	50%	75%	Max
1	69941	0.0045	0.1508	-0.7168	-0.0847	-0.0088	0.0750	2.6094
2	69806	0.0062	0.1392	-0.6442	-0.075	-0.0061	0.0703	2.9209
3	69815	0.0073	0.1335	-0.6382	-0.0693	-0.0041	0.0683	2.3009
4	69806	0.0112	0.1346	-0.6621	-0.0673	-0.0015	0.0727	2.1698
5	69691	0.0228	0.1507	-0.5694	-0.0685	0.0059	0.0939	1.9478
Total	349059	0.0104	0.1421	-0.7168	-0.7287	-0.003	0.0758	2.9209

6.2. The determination of the number of network layers

Table 3 presented the regression results of the Q-factor model based on momentum grouping. While the return spread was significantly negative at the 99% level, indicating that the momentum-based long-short portfolio yielded negative excess returns, the coefficient did not exhibit a monotonic decreasing pattern with increasing momentum. Therefore, the conclusion did not fully support the existence of the reversal effect.

Table 3. Alphas from Single-Sorted Momentum Portfolios.

	1(Low)	2	3	4	5(High)	Spread (5-1)
All Firms	0.0002	0.0003	0	-0.0027***	-0.130***	-0.0133***
T-Value	0.58	0.9	0.1	-5.69	-21.82	-24.99

6.3. Double-sorting turnover rate and momentum to verify the reversal effect

To explore the impact of turnover rate on the reversal effect, a cross-grouping method with turnover rate and momentum was employed. Table 4 presented the regression results of the Q-factor model after cross-grouping by turnover rate and momentum. Within each of the five momentum groups, returns generally exhibited a monotonic decreasing trend as turnover rate increased. After controlling for momentum, turnover rate and returns showed a negative correlation. The momentum spread was significant at the 1% level for four of the five turnover groups, except for the low turnover group, where the momentum spread was significant at the 10% level. The spread for the high turnover group was -2.13% with a t-value of -20.09. In high turnover groups (Turn 4 and Turn 5), returns decreased monotonically as momentum increased, while other groups did not show a clear monotonic pattern.

Table 4. Alphas from Double-Sorted MOM and Turn Portfolios.

	Low MOM				High MOM	Spread (5-1)	t
	1	2	3	4	5		
1 (Low Turn)	0.0026***	0.0039***	0.0037***	0.0023***	-0.0033**	-0.0059*	-1.85
2	0.0016***	0.0021***	0.0010***	0.0017***	-0.0028***	-0.0044***	-3.25
3	0.0017**	0.0003	0.0011	-0.0009	-0.0072***	-0.0089***	-8.48
4	-0.0001	-0.0014	-0.0022**	-0.0046***	-0.0122***	-0.0121***	-11.52
5 (High Turn)	-0.0057***	-0.0102***	-0.0122***	-0.0161***	-0.0270***	-0.0213***	-20.29

6.4. Using IHCR to explain the reversal effect in high turnover groups.

The results of grouping based on the single variable IHCR are shown in Table 5. From the low IHCR group to the high IHCR group, returns exhibited a monotonic increase. The spread between the highest and lowest IHCR groups (IHCR 5-1) was 1.41% and significant at the 1% level. Increasing institutional ownership relative to market capitalization significantly enhanced stock returns in the following month, indicating that institutional funds acted as marginal funds influencing pricing decisions.

Table 5. Alphas from Single-Sorted IHCR Portfolios.

	1(Low)	2	3	4	5(High)	Spread (5-1)
All Firms	-0.0092***	-0.0069***	-0.0052***	-0.0013	0.0049***	0.0141***
T-Value	-5.67	-5.22	-3.86	-0.98	2.55	7.24

Institutional investors and individual investors exhibit significant differences in expertise, risk preferences, and investment philosophies. When new external factors impact the market, such as significant news announcements, these differences often lead to substantial disagreement between institutional and individual investors, triggering large-scale exchanges of shares.

The study aimed to investigate whether marginal changes in institutional funds could explain the monotonicity of the reversal effect in high turnover groups. Based on the approach by Shenli et al. (2022), the paper cross-classified momentum and Institutional Holding Change Ratio (IHCR) to analyze their interrelationship [16]. Table 6 presented the regression results of the Q-factor model after cross-grouping IHCR and momentum. The x-axis represented five groups divided by IHCR from low to high, while the y-axis represented five groups divided by momentum from low to high.

After grouping by momentum, within each momentum group, the spread between high and low institutional fund flows was significantly positive for all groups: Groups 1 to 4 were significant at the 1% level, and Group 5 was significant at the 5% level. This demonstrated that momentum alone did not fully explain the variation in IHCR. However, after grouping by IHCR, the difference in average returns between low and high momentum was not consistently significant. Groups 2 and 3 were not significant at the 10% level, indicating that IHCR encompassed the explanatory power for the reversal effect caused by high momentum in the previous period within high turnover groups.

Table 6. Alphas from Double-Sorted IHCR and MOM Portfolios.

	All Stocks	Low IHCR				High IHCR	Spread	
		1	2	3	4	5	(5-1)	t
All Stocks		0.0035	0.0039	0.0049	0.0068	0.0092	0.0057***	14.43
1(Low MOM)	0.0041	0.0024	0.0034	0.0057	0.0095	0.0130	0.0107***	7.96
2	0.0052	0.0030	0.0038	0.0049	0.0070	0.0147	0.0017***	10.66
3	0.0058	0.0043	0.0040	0.0043	0.0065	0.0119	0.0076***	7.63
4	0.0063	0.0051	0.0048	0.0047	0.0064	0.0088	0.0036***	4.88
5(High MOM)	0.0070	0.0066	0.0046	0.0050	0.0068	0.0078	0.0012**	1.96
Spread(5-1)	-0.0029	-0.0043	-0.0013	0.0008	0.0027	0.0052		
t	-3.24***	-4.32***	-1.04	0.68	2.06**	3.35***		

6.5. Constructing the IMI factor and conduct Fama-MacBeth Two-Step Regression

The regression results of cross-grouping IHCR and momentum in Table 7 showed that IHCR partially explained the reversal effect in high turnover groups. Consequently, IMI was introduced as the fifth factor in the Fama-MacBeth Two-Step Regression. Comparing to Regression 1, the model's explanatory power was enhanced with the inclusion of the IMI factor, resulting in an R-squared of 0.0017. The regression coefficient for IMI was 1.41% and significant at the 10% level. The INV, ROE, MKT, and SMB factors in the Q-factor model primarily characterized fundamental company information, whereas the newly introduced IMI factor focused on market fund behavior. By incorporating the IMI factor, the model was complemented with additional information, thereby improving its explanatory power to some extent.

Table 7. Fama-MacBeth Two-Step Regression Results.

	Regression 1	Regression 2
Alpha	0.0133*** (4.59)	0.0097*** (3.61)
INV Premium	-0.0735*** (-4.59)	-0.0642*** (-3.78)
ROE Premium	0.032*** (2.46)	0.0023* (1.44)
MKT Premium	-0.2463*** (-4.83)	-0.2492*** (-4.89)
SMB Premium	0.0301** (2.32)	0.0293** (2.25)
IMI Premium		0.0141* (1.70)
adj. R2	0.0015	0.0017
N	348317	348317
Note: the numbers below the coefficient are t values		

7. Conclusion

This study analyzed the one-month reversal effect in the A-share market by examining the exchange of chips between institutional and individual investors. It was found that high turnover stocks exhibited significant reversal effects, indicating that speculative trading leads to price deviations from intrinsic values. Institutional investors play a crucial role in identifying and correcting mispricing, significantly impacting stock prices through their marginal funds. To explain these reversal effects, the Institutional Holding Change Ratio (IHCR) was introduced. The IHCR reflects a distinct investment style, and the IMI factor was constructed to capture this, proving to influence stock returns.

However, these conclusions have certain limitations. The limited sample size and the earlier time range may affect the applicability of the findings to current markets. Additionally, while the IHCR indicator can reflect marginal institutional funds, it does not represent transactions among institutional or individual investors. Future research could introduce more indicators to better capture the behaviors of institutional and individual investors to further validate these conclusions.

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