An Empirical Test of Momentum Effect on the Chinese Market during COVID period

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Abstract. Our research analyzes momentum effects in the Chinese stock market during the COVID period from 2020 to 2023. We studied over 5000 Chinese A-share stocks categorized into 306 industry sectors to identify momentum and reversal effects in both individual stocks and industries. Our primary research follows the traditional construction of winner-loser groups. Results indicate that individual stock portfolios exhibit profits only when the formation period is one week, with diminishing earnings as the formation and holding periods increase. Reversal effects are observed in most cases, with the winner group showing a stronger impact than the loser group. In contrast, industry portfolios show different patterns of changes between momentum and reversal. Specifically, industry portfolios display short-term momentum effects, generating profits within one month, followed by reversal effects over longer periods. However, the magnitude of gains and losses in industry portfolios is smaller compared to individual stocks.

Keywords: Momentum, Reversal, Individual stocks, Industries, Chinese market, COVID-19

1 Introduction

"Momentum effects" is a term used in financial markets to describe the tendency of assets that have demonstrated strong performance in the past to continue on an upward trend. Conversely, "reversal effects" refer to a subsequent correction in assets that have underperformed. These fascinating phenomena have been extensively researched in various global economies and asset classes, with empirical evidence demonstrating their existence.

Momentum and reversal effects are intriguing phenomena observed in financial markets, offering valuable insights into the behavior of asset prices and the efficacy of investment strategies. These anomalies challenge the efficient market hypothesis by suggesting that past price trends can influence future stock performance.

The Chinese stock market, characterized by its rapid growth and volatility, provides a compelling backdrop to investigate momentum and reversal effects. With its unique regulatory environment and economic dynamics, this market offers distinct challenges and opportunities for investors. This study investigates the existence of momentum

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effects in the context of the Chinese stock market and seeks to provide empirical evidence that can help investors, policymakers, and financial analysts make informed decisions in the complex and rapidly changing Chinese stock market.

2 Literature review

The concept of momentum and the momentum effect can be traced back to a paper published by Jegadeesh and Titman in 1993. A momentum strategy was constructed by buying well-performing stocks and selling underperforming stocks during a 25-year period starting in 1965 on the NYSE. Their findings indicated that this momentum strategy generated positive and significant returns over a holding period of 3 to 12 months which had reduced after the following two years. Additional research suggested that the cause of this excess return was not due to systematic risk or the lead-lag effect but rather due to the lag in the price response to firm-specific information. To ensure that the results were not generated by data mining, Jegadeesh and Titman validated their theory further in 2001 using out-of-sample data and concluded that momentum profits result from delayed overreactions, which are eventually reversed. [1]

Since momentum was introduced by Jegadeesh and Titman in 1993, extensive research has been conducted on the momentum effect. Through their studies, it was discovered that the momentum effect exists for various assets across multiple countries. Carhart (1997) further expanded on this topic by examining the short-term persistence of stock mutual fund returns, focusing on stock returns and investment costs. Through a sample that eliminates survivor bias, he created a winner-loser portfolio that resulted in an average return of 8% annually and market value and stock momentum difference accounted for 4.6% of this spread, which is consistent with the findings of Jegadeesh and Titman. The momentum effect was also confirmed by Rouwenhorst (1998) in the stock markets of twelve European countries, including Austria, Spain, France, and the UK. Moreover, he discovered a negative correlation between momentum returns and firm size. De Groot et al. (2012) studies have conclusively shown that the momentum effect persists in highly liquid emerging markets across 24 countries with conservative assumptions on transaction costs. Meanwhile, Asness et al. (2013) have discovered a consistent value effect across various markets and asset classes, including equities, stock indices, foreign exchange, global treasuries, and commodity futures markets. These asset classes exhibit consistent value and momentum return premiums and share a strong common factor structure. Jostova et al. (2013) conducted a thorough analysis and discovered that momentum strategies generated abnormal returns in the U.S. corporate bond market between January 1973 and June 2011. Other scholars, such as Orlov (2016), Houweling and van Zundert (2017), and Israel et al. (2018), have also found traces of momentum effects in different markets, such as foreign exchange and corporate bonds. Moskowitz and Grinblatt (1999) introduced the concept of sectoral momentum and found that it is the main cause of anomalies in individual stock momentum. They argued that sector momentum strategies are more profitable than individual stock momentum strategies, and this is a fact that cannot be disputed. [2, 3-7]

Nonetheless, there is a growing debate among academics regarding the effectiveness of the momentum factor. Some scholars posit that momentum gains may be a consequence of exposure to other classical factors, such as the low volatility factor (Liu, 2019) and surplus momentum (Novy-Marx, 2015). In addition, it has been observed that shorting plays a significant role in momentum returns. However, shorting can be a complex operation with numerous restrictions, particularly in the United States, where not all stocks are eligible for short selling. In China, shorting is a nearly insurmountable challenge due to a lack of mechanisms. Although securities financing theoretically enables shorting, there is a dearth of channels that provide securities sources, resulting in diminished momentum factor returns in A-shares. Furthermore, momentum strategies often incur high turnover rates, leading to increased transaction costs. A study has revealed that, after accounting for transaction costs, mutual funds typically generate low returns on value and nearly zero returns on momentum while having minimal impact on market and size factor strategies. [2, 8]

In China, there is no consensus among scholars regarding the momentum effect's existence. Particularly, researchers had reduced enthusiasm for momentum testing and propounded few papers regarding it since the COVID-19 outbreak in January 2020. Therefore, our research aims to cover the gaps in research during this time by conducting a momentum test with data from January 2020 to March 2023. [9]

3 Empirical evidence of momentum effects

3.1 Data Selection

Our data is obtained from Eastmoney.com and covers the period between 2007-01 and 2023-03. To ensure the accuracy of our research, we exclude data predating 2007 to eliminate the impact of the non-tradable shares reform on stock prices. Our sample comprises all 5132 Chinese A-share stocks with available data, excluding those with ST (Special treatment) or PT (Particular transfer) status. We follow the Shanghai Stock Exchange (SSE) Industry Classification and the database from Eastmoney.com to classify industries into 306 categories and obtain their corresponding sector indexes as representative criteria for their performance. To test the momentum effect's existence, we select data from 2020-01 to 2023-03, a period characterized by market fluctuations following the COVID-19 outbreak and limited studies on momentum effects in China. Because the Chinese market's stock trading style undergoes significant changes annually, and thus analyzing historical data from the past has limited guiding significance for current operations. But to compensate for the lack of industry sample size in seasonal momentum testing, we extend the period to 2010-01 to avoid accidental results. All the data is provided weekly and based on adjusted closing prices to ensure a more accurate assessment of stock performance as it takes stock splits, dividends, and rights offerings into account.

3.2 Research design

As per the existing regulations, purchasing short in the Chinese stock market is not publicly permissible. Nonetheless, we have included it in our momentum strategy to gain a comprehensive understanding of momentum effects in the Chinese market.

3.2.1 Construction of Formation and Holding Periods.

We form winners–losers momentum investment strategies in individual stocks by first ranking stocks based on their geometric average returns in the formation period, which is the period of the prior J weeks before the holding period K start. We use geometric averages instead of arithmetic averages as representatives of stocks' performance. Due to the volatile and immature nature of the Chinese stock market, the arithmetic average will inevitably overestimate the return rate. In contrast, the geometric average can more accurately reflect the actual return rate by considering time value. The average return of each stock during the formation period is calculated through the following regression:

$$REV_f = \left(\frac{Close_{t+J}}{Close_t}\right)^{\frac{1}{J}} - 1$$

Where $Close_t$ is the closing price of the day when the formation period starts, $Close_{t+J}$ is the closing price of the ending day for the formation period, and J stands for the number of weeks the formation period lasts.

The ranking of the returns is in descending order. The top 10 stocks with the highest returns will be in the "winners" group, while the bottom 10 stocks with the lowest returns will be in the "losers" group. After constructing necessary portfolios based on the winner-loser groups, we hold these positions over the next K weeks, following the same procedure as Jagadeesh and Titman (1993) for brevity and ease of comparison. [1]

To increase the power of our test, instead of the fixed rolling windows method, the samples we examined derive from overlapping formation periods and holding periods. It means the time window consisting of formation period J and holding period K slid on the timeline. At each swipe, there is a certain overlap between the current and previous time window, thus forming a series of overlapping samples.

Based on the overall agreement and the volatility of the Chinese market, we limited the formation periods and holding periods to 2 months, that is, 1 to 8 weeks, and then we used overlapping sampling to gather traversal data within the time frame.

3.2.2 Momentum strategy.

To assess the momentum and the reverse effects, 3 zero-cost momentum portfolios are constructed respectively, which include equal-weighted purchasing stocks in the winner group (Strategy W), selling stocks in the loser group (Strategy L) and purchasing the winner group while simultaneously selling the loser group (Strategy WL). Earnings of different strategies during holding periods are defined by the following expressions. It is worth noting that the returns of each strategy in (J, K) are the arithmetic average of all traversal data we get from the overlapping sampling within the time

frame. The average process is not represented in the following expression for conciseness [1]:

$$REV_m = (\frac{W\_Close_{t+K}}{W\_Close_t})^{\frac{1}{K}} - 1, \qquad REV_n = -\left[(\frac{L\_Close_{t+K}}{L\_Close_t})^{\frac{1}{K}} - 1\right]$$

$$REV_W = \frac{\sum_{m=1}^{10} REV_m}{10}, \qquad REV_L = \frac{\sum_{n=1}^{10} REV_n}{10}$$

$$Annual\_REV_{W+L} = \left(\frac{\sum_{m=1,n=1}^{10}(REV_m + REV_n)}{20}\right) \times 52$$

Where W_Close_{t+K} is the closing price of the day when the holding period starts, W_Close_t is the closing price of the ending day for the holding period, and K stands for the number of weeks the holding period lasts. W and L only stand for the winner group and the loser group as labels, so the rationale driving their formulas remains consistent. $Annual\_REV_{W+L}$ is the annual return of Strategy WL of buying the winner group while simultaneously selling the loser group. We calculate the annual return rate in simple interest by assuming 52 weeks in a year. In general, using simple interest will underestimate the return on investment and may ignore the volatility brought by extra longevity. However, considering this part of our research only aims to assess the existence of the momentum effect and has a trivial impact on the results of our study, we choose the simple interest method for calculation simplicity. [1]

3.2.3 Results.

Typically, a positive earning suggests that the portfolio has experienced a momentum effect during the corresponding holding period. On the other hand, a negative value can indicate a reversal effect instead of a momentum effect. However, it's worth noting that the magnitude of gains and losses only serves as an indicator for comparison and does not precisely reflect the size of momentum and reversal effects.

(1) Individual stocks.

Table 1 reports the average results from the traversal data of the weekly geometric average returns of 3 individual-stock-momentum strategies. To provide better visualization of the momentum effect, a surface chart of the annual returns of Strategy WL has been created and presented in Figure 2. Overall, it is found that portfolios generate profit only when J=1 and the earnings are getting lower as J or K increases. Except for this, all 3 strategies show a certain degree of reversal effects in most combinations of J and K. Furthermore, the winner group tends to experience a more significant impact of reversal than the loser group. More precisely, the magnitude of their losses is nearly twice as much as that of the loser group on average. This finding demonstrates that the winner groups tend to be more responsive to market information compared to the loser groups. As a result, they may experience stronger momentum or reversal effects.

The surface chart shows that the center of the reversal effect with the lowest earning is located at (J=5, K=4). The gradient change in earnings and the process of a shift from reversal to momentum can also be observed when both J and K decrease. The result

demonstrates a distinct reversal effect in the Chinese stock market within a two-month portfolio duration from weekly data. Nonetheless, if the unit time interval of data and the total duration of momentum strategies are shortened, there may be a momentum effect of some scale, and we can tell the potential from the positive peak of (J=1, K=1).

Table 1. Individual Stocks Returns in Holding Periods

		K=1	K=2	K=3	K=4	K=5	K=6	K=7	K=8
J=1	W	0.0010	-0.0121	-0.0130	-0.0122	-0.0114	-0.0104	-0.0091	-0.0084
	L	0.0034	0.0038	0.0022	0.0023	0.0008	-0.0003	0.0004	0.0008
	Annual WL	0.2284	-0.4289	-0.5582	-0.5168	-0.5493	-0.5569	-0.4491	-0.3932
J=2	W	-0.0072	-0.0170	-0.0163	-0.0152	-0.0140	-0.0129	-0.0113	-0.0106
	L	-0.0051	-0.0005	-0.0005	-0.0005	-0.0020	-0.0014	-0.0008	-0.0009
	Annual WL	-0.6439	-0.9092	-0.8769	-0.8160	-0.8319	-0.7418	-0.6249	-0.5990
J=3	W	-0.0148	-0.0185	-0.0181	-0.0177	-0.0167	-0.0147	-0.0132	-0.0128
	L	-0.0071	-0.0016	-0.0025	-0.0033	-0.0030	-0.0021	-0.0024	-0.0018
	Annual WL	-1.1389	-1.0471	-1.0718	-1.0933	-1.0282	-0.8722	-0.8076	-0.7607
J=4	W	-0.0080	-0.0168	-0.0181	-0.0171	-0.0160	-0.0142	-0.0123	-0.0123
	L	-0.0074	-0.0058	-0.0055	-0.0044	-0.0037	-0.0038	-0.0034	-0.0028
	Annual WL	-0.7998	-1.1758	-1.2281	-1.1146	-1.0240	-0.9343	-0.8144	-0.7833
J=5	W	-0.0109	-0.0178	-0.0172	-0.0155	-0.0144	-0.0129	-0.0122	-0.0119
	L	-0.0132	-0.0109	-0.0083	-0.0071	-0.0068	-0.0055	-0.0047	-0.0036
	Annual WL	-1.2517	-1.4904	-1.3273	-1.1791	-1.0995	-0.9556	-0.8781	-0.8070
J=6	W	-0.0110	-0.0172	-0.0162	-0.0151	-0.0144	-0.0133	-0.0121	-0.0121
	L	-0.0136	-0.0095	-0.0078	-0.0076	-0.0064	-0.0056	-0.0049	-0.0040
	Annual WL	-1.2782	-1.3877	-1.2477	-1.1785	-1.0850	-0.9871	-0.8808	-0.8376
J=7	W	-0.0084	-0.0141	-0.0135	-0.0143	-0.0138	-0.0125	-0.0117	-0.0115
	L	-0.0112	-0.0082	-0.0068	-0.0061	-0.0051	-0.0041	-0.0035	-0.0030
	Annual WL	-1.0221	-1.1599	-1.0556	-1.0592	-0.9806	-0.8667	-0.7868	-0.7529
J=8	W	-0.0072	-0.0131	-0.0135	-0.0141	-0.0134	-0.0127	-0.0122	-0.0117
	L	-0.0124	-0.0086	-0.0077	-0.0061	-0.0049	-0.0044	-0.0037	-0.0037
	Annual WL	-1.0179	-1.1294	-1.0993	-1.0479	-0.9508	-0.8885	-0.8285	-0.8001

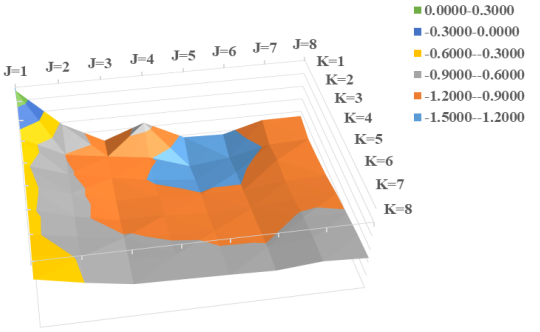

Fig. 1. Surface Chart of Annual Returns of Strategy WL with Individual Stocks

(2) Industry.

Table 2 reports the average results we gathered from the traversal data of the weekly geometric average returns of 3 industry-momentum strategies. Figure 2 is a surface chart of the annual returns of strategy WL for better visualization.

The results of the industry-momentum effect test show completely different features compared to that of the individual-stock-momentum test. The winner groups generate profit with the comparable magnitude of losses the loser groups exhibit. Strategy WL earns a substantial positive return in every combination of J and K when J, K≤4, while it experiences a loss when J, K> 4.

We can observe from Figure 2 that the gradient changes are oblique and diagonal, which is different from the central gradient in Figure 1. This finding suggests that the industry portfolio experiences a momentum effect in the short term (within one month), and the industry begins to show a reverse effect over longer periods. However, the gains and losses observed in industry portfolios are relatively smaller compared to those achieved through individual stock portfolios, possibly due to the considerable market value of the sector index we used as a representative for the price of industries.

Table 2. Industries Returns in Holding Period

		K=1	K=2	K=3	K=4	K=5	K=6	K=7	K=8
J=1	W	0.0065	0.0036	0.0018	0.0027	0.0027	0.0028	0.0027	0.0026
	L	-0.0011	-0.0004	-0.0016	-0.0010	-0.0015	-0.0018	-0.0021	-0.0022
	Annual WL	0.2802	0.1677	0.0115	0.0920	0.0583	0.0541	0.0274	0.0213
J=2	W	0.0038	0.0020	0.0022	0.0027	0.0025	0.0023	0.0021	0.0019
	L	0.0014	0.0000	-0.0012	-0.0017	-0.0025	-0.0025	-0.0028	-0.0030
	Annual WL	0.2673	0.1059	0.0536	0.0542	0.0005	-0.0073	-0.0317	-0.0558
J=3	W	0.0037	0.0023	0.0022	0.0025	0.0019	0.0019	0.0021	0.0019
	L	-0.0008	-0.0004	-0.0006	-0.0011	-0.0019	-0.0022	-0.0029	-0.0029
	Annual WL	0.1506	0.0972	0.0832	0.0724	0.0036	-0.0184	-0.0407	-0.0491
J=4	W	0.0042	0.0032	0.0025	0.0023	0.0022	0.0024	0.0024	0.0021
	L	-0.0004	-0.0004	-0.0015	-0.0018	-0.0025	-0.0031	-0.0031	-0.0029
	Annual WL	0.1987	0.1432	0.0479	0.0266	-0.0148	-0.0388	-0.0364	-0.0405
J=5	W	0.0029	0.0023	0.0020	0.0030	0.0027	0.0029	0.0025	0.0021
	L	-0.0016	-0.0016	-0.0017	-0.0024	-0.0033	-0.0035	-0.0034	-0.0033
	Annual WL	0.0673	0.0376	0.0122	0.0312	-0.0323	-0.0345	-0.0448	-0.0632
J=6	W	0.0040	0.0023	0.0025	0.0032	0.0030	0.0026	0.0023	0.0020
	L	-0.0009	-0.0016	-0.0029	-0.0037	-0.0041	-0.0040	-0.0038	-0.0036
	Annual WL	0.1650	0.0393	-0.0193	-0.0212	-0.0528	-0.0702	-0.0752	-0.0819
J=7	W	0.0033	0.0023	0.0026	0.0030	0.0024	0.0022	0.0020	0.0018
	L	-0.0034	-0.0037	-0.0045	-0.0045	-0.0045	-0.0044	-0.0041	-0.0040
	Annual WL	-0.0052	-0.0698	-0.0954	-0.0794	-0.1071	-0.1136	-0.1127	-0.1110
J=8	W	0.0044	0.0032	0.0033	0.0029	0.0025	0.0020	0.0020	0.0018
	L	-0.0032	-0.0037	-0.0037	-0.0037	-0.0037	-0.0037	-0.0035	-0.0034
	Annual WL	0.0574	-0.0231	-0.0197	-0.0380	-0.0644	-0.0873	-0.0820	-0.0835

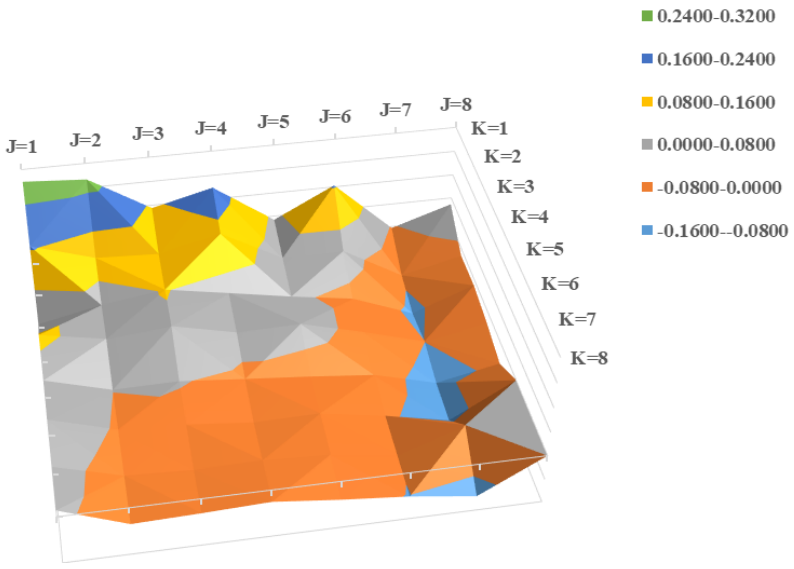

Fig. 2. Surface Chart of Annual Returns of Strategy WL with Industries

3.2.4 Test of Significance

Initially, we planned to utilize the Newey-West adjusted t-statistics when conducting significance tests to effectively address the heteroscedasticity and autocorrelation issues caused by overlapping sampling. However, we discovered that the adjustments did not yield the desired results when testing the significance of momentum and reversal in individual stocks and industries. Specifically, before the t-statistic adjustment, no annual returns of individual stock portfolios indicated statistical significance at a 90% confidence level, and only a few industry portfolios were able to pass the test. Once we incorporate the Newey-West adjustment, the significance test becomes even more rigorous.

Because the Newey-West adjustment is mainly used for the error terms of a regression mode, while no consequent factors regression steps are included in our research. After consideration, we ultimately decided that it was unnecessary to include any lags of the autocovariance function when estimating the corrected covariance matrix. Therefore, we set nlags=none in the Newey-West estimator and proceeded with ordinary mean-variance testing. This approach allowed us to obtain the outcomes we needed for our research.

The significance test results are presented in Table 3, in which t-statistics are reported in parentheses below the corresponding annual return of Strategy WL. The results that exhibit statistically significant at the 90% confidence level are marked with 1 asterisk, at the 95% statistical significance level are marked with 2 asterisks, and at the 99% statistical significance level are marked with 3 asterisks.

Table 3. Test of Significance on Annual Returns of Strategy WL (Individual stocks)

Ann. WL	K=1	K=2	K=3	K=4	K=5	K=6	K=7	K=8
J=1	0.228	-0.429	-0.558	-0.517	-0.549	-0.557	-0.449	-0.393
	(0.006)	-(0.011)	-(0.017)	-(0.016)	-(0.039)	-(0.02)	-(0.017)	-(0.012)
J=2	-0.644	-0.909	-0.877	-0.816	-0.039	-0.742	-0.625	-0.599
	-(0.013)	-(0.032)	-(0.08)	-(0.031)	-(0.039)	-(0.018)	-(0.017)	-(0.027)
J=3	-1.139	-1.047	-1.072	-1.093	-0.039	-0.872	-0.808	-0.761
	-(0.023)	-(0.026)	-(0.023)	-(0.023)	-(0.039)	-(0.036)	-(0.035)	-(0.046)
J=4	-0.800	-1.176	-1.228	-1.115	-0.039	-0.934	-0.814	-0.783
	-(0.016)	-(0.026)	-(0.024)	-(0.025)	-(0.039)	-(0.03)	-(0.033)	-(0.037)
J=5	-1.252	-1.490	-1.327	-1.179	-0.039	-0.956	-0.878	-0.807
	-(0.048)	-(0.09)	-(0.035)	-(0.053)	-(0.039)	-(0.079)	-(0.058)	-(0.359)
J=6	-1.278	-1.388	-1.248	-1.178	-0.039	-0.987	-0.881	-0.838
	-(0.038)	-(0.032)	-(0.03)	-(0.148)	-(0.039)	-(0.353)	-(0.633)	-(5.466)
J=7	-1.022	-1.160	-1.056	-1.059	-0.039	-0.867	-0.787	-0.753
	-(0.02)	-(0.026)	-(0.024)	-(0.058)	-(0.039)	-(0.039)	-(0.045)	-(0.062)
J=8	-1.018	-1.129	-1.099	-1.048	-0.039	-0.888	-0.828	-0.800
	-(0.02)	-(0.025)	-(0.034)	-(0.91)	-(0.039)	-(0.251)	-(0.185)	-(0.599)

Table 4. Test of Significance on Annual Returns of Strategy WL (Industries)

Ann. WL	K=1	K=2	K=3	K=4	K=5	K=6	K=7	K=8
J=1	0.280	0.168	0.012	0.092	0.058	0.054	0.027	0.021
	(0.01)	(0.012)	(0)	(0.002)	(0.002)	(0.003)	(0.001)	(0.001)
J=2	0.267	0.106	0.054	0.054	0.001	-0.007	-0.032	-0.056
	(0.009)	(0.002)	(0.001)	(0.002)	(0)	(0)	-(0.002)	-(0.005)
J=3	0.151	0.097	0.083	0.072	0.004	-0.018	-0.041	-0.049**
	(0.018)	(0.002)	(0.004)	(0.009)	(0.002)	-(0.008)	-(0.536)	-(2.257)
J=4	0.199	0.143	0.048	0.027	-0.015	-0.039	-0.036	-0.040
	(0.007)	(0.003)	(0.002)	(0.007)	-(0.004)	-(0.013)	-(0.11)	-(0.575)
J=5	0.067	0.038	0.012	0.031	-0.032	-0.034	-0.045	-0.063
	(0.002)	(0.001)	(0.001)	(0.0216)	-(0.007)	-(0.035)	-(0.154)	-(0.02)
J=6	0.165	0.039	-0.019	-0.021	-0.053	-0.070	-0.075	-0.082
	(0.007)	(0.001)	-(0.002)	-(0.021)	-(0.01)	-(0.55)	-(0.168)	-(0.388)
J=7	-0.005	-0.070	-0.095	-0.079	-0.107	-0.114	-0.113***	-0.111
	(0)	-(0.003)	-(0.006)	-(0.166)	-(0.289)	-(0.72)	-(5.258)	-(0.828)
J=8	0.057	-0.023	-0.020	-0.038	-0.064	-0.087***	-0.082***	-0.084***
	(0.001)	-(0.002)	-(0.002)	-(0.577)	-(0.025)	-(10.973)	-(7.221)	-(5.074)

Table 4 reports several strategies with high significance levels as (J=3, K=8), (J=7, K=7), (J=8, K=6), (J=8, K=7) and (J=8, K=8), most of which are combinations of long formation and holding periods. And in these periods, the portfolios experienced unit-digit percentage losses, which indicate a reversal effect that all passed the significance test at the 95% confidence level.

4 Conclusion

This passage discusses the findings of momentum and reversal effects observed in individual stocks and industries within the Chinese stock market, using data from 3 different momentum strategies. It was discovered that the individual stock portfolios generate profits only when J=1 and earnings decrease as J or K increases.

Furthermore, 3 strategies exhibited some degree of reversal effects, with the winner group being more affected compared to the loser group. The strongest reversal effect was observed when J=5, K=4, and a shift from reversal to momentum occurred when both J and K decreased.

According to the study, the industry-momentum effect test showed different features compared to the individual-stock-momentum test with oblique and diagonal gradient changes. This suggests that the industry portfolio experiences a momentum effect in the short term, specifically within one month, and exhibits a significant reversal effect over longer periods. However, gains and losses observed in industry portfolios are relatively smaller compared to those achieved through individual stock portfolios.

The study highlights that the Chinese stock market undergoes a significant reversal effect when analyzed over a two-month period using weekly data. However, it is important to note that the market tends to show momentum in the short term.

Even though specific results showed low significance, the evidence of numerous and regular results suggests that there is indeed a momentum and reverse effect present in China's stock market. We also discovered a potential for momentum effect if the time interval of data and duration of momentum strategies are shortened. Moving forward, further research could explore the use of shorter data intervals and limiting momentum strategies to one week, along with improved data cleaning and processing methods to increase the significance of the results.

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